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An Official Publication of the Education and Research Division of Doctors Academy

Highlight: Abstracts from the 4th International Academic and Research Conference 2014, Manchester, UK

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Introduction

The World Journal of Medical Education and Research (WJMER) (ISSN 2052-1715) is an online publication of the Doctors Academy Group of Educational Establishments. Published on a quarterly basis, the aim of the journal is to promote academia and research amongst members of the multi-disciplinary healthcare team including doctors, dentists, scientists, and students of these specialties from around the world. The principal objective of this journal is to encourage the aforementioned, from developing countries in particular, to publish their work. The journal intends to promote the healthy transfer of knowledge, opinions and expertise between those who have the benefit of cutting edge technology and those who need to innovate within their resource constraints. It is our hope that this will help to develop medical knowledge and to provide optimal clinical care in different settings. We envisage an incessant stream of information flowing along the channels that WJMER will create and that a surfeit of ideas will be gleaned from this process. We look forward to sharing these experiences with our readers in our editions. We are honoured to welcome you to WJMER.

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WELCOME

We are pleased to bring you the seventh edition of the World Journal of Medical Education and Research (WJMER). This edition, similar to the previous editions, has a fantastic spread of articles from all over the world that includes topics on functional anatomy, medical education, career options, case reports and current advances in healthcare technology. The highlight of this edition is the abstracts from the 4th International Academic and Research Conference in Manchester, UK, that was held on 2nd August 2014.

Our opening article by Dr Stephens from the School of Biosciences, Cardiff University, UK, explores the anatomy and pathophysiology behind tendinous interconnection between the flexor digitorum profundus tendon of the digits, mainly the index finger, and the flexor pollicis longus tendon in the hands of string instrument players. This very lucid article explains the reasons for the clinically interesting anomaly and discusses the 'Linburg-Comstock Syndrome'. Following this, students from the Bart's and London School of Medicine and Dentistry report about their National Undergraduate Conference in Clinical Anatomy that was intended to enhance the exposure to this subject using novel interactive teaching methods and plenary sessions from globally reputed clinical anatomists such as Professor Harold Ellis, Emeritus Professor of Anatomy and Surgery at the University of London, and Professor Vishy Mahadevan, Professor of Surgical Anatomy at the Royal College of Surgeons of England. Dr Mukhtar from Department of Community Medicine, Lahore, Pakistan, discuss the need to evaluate the teaching methods currently used in undergraduate medical student curriculum and emphasises the need to develop educational strategies that tailor to the needs and preferences of individual medical students.

Scientists from the Department of Computer Science and Engineering, Noorul Islam University, India, discuss the role of Wireless Sensor Networks in Healthcare Applications. They discuss the usefulness of biomedical sensors to monitor physiological parameters in the disabled and elderly population but accurately highlight the need for rigorous security and privacy measures in these devices. Dr Hankir and Miss Derbyshire explain the training structure of the Academic Foundation Programme and Academic Clinical Fellowship pathways. They draw on their personal experience and inform the reader the nuances of pursing an academic clinical career in the UK National Health Service. The last two articles are case reports, the first one by Mr Scrimshire and colleagues discussing the management of paediatric trauma in siblings with Pyknodysostosis, a rare autosomal recessive bone disorder characterized by osteosclerosis, short limbs and short stature. They highlight the need for healthcare professionals to be aware of this condition when dealing with multiple fractures and have it as a differential diagnosis for non-accidental injury in children. The second report about synchronous colorectal cancers by Dr Prabhu and colleagues from Kasturba Medical College, India, bring to focus the increasing prevalence of colorectal cancers in India and emphasise the need for a thorough pre-operative diagnosis in the management of colorectal malignancies.

This special issue also includes abstracts that were showcased in the 4th International Academic and Research Conference. Over 425 abstracts were submitted, which underwent several rounds of rigorous judging and the authors of the best abstracts were invited to present at the conference. Delegates had a choice of submitting their work for poster presentation or for oral presentations which were further subdivided into research, clinical work and audit categories. Prizes were awarded to the top presentations in each category by an esteemed panel of judges and, in addition, the best oral presentation across the categories was awarded the prestigious 'The Doctors Academy Award in Academia and Research' Prize. We have invited the winners of these prizes to submit their articles in full, which will be eagerly awaited in subsequent editions.

We hope that you find all the articles in this edition, which addresses a variety of topics, enlightening, stimulating and enjoyable to read.

With very best wishes,

Ms Karen Au-Yeung
Editor

Dr Ahmed Hankir
Associate Editor

Ms Laura Derbyshire
Associate Editor

Professor Stuart Enoch
Editor-in-Chief

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Review Article
DAUIN 20140050

The Anatomy and Pathogenesis of Tendinous Interconnection between Flexor Tendons in the Hands of Musicians

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Abstract

The tendinous interconnections occurring between the flexor pollicis longus (FPL) and the flexor digitorum profundus (index finger) (FDPi) (called the Linburg - Comstock syndrome) can be classified as acquired or congenital. Constant and repetitive movements in the hand of musicians can lead to inflammatory changes resulting in an increase in the Tendon Cross Sectional Area (TCSA) and, subsequently, lead to acquired tendinous interconnections. The difference in the morphology of the superficial and deep flexor tendons consequently predispose to the synovial membrane getting trapped between the individual tendon strands. In addition, the lack of differentiation of the common mesodermal mass during the foetal life may lead to the congenital tendinous interconnections. This article reviews the relevant embryology, salient anatomy and the essential pathophysiology of tendinous interconnections in the hand.

Key Words

Linburg-Comstock anomaly, tenosynovitis, peritendinuem, epitendinuem, work related musculoskeletal disorders

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Introduction

Tendinous interconnections are estimated to occur in about 20% of the general population[1]. Although string music players present with symptoms associated with tendinous interconnections and, consequently, considered to have a higher incidence, there is insufficient evidence in the literature that conclusively establishes higher incidence in this group. Studies by Miller *et al*[2]. (2003) and Karalezli *et al*[3]. corroborate the above observation.

Constant and repetitive movements involving the flexor tendons of the thumb and the fingers whilst typing, playing sports, playing string and keyboard-based instruments can result in tenosynovitis (inflammation of the outer synovial sheath that covers the tendon - tenosynovium) and tendonitis (inflammation of the tendon). This leads to an increase in the tendon cross sectional area (TCSA), which subsequently contributes to the development of tendinous interconnections[4]. These interconnections, coupled with an anatomically congested carpal tunnel at the wrist, may lead to compression of the median nerve resulting in carpal tunnel syndrome (Slater, 2001). Aside from being acquired, interconnections may also be developmental or inherited[5].

This paper looks at the pathogenesis of the tendinous interconnections in the hands of the musicians. It also analyses the embryological basis of the tendinous interconnections and the factors that predisposes to the formation of these interconnections around carpal tunnel including the morphology of the superficial and deep flexor tendons and the process of muscle differentiation.

Overview of the hand

The human hand, an intricate and prehensile part of the body, is capable of a wide range of movements involving extreme precision and exactitude. The hand is the region of the upper limb distal to the wrist joint. Its skeleton consists of carpal bones, metacarpals and phalanges. The soft tissue covering the skeleton consists of tendon and its coverings, small muscles of the hand and neurovascular structures. These structures cover (envelope) the phalanges to form the digits. The five digits consist of the laterally positioned thumb and medial to the thumb the four fingers the index, middle, ring and little fingers. The hand has a volar (anterior or palmar) and dorsal (posterior) surface.

The ability to use the hands has evolved over time, starting with primitive gestures such as grabbing objects to more precise and highly dexterous activities such as threading a needle that warrants accurate hand-eye coordination. Fine motor skills require controlled use of the small muscles of the hand, fingers and the thumb, in conjunction with forearm muscles and wrist movements. The development of these skills allows humans to undertake complex tasks such as typing, writing, buttoning, sewing, and playing certain musical instruments (such as the guitar, violin and piano).

Histology of the flexor tendons

The normal histology of the flexor tendons consists of densely packed collagen fibrils running parallel to each other. A dense connective tissue called the endotendineum separates collagen fibrils from each other. The blood vessels and nerves run through the endotendineum in a longitudinal fashion. The capillary wall is composed of lining endothelium resting on a basal lamina and sub-endothelial connective tissue. The ground substance (the extracellular space between collagen fibrils) consists of polysaccharides and extra-cellular fluid. Groups of endotendinuem may be reorganised to form larger functional units by thicker connective tissue to form the peritendineum. The group of peritendineum are surrounded by dense irregular connective tissue to form epitendineum. The nucleus of the longitudinal elongated fibroblasts lies in the widest portion of the cell and these are scattered between the collagen fibril bundles. Within these collagen fibres also lie elongated and flattened nuclei of inactive fibrolast (tendinocytes)[6].

Histology of the tenosynovium

To protect the epitendineum layer of the tendon from friction they are surrounded on the outside by two layers of flattened synovial cells of mesenchymal origin. Of these two layers, one of the layers is attached to the tendon while the other one is attached to the neighbouring structures. The space (tendon sheath space- TSS) between the two layers contains a viscous fluid that is composed of water, protein and hyaluronate[7].

Carpal tunnel anatomy:

Structures passing through the Carpal Tunnel (Contents of the Tunnel)

The carpal tunnel contains the median nerve and all the long flexor tendons to the digits and the thumb (FDP, FDS and FPL). The median nerve is the most superficial structure in the carpal tunnel[8]. The motor branch of the median nerve in hand arises from the main trunk under or just distal to flexor retinaculum, and winds around the distal border of retinaculum to reach thenar muscles (including the APB, FPB and OP) and the first two lumbricals. The sensory branches of the median nerve innervate the skin over the lateral three and 1/2 digits including the nail bed and dorsal surface of the distal phalanx (can be up to distal half of the middle phalanx)[9]. A cross section through the carpal tunnel is shown in **Figure 1**.

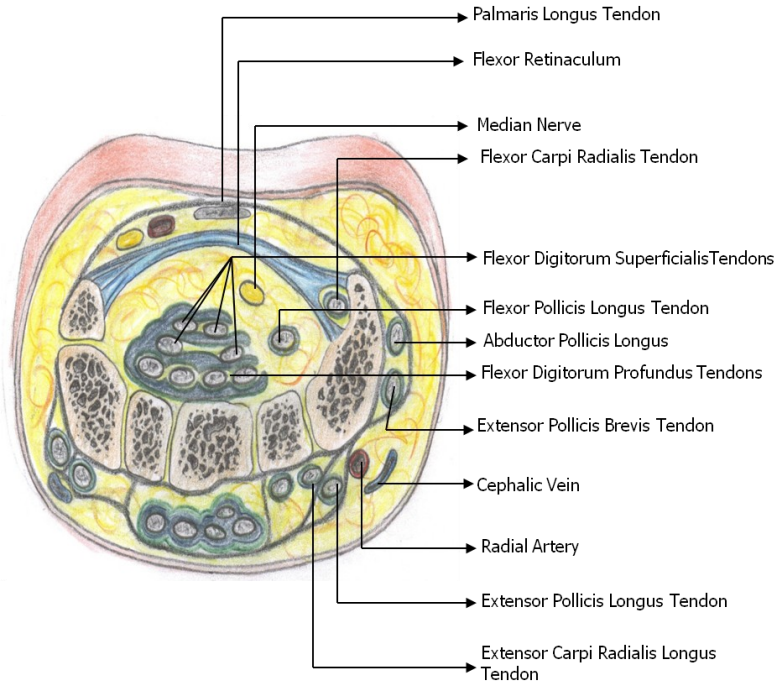

***Figure 1*:** Cross section of the carpal tunnel.

Acknowledgement: Wheat J, Satherley L, Stephens S and Enoch S. Applied Surgical Anatomy for MRCS OSCE, Doctors Academy Publication, 1st Edition, Cardiff, UK, 2009:17

Within the carpal tunnel, the alignment, shape and relationship of the median nerve to the flexor tendons varies depending on wrist movements. Using US scan, Zeiss and colleagues (1989) noted that during flexion of the wrist, the nerve lies anterior to the FDS (index) tendon and during extension the nerve became interposed between the superficial flexor tendons of the index finger and FPL of the thumb or between the FDS of the middle and ring fingers. It was also noted that the area of the nerve changed with wrist movements. During flexion the nerve flattened antero-posteriorly whilst it became rounded during extension.

There is an inverse relation between the width and the thickness of the median nerve as it passes through the carpal tunnel. As the width increase from an average of 6.1 mm (at the middle portion of the tunnel) to 7.7 mm (at the exit of the tunnel), the thickness of the nerve decreases from an average of 2.1 mm (at the middle portion of the tunnel) to 1.9 mm (at the exit of the tunnel)[10]. Thus the median nerve flattens during its course through the carpal tunnel. This may be to easily pass through the tunnel and to accommodate the accompanying flexor tendons[11]. Similar findings have also been established using US scan by Buchberger and colleagues in 1991. The increase in the area of the nerve is due to increased density of the intraneural connective tissue especially within the epineurial layers[12]. There is also an increase in the thickness of the arteriole wall and the venules due to endo proliferation[13]. This change to the vessel wall is regarded as an adjunct protective feature that opposes increased intra-tunnel pressure during wrist movements and reduces the chances of vascular collapse[12].

Structural changes in the Carpal Tunnel during wrist movements

Movements such as normal flexion and extension of the wrist and fingers affect the width and dynamic pressure within the carpal tunnel. Flexing the wrist causes the flexor retinaculum to move closer to the radius which considerably decreases the cross section of the proximal opening of the tunnel and also the distal end of the capitate moves into the opening. In extreme extension the lunate constricts the passage as it is pressed toward the interior of the tunnel.

During ulnar deviation of the wrist, the triquetrum glides distally across the hamate. This movement causes the triquetrum to move into extension resulting in reduced height of the ulnar aspect of the wrist. In addition, during this movement, the hamate approaches the ulnar styloid and the lunate rotates antero-medially along with it into extension. During radial deviation, the distal row of carpal bones migrate radially whilst the proximal row, mainly the scaphoid and lunate, move towards the ulnar styloid. The capitate along with trapezoid moves more towards the radial styloid in relation to the scaphoid and lunate movements[14].

During forceful flexion of the fingers (such as when making a fist), the lumbrical muscles migrate proximally into the carpal tunnel and increase the pressure within the carpal tunnel from about 2.5 mmHg to 31 mmHg at the most constricted part of the tunnel (at the level of hook of hamate)[15]. The cross sectional area (CSA) of the carpal tunnel is found to increase during flexion of the wrist. This is to accommodate the lumbrical muscles that move into the carpal tunnel during flexion. This adjustment causes overall reduction in the space within the carpal tunnel and may result in compression of the median nerve (carpal tunnel syndrome is discussed later in this chapter). The other adjustments that occur during flexion of the wrist include compression of the fat, flattening and displacement of the median nerve, and pressure on the superficial and deep flexor tendons[16]. During wrist extension, the cross-sectional area of the carpal tunnel increases at the level of the hook of hamate thus decreasing the pressure within the tunnel[17].

Essential embryology

Upper limb

In humans, the upper limb develops by the end of the first month of intrauterine life. At this stage, the limb bud appears as a mesenchymal core (which is a type of undifferentiated loose connective tissue derived mostly from the mesoderm - one of the three primary germ cell layer) covered by a thin layer of epithelium[18]. The hands and the fingers are well developed by the end of second month of intrauterine life. The differentiation of the tendons at the end of muscle belly begins between the seventh and eighth week[19]. Limb fibroblasts and tenoblasts (tendon cells) primarily originate from the somatopleura, which is formed from the outer layer of the lateral plate mesoderm found at the periphery of the embryo[20].

Development of flexor tendons and pulleys

Limb muscles are formed by myogenic precursor cells that migrate into the limb buds and differentiate into myoblasts. The myogenic precursor cells are derived from the dorsolateral muscle-forming region of the somites (which are bilaterally paired segments of mesoderm that are arranged along the anterior-posterior axis of the developing embryo)[21]. In humans, they migrate into the limb buds during the fourth week of development. Following migration of the mesodermal cells into the limbs, the axons of the

nerve from the corresponding rami of the spinal cord follow them proximally to distally[22]. These mesodermal cells unite into two common muscle masses which later splits to form the extensor and flexor compartment respectively. The myoblasts hypertrophy and fuse into myotubules; every muscle is recognizable by seven weeks.

Shellswell and Wolpert[23] (in 1977) demonstrated that tendons (which are somatopleuric in origin) develop independent of the muscle bellies. The tendinous and muscle blastemae (the formative, undifferentiated material from which muscles and tendons develop) start to develop separately from one another and join up secondarily. In chick embryo study, it has been found that the tendons start to develop earlier and anterior to the future forearm muscles, despite the absence of these muscles. However, for their maintenance and further development the tendons require connection to at least one muscle belly or the whole muscle group. Further to this observation, experiments by Kieny and Chevallier[20] (1979) demonstrated that if the dorso-ventral axis of the limb were to be inverted the tendons developed normally but joined with the wrong muscles *i.e.,* ventral tendons matched with dorsal muscle group and vice versa. This establishes that the attachment to a muscle is necessary for the further development of the tendon. The pulley system is recognised by week nine as condensing mesenchyme. The pulleys are well-developed by the 12th week of intra-uterine life and are identifiable around the flexor tendon in positions similar to that found in the adult hand[24].

Work Related Musculoskeletal Disorders (WRMD)

Musculoskeletal problems are considered significant health factors for performing artists, especially instrumentalists. Use of the hand in continuous and repeated activities such as typing, playing string- or key-based musical instruments places an increased degree of stress and strain on the soft tissue structures including the tendons. In the long-term, this can lead to reduced functional efficiency of the involved digits and/or the hand, resulting in inability to perform the task that requires a very high degree of dexterity. The symptoms of this condition include pain, weakness of the hand, tingling and stiffness[26], which might be related to the tendonitis, tenosynovitis or carpal tunnel syndrome. Common playing-related musculoskeletal disorders (PRMDs) of musicians include overuse problems, such as tendonitis, and peripheral nerve entrapment syndromes[27].

In musicians, repetitive movements at the wrist such as flexion, extension, radial and ulnar deviation of the wrist may cause tenosynovitis of the long flexor tendons, which in the long-term contribute to the formation of tendinous interconnections mainly within the carpal tunnel[28]. These interconnections can either be fine tendinous linkages or strong adherent sheets of tenosynovium, both of which may be very resistant to stretch. Tenosynovium helps with the smooth gliding of the tendon with the least amount of friction. Interconnections at the level of tenosynovium act as adhesions that prevent movements of the tendon and causes tension during finger movements. Whilst playing a musical instrument, these may become the potential sites for pain and inflammation[29]. The postulated pathophysiology for development of tendinous interconnection is discussed in detail in subsequent sections.

The risk factors that have been identified for PRMD include the type of instrument that the musician frequently plays, their gender, age, duration and intensity of playing, and individual physical characteristics such as the hand size[30]. Abréu-Ramos and colleagues[32] (2007) demonstrated that PRMD is more common in adult musicians (mean age: 22-29 years) than in adolescents as this age group played the musical instrument for longer hours and with fewer breaks in between playing (28.7 hours/week). Similarly, in 1992, Pratt and colleagues identified that the prevalence of PRMD was approximately 39% to 47% in adults compared to 17% in secondary school music students. They also found that PRMD is more common in female string- and keyboard players compared to their male counterparts. Some of the proposed theories concerning the difference are smaller hand size along with decreased arm strength and more flexibility and joint laxity of the hand in females. However, these theories have not been investigated sufficiently to derive concrete conclusions[31]. There is strong evidence to suggest that the musicians who play an instrument for more than four hours a day and more than 60 minutes without a break are more prone to clinical signs and symptoms of PRMD[33].

Prevention of PRMDs includes recognition of both internal (e.g., musicians strength and flexibility of the musician's body) and external factors involved (e.g., anatomical and functional position whilst playing an instrument, instrument size and techniques of holding the instrument involved); that is, the interface between the musicians, their instruments and the playing environment (e.g., rest breaks or hours of practice)[35].

Common types of tendinous interconnections in musicians

In 1979, Richard Linburg and Brian Comstock

identified an anomalous interconnection between the FPL and FDP of index finger at the level of carpal tunnel that restricted independent flexion of these digits (as seen in **Figure 2**). The patient presented with pain in the distal forearm. Now popularly known as the ***Linburg-Comstock anomaly,*** it is characterised by simultaneous flexion of the distal IP joint of the index finger with flexion of the IP joint of the thumb and the inability to actively flex the IP joint of the thumb without simultaneously flexing the distal IP joint of the index finger (as seen in **Figure 3**)[36]. Linburg-Comstock syndrome causes functional impediment in musicians[37] by reducing the independent movement of the FDP (index) when the thumb is flexed[38]. The presence of these interconnection and similar anomalies have been subsequently identified and reiterated by a number of studies both amongst musicians and non-musicians[39].

Any movement against interconnection causes pain (usually of tearing in nature) on the palmar aspect of the hand, radial side of the wrist or in the distal part (mainly the distal one-thirds) of the forearm[2]. These interconnections have been identified just proximal to the radiocarpal joint or the distal forearm[37].

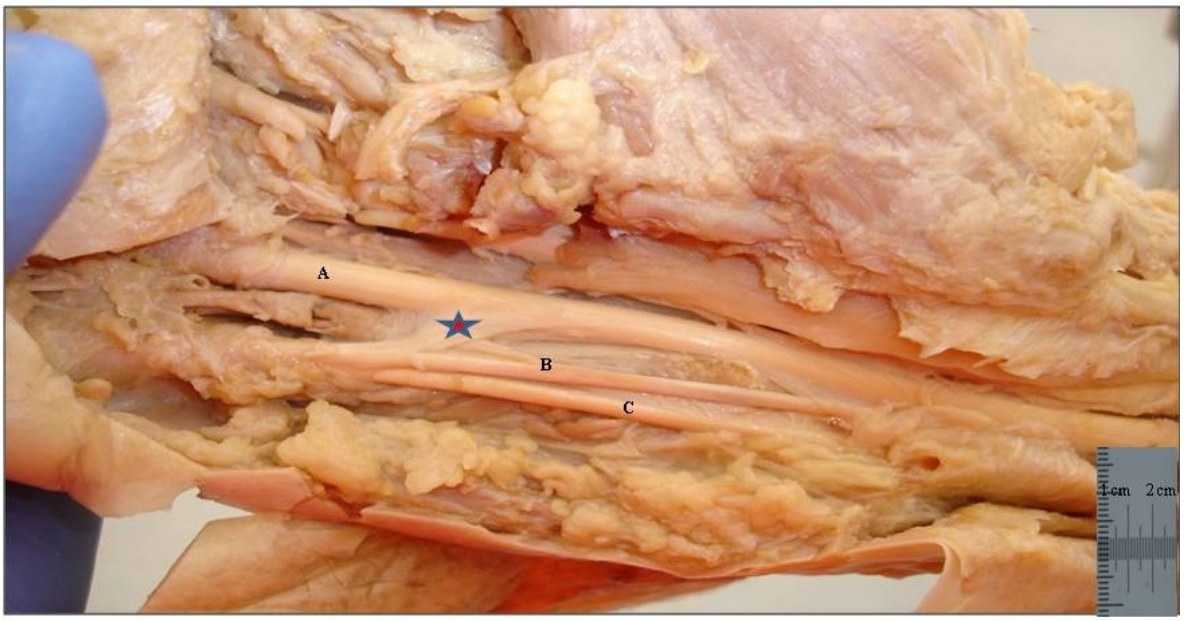

Figure 2 **:** Demonstrating a tenosynovial interconnection (★) between the Flexor Digitorum Superficialis (ring finger) (A) and Flexor Digitorum Superficialis (little finger) (B). Also seen is Flexor Digitorum Profundus (little finger) (C).

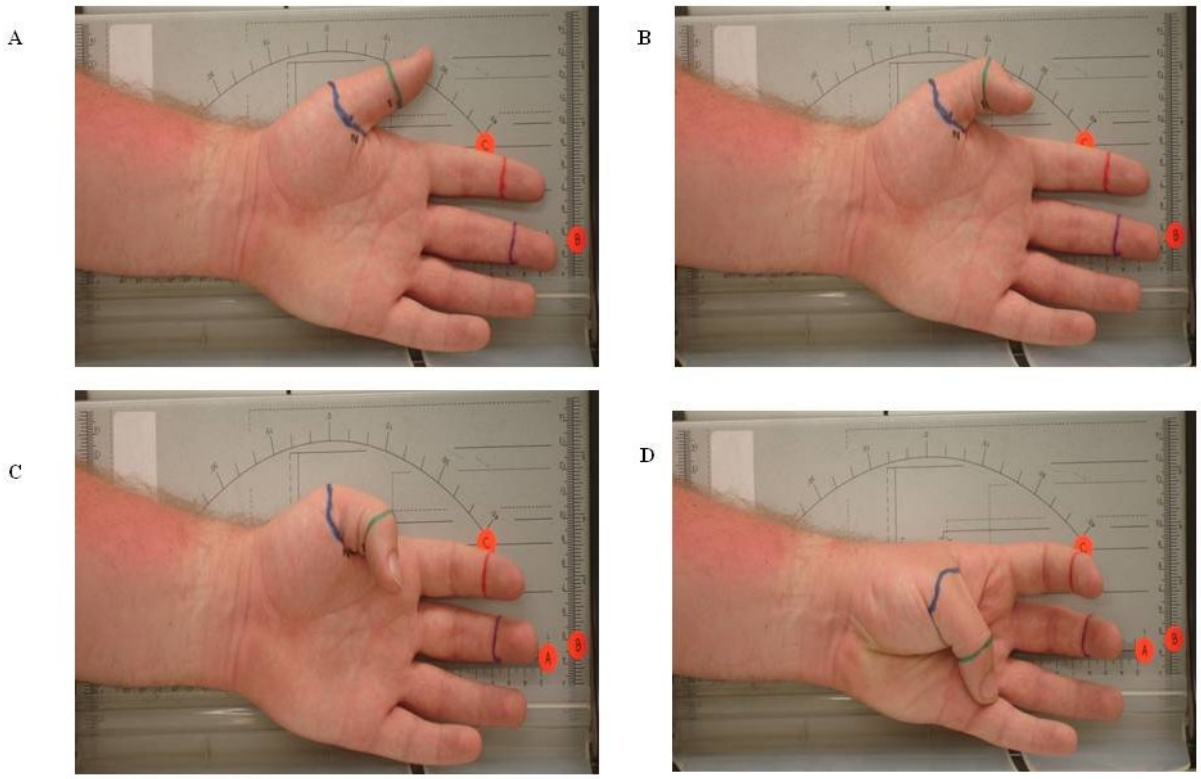

***Figure 3*:** Demonstrating the angle of flexion of the thumb and the dependent fingers (A) at rest, (B) initial movement, (C) mid position and (D) fully flexed at mid prone position of volunteer.

Miller and colleagues[2, 35] (2002 and 2003) have classified the manifestations of FPL and FDP interconnections. This classification is based on the level of the interconnection and the degree of mechanical impediment. These are: (1) synkinesis (involuntary movement of hand or muscles associated with a voluntary movement) (2) synkinesis and positive Linburg-Comstock test results (i.e., pain and discomfort during flexion of the thumb to the base of the little finger while the index finger is held in extension by the examiner), and (3) pain and deformity following continuous use. They also observed that amongst string players, the symptoms were more prevalent in the left hand and this tended to decrease from the radial to the ulnar side of the hand. This is due to the fact that the left hand is involved in free finger and thumb movements when playing bowed or string instruments. The static thumb posture with active finger movements, as in string instrument players, leading to tenosynovitis over time has been suggested to lead to this anomalous interconnection[2].

Discussion

The recognised concept of a synovial sheath (tenosynovium) is that of a two-layered structure surrounding the tendon with the presence of lubricating fluid between these layers. The inner layer holds on to the tendon, and is attached by areolar tissue to the outer layer that adheres to the surroundings. These layers slide relative to each other and the loose connective tissue sandwiched between them is stretched only with larger than physiological tendon displacements. The purpose of the sheaths is to reduce friction of the tendons relative to the environment or other tendons, and they are constructed in a manner that allows nerves and vessels to reach the tendons undamaged. However, within the carpal tunnel, the synovial sheaths comprise many layers of thin membranes (in contrast to the 'classical' two layered tendon sheaths arrangement (e.g., in the digits), the synovial mass in the carpal region will be referred to here as 'synovial membranes'[39]. These membranes enclose all flexor tendons (FDS, FDP and FPL) collectively as well as the individual tendons. Synovial membranes, in general, do not adhere to the superficial tendons, except sometimes in the case of those of the little finger as numerous thin tendon strands[39]. However, within the carpal tunnel they often adhere strongly to the deep flexor tendons. When they are attached to two adjacent tendons, they may form interconnections.

There are differences in the morphology of the superficial and deep flexor tendons. The superficial flexor tendons have tightly packed tendon strands

giving it a round and smooth appearance, while the deep flexor tendons (especially, the three on the ulnar side) are a collection of loosely packed tendon strands **(seen in figure 4).** However, distal to the distal border of the flexor retinaculum where the lumbrical muscles originate, the deep flexor tendons assume a round and smooth appearance. In the carpal tunnel where the deep flexor tendons are loosely packed tendon strands, the synovial membrane gets trapped between the individual tendon strands predisposing to the formation of interconnections[39]**.** The interconnection between the tendons of FPL and FDP (index) might be due to the anatomic proximity coupled with the large mean PCSA of the FDP tendons. In addition, although the FPL and FDP tendons are independent of each other, due to the common mesodermal mass from which these tendons are derived, the interconnection could occur as a congenial anomaly. These tendinous interconnections together with adhesive synovial membranes may provide strength to resist the *in vivo* forces that generate the opposite displacements of the connected tendons[39].

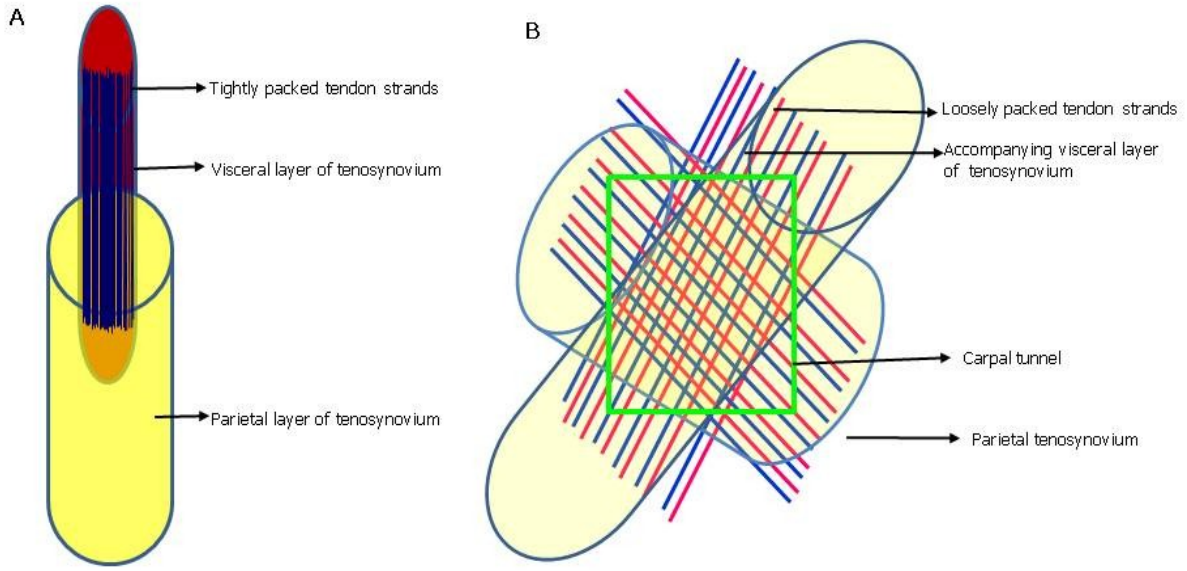

***Figure 4*:** Illustrates the normal arrangement of the tendon strands of FDS and FDP tendons at carpal tunnel. **A:** The FDS tendon strands are tightly packed and better organised than the FDP tendons. **B:** The FDP tendon strands are loosely packed. The visceral layer of the tenosynovium recognises each tendon strand to be a tendon and wrap around them. At the carpal tunnel, there is criss crossing of these tendon strands and their accompanying visceral tenosynovium.

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Report
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The First National Undergraduate Conference for Clinical Anatomy (NUCCA)

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Abstract

A clinician must have a satisfactory understanding of anatomy in order to safely practice at a competent and effective level. In recent years, there is a current perception of declining emphasis being put on undergraduate anatomy teaching amongst universities in the UK. To address this perception, the first National Undergraduate Conference for Clinical Anatomy (NUCCA) was held in London 2013.

Key Words

NUCCA, Undergraduate Conference, Clinical Anatomy, Barts Anatomical Society

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Introduction

The majority of anatomy teaching required for satisfactory clinical practice is taught during medical school training. However, with novel teaching methods such as problem-based learning (PBL) replacing the number of lectures and the use of dissection in anatomy education[1], there is a current perception of declining emphasis being put on anatomy at the undergraduate level[2]. This is especially becoming a concern with anatomy being examined much more thoroughly in postgraduate exams such as the intercollegiate membership exams[3]. There is a concern among clinicians that there is a discrepancy amongst the anatomical knowledge of recent graduates, with variable knowledge depending upon the medical school of graduation. Furthermore, we identified a significant lack of platforms available for medical students to present their research relating to clinical, surgical or radiological anatomy. Thus, in the hope of raising attention and enthusiasm on clinical anatomy in undergraduate medical students, the first national undergraduate anatomy conference was organised. The purpose of the conference was to highlight the relevance of anatomy in clinical practice and research, and its significance throughout training. The committee also hoped to broaden the student perception of anatomy, which is often confined to a very basic understanding, taught in the first two years of medical school, often by non-clinicians[3].

Overview of NUCCA

On Saturday 28th September 2013, The National Undergraduate Conference for Clinical Anatomy (NUCCA) was held, for the first time, at the Robin Brook Centre, St. Bartholomew's Hospital, the oldest hospital in Europe. The conference was organized by Barts and The London Student Anatomical Society, in association with Doctor's Academy, an international consortium of Doctors, Dentists and Scientists. The conference consisted of delegates from eighteen medical schools around the United Kingdom alongside renowned clinical anatomists and surgeons. The day consisted of three keynote lectures, student poster presentations and an afternoon of workshops.

Keynote Lectures

Following a brief welcome from Barts and The London Anatomical Society, **Dr. Catherine Molyneux**, Director of Anatomical Studies at Barts and The London and the Patron for NUCCA 2013, welcomed delegates and gave an enticing overview of Clinical Anatomy and the evolution of anatomy teaching throughout the ages.

Our morning was graced with a series of engaging keynote speakers. The first was **Mr. Robert Whitaker**, a retired paediatric urological surgeon, and is the renowned author of Instant Anatomy book and website www.instantanatomy.net. During

his talk entitled "Anatomical Illustration", Mr. Whitaker shared with us his long experience of teaching anatomy and illustration, and provided students with invaluable advice on how to improve illustration skills (as is useful in documenting details of procedures performed in clinical practice).

The second keynote lecture was by none other that **Professor Harold Ellis**, Emeritus Professor of Anatomy and Surgery at the University of London. In his much anticipated lecture, entitled "A lifetime of learning, using and teaching anatomy", Prof. Ellis described how anatomy has maintained its relevance to surgical practice as disease evolves and newer procedures are introduced into clinical practice. He, therefore, emphasized the significance of having strong links between the operating theatre and the dissecting room.

The final keynote speech was by **Professor Vishy Mahadevan**, Professor of Surgical Anatomy at the Royal College of Surgeons of England, who is more famous as the Funky Anatomy Professor. Prof. Mahadevan gave delegates an insight into the evolution of surgical practice with his lecture entitled "From Barber Surgeons to Robots". His

Figure 1: left - Prof. Harold Ellis; middle – Mr. Robert Whitaker; right – Prof. Vishy Mahadevan

Figure 2: Afternoon anatomy workshops

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unique and flamboyant teaching style captured the audience's attention and the importance of appreciating the works of early anatomists such as Andreas Vesalius (1514–1564).

Workshops

The delegates were divided into three groups in the afternoon and rotated through the three workshops. The first workshop was "**Anatomy as Applied to Trauma and Emergency Medicine**", run by faculty from Doctor's Academy. The other two workshops: "**Pathologies of the Thorax**" and "**Applied Anatomy of the Head and Neck**" were run by our guest speakers Prof. Harold Ellis and Prof. Vishy Mahadevan, respectively. These interactive workshops engaged with students through their existing knowledge and also included relevant surface anatomy. The delegates received an opportunity to learn selected components of clinical anatomy from experts in the field, unusual to that of the traditional lecture or dissection-based learning.

Poster Competition

A poster competition on the theme of clinically orientated dissection or projects related to medicine, surgery or radiology was also held during the conference. Prior to the conference, submitted abstracts by students from across the UK were reviewed by an expert panel, and the best twenty-two were invited to present their poster at NUCCA. Guest speakers were impressed with the high quality of all the presentations, and upon much discussion, winners of the poster competition winners was decided.

- 1st Place: **Amy Campbell** from University of Glasgow for her poster presentation entitled, **'Neurovasculature of High and Low Tie Ligation of the Inferior Mesenteric Artery'**
- 2nd Place**: Nikita Joji** from University of Birmingham or her poster presentation entitled, **'Anterolateral Leg: A Single Cadaveric Study on Duplicate Veins & Variant Nerves'**
- 3rd Place: **Meerwais Tokhi** from University of Leeds for his poster presentation entitled, **'Carotid Artery Geometry and Stroke'**

Prof. Vishy Mahadevan presented the winners with their certificates and prizes.

Feedback

The conference had a total of 75 delegates from over eighteen UK medical schools, 59% were in clinical years of study, 9% doing an intercalated Bachelors of Science degree (BSc) and 32% in preclinical studies. Many of the attending delegates had or were undertaking a BSc in anatomy-related subjects. During the conference, delegates were asked to complete a questionnaire exploring students' motivation to attend such conferences and

Figure 3: Poster competition

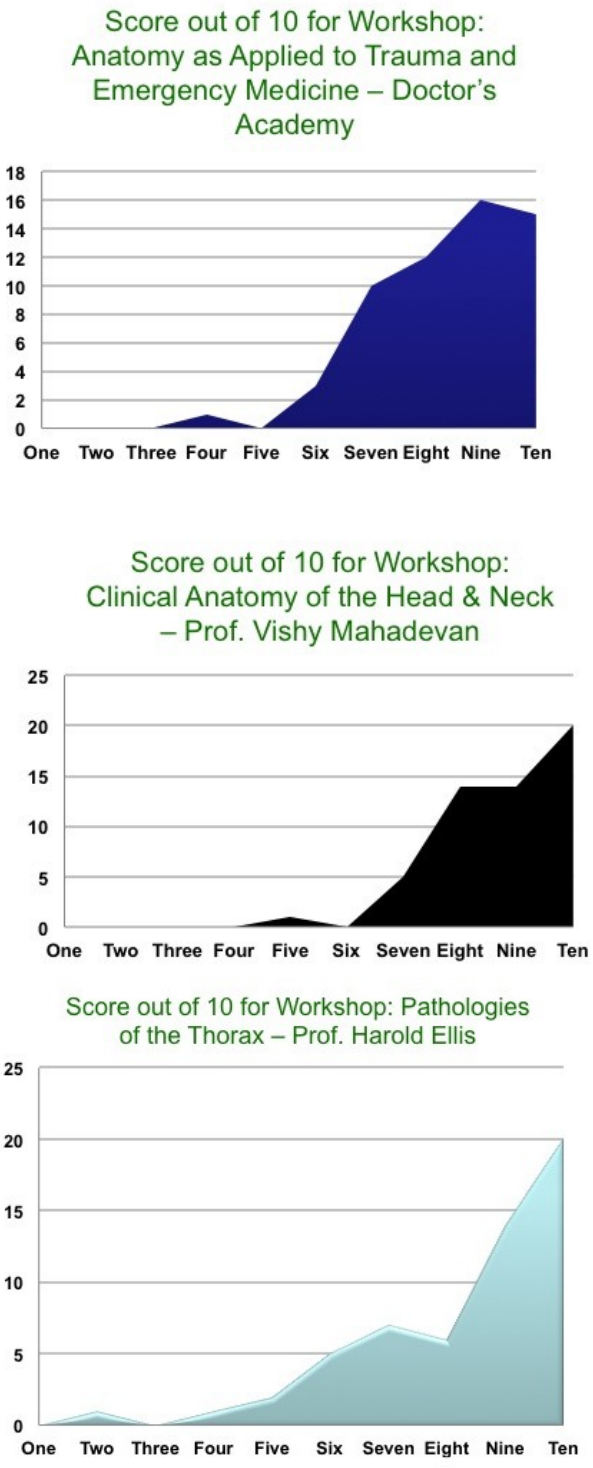

Figure 4: breakdown of satisfaction score for afternoon workshops

feedback on whether NUCCA added to their existing knowledge or changed the delegate's perception of anatomy in clinical medicine. The feedback for NUCCA was overwhelmingly positive with over 70% of delegates giving an overall experience score of 8/10. Delegates were asked how much the conference added to their existing knowledge, upon which 60% gave a rating of 6/10 or above. All the keynote lectures were received with great enthusiasm and 80% of delegates rated the keynote lectures above 8/10 on a mean rating scale score. Furthermore, more than 75% of delegates rated the workshops above 7/10 (Figure 4), indicating that the majority of students were extremely satisfied, especially since 60% also added positive comments reflecting upon the valuable knowledge they had gained. Having received such positive feedback and commendation from the host medical school, NUCCA has started its preparations for the 2014 conference. A new committee is currently being formed with the previous committee acting as senior advisors. Further to the existing components of the conference, we hope to introduce prosection-based teaching and anatomy illustration workshops.

Acknowledgements

The NUCCA committee would like to thank Dr. Catherine Molyneux for her support in organizing NUCCA 2013 and all of the sponsors who made the running of the conference possible. We would also like to thank Doctor's Academy for their invaluable support as well as InstantAnatomy.net and FunkyProfessor.com for assisting with the poster competition prizes.

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Research
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Use of Mixed Teaching Modality: Pakistani Medical Students Perspective

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Abstract

Background: A medical teacher needs to use a variety of teaching methods, which cater to the discrete learning styles of the students and ensure the efficient transfer of knowledge from the teacher to the learner. This study was conducted to determine the preferences of medical students for mixed teaching modality.

Methods: A mixed teaching method comprising of interactive lectures, class presentations and quiz was used to teach the topic of non-communicable diseases (NCD's) to the 4th year medical students at the Lahore Medical & Dental College, Lahore.

Result: Majority of students were satisfied with the mixed teaching modality (73%) and more than half the class reported that the course ensured participation of the majority of the class (87%) and it actively involved the students (71%).

Conclusion: Student preferences regarding other subjects and courses taught to undergraduate medical students in different years of their medical schooling needs to be evaluated. Future research needs to address the gender differences in student preferences, and the academic performance of students taught using this method.

Key Words

Mixed teaching modality, interactive lectures, quiz, teaching methods, students' perception

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Introduction

A paradigm shift has been observed in the field of medical education from a teacher centered or didactic to a student centered or interactive form of teaching. The traditional blackboard teaching is being replaced by newer methods involving the use of power point, group discussions, skills laboratory and role playing.[1,2] This transition from the behaviorist theory of learning to the cognitive and constructivist theories was required for the development of meaningful learning and takes into account strategies that help students in comprehension and attachment of meaning to the learning process.[3] These strategies incorporate instructional methods that are interactive, student oriented and inculcate self-learning, critical thinking and problem solving skills in the learner. All these foster internal motivation in the learner, which is important for deep learning.[4,5]

In addition, medical educators need to keep in view the learning styles of the students. Learning styles has been defined as the "cognitive, affective, and physiological traits that are relatively stable indicators of how learners perceive, interact with and respond to the learning environment".[6] Learning styles pertain to an individual's personality and environmental factors. An individual can have more than one type of learning style. Psychologists and educators have highlighted many learning styles in literature[7,8] such as active, visual, intuitive, reflective, sensing and verbal learners. In order to be an effective and efficient medical teacher it is imperative to keep in perspective the various learning styles of the students and amend one's teaching and incorporate new teaching methods to ensure the efficient transfer of knowledge from the teacher to the student. However, in reality this is not so simple, as every student has his individual learning style; a teaching method that maybe beneficial for one student might not be for the other student.[9] It is, therefore, important for courses to be designed to take into account the learning styles of the majority of medical students,

incorporating a range of teaching methods to create a better learning environment.[10] This particular study was undertaken to determine the preferences of medical students for mixed teaching modality.

Methods

This descriptive cross-sectional study was conducted among the 4th year medical students of Lahore Medical & Dental College, Lahore, Pakistan in March 2013.

The medical curriculum prepared by the Pakistan Medical & Dental Council and the Higher Education Commission includes the subject of Community Medicine in the Third Professional Examination. The curriculum specifies the contents to be covered under the subject of Community Medicine. One of its modules "Epidemiology, control and prevention of non-infectious diseases of public health importance", commonly referred to as non-communicable diseases (NCD's) covers the diseases hypertension, coronary heart disease, cancers, injuries, diabetes mellitus, obesity, acute rheumatic fever and heart disease.

This study incorporated a mixed teaching modality to teach NCD's to the 4th year medical students. This teaching method was unique, as it hadn't been used previously. The same topic was taught the previous year using interactive lectures only. The teaching methods used were interactive lectures, class presentations and a quiz. The faculty member took the interactive lectures on the salient features of NCD's and the principles of their prevention and control. The 4th year students gave the class presentations. The simple random method was used to select eight students from the class, who were allocated different topics such as hypertension, heart disease, cancers to present to the rest of the class. The students used power-point slides or overhead projector as a mode of presentation based on their personal preference. At the end of the NCD course a class quiz was conducted in which the class was divided into two teams, team A and team B and the quiz questions prepared by the faculty member including multiple choice questions (MCQ's) and short answer questions were asked. The team, which won the quiz was rewarded by a treat which included a drink and a snack.

All the 4th year students were involved in the study. Data was collected using a pretested questionnaire, having both open and closed ended questions. The questions inquired about the students' satisfaction with the mixed teaching modality, their perceptions about the outcome of the course and their reasons for liking or disliking the teaching methodology used to teach NCD's. In the end students were asked to give their suggestions regarding this teaching modality.

The purpose of data collection was explained before obtaining informed consent from the students. Confidentiality and anonymity was ensured.

The data was entered into the statistical package for social sciences (SPSS) version 16.00 for analysis. Descriptive statistics were computed and presented in the form of tables and figures. The perceived outcome of the course by the students was analyzed using a 5 point Likert Scale, where 5= much more than most courses and 1= much less than most courses.

Results

The entire 4th year MBBS class of 103 students were involved in the study. The majority were females 65 (63%) and only 38 (37%) were males. The age range was from 18 to 25, with the bulk (69%) of students falling between the age category of 20-22. Apart from a single student falling below this age group, the remainder (30%) were above the age of 22. The student satisfaction rate with the mixed teaching modality was 75(73%) students, while 28 (27%) reported not being satisfied with this teaching method. (Figure 1)

The students' perceptions regarding the outcome of the NCD course taught using mixed teaching modality was analyzed on a 5-point Likert Scale, in which 5 = much more than most courses, 4= more than most courses, 3= about the same as other courses, 2= less than most courses, 1= much less than most courses and 0= not applicable. Eighty-nine students (87%) reported this teaching method ensured the participation of the majority of the

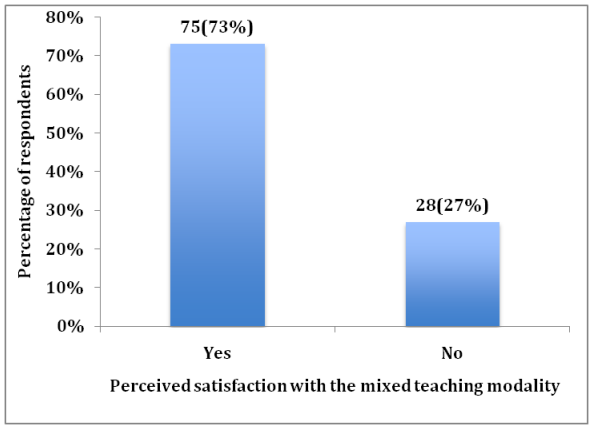

Figure 1: Perceived satisfaction of students with the mixed teaching modality

class, seventy-three students (71%) stated the course actively involved the students, and seventy-two students claimed the course helped to develop communication skills. Furthermore, sixty-seven students (65%) thought this teaching method made effective use of time (Table 1).

Perceptions regarding the course outcome	*Much more than most courses 5*	*More than most courses 4*	*About the same as others 3*	*Less than most courses 2*	*Much less than most courses 1*	*Mean ± SD*
My learning increased in this course	10 (10%)	47 (46%)	39 (38%)	6 (6%)	1 (1%)	3.5 ± 0.78
My interest in the subject area has increased	7 (7%)	50 (48%)	36 (35%)	9 (9%)	1 (1%)	3.5 ± 0.79
This course helped me to think independently about the subject matter	7 (7%)	42 (41%)	50 (48%)	4 (4%)	0 (0%)	3.5 ± 0.68
This course actively involved me in what I was learning	22 (21%)	51 (50%)	26 (25%)	3 (3%)	1 (1%)	3.8 ± 0.81
This course made effective use of time	19 (18%)	48 (47%)	28 (27%)	6 (6%)	2 (2%)	3.7 ± 0.89
This course helped teach difficult concepts	7 (7%)	37 (36%)	50 (48%)	6 (6%)	3 (3%)	3.3 ± 0.81
This course ensured participation of the majority of the class	40 (39%)	49 (48%)	10 (10%)	1 (1%)	3 (3%)	4.1 ± 0.87
This course helped develop communication skills	24 (23%)	48 (47%)	26 (25%)	5 (5%)	0 (0%)	3.8 ± 0.82
This course will help us in achieving better grades	12 (12%)	46 (45%)	39 (38%)	5 (5%)	1 (1%)	3.6 ± 0.79
This course helped develop group dynamics	14 (14%)	50 (49%)	34 (33%)	3 (3%)	2 (2%)	3.6 ± 0.81
We studied and put effort into the course	9 (9%)	42 (41%)	46 (45%)	6 (6%)	0 (0%)	3.5 ± 0.73
We came prepared for each class	8 (8%)	30 (30%)	49 (48%)	12 (12%)	4 (4%)	3.2 ± 0.90
We were challenged by this course	12 (12%)	41 (40%)	39 (38%)	9 (9%)	2 (2%)	3.5 ± 0.88
We found the course interesting	23 (22%)	38 (37%)	32 (31%)	9 (9%)	1 (1%)	3.7 ± 0.94

Table 1: Students' perceptions regarding the NCD course outcome taught using mixed teaching modality

The students were asked to identify their reasons for liking and disliking the mixed teaching modality, and the open-ended responses of the respondents are shown in table no. 2.

Reasons for liking the mixed teaching modality
"It ensured active participation of all the students"
"The combination of methodologies helped better understand the topic"
"Better use of time and clarification of concepts"
"Change is always good, a good change from conservative method of teaching"
"boosts confidence"
"Communication skills increased, all methods complement each other"
"developed interest, basic concepts taught by teacher, students put effort in class presentations"
"Equal chance for every student to participate'
"Everybody participated, improved communication skills and ensured active learning
"Exciting, competitive and helped to understand the format of university questions"
"Interactive learning, active participation of all"
"Instead of sitting we were made to study effectively by this method"
"Involvement of whole class, not boring, exciting"
"It captured my interest, I found myself listening more attentively"
"Most interesting and beneficial way, it made us think, learn and prepare"
"Quiz was the best"
"Whole class was involved even the hesitant students"
"Topic was made interesting"
"Really very innovative and interesting as compared to boring lectures"
"Quiz helps in preparation of tests"
Reasons for disliking the mixed teaching modality
"A small number of students failed to participate"
"Class presentations didn't help, students were shy and just read off the slides"
"Only the students presenting had prepared the topic"
"Preparation of presentations is time consuming and difficult when we have tests"
"Some students didn't feel comfortable presenting"
"Some students are shy and reluctant to present"
"Teacher can deliver a topic better than students"
"Selection of students for presentations should be voluntary and not through lottery method"

Table 2: Students reasons for liking and disliking the mixed teaching modality.

Respondents were requested to give their suggestions regarding the mixed teaching method, and the following suggestions were drawn:
"All other topics should be taught this way "
"The number of quiz groups should be increased"
"I would want all departments to use this teaching methodology"
"Quiz should be regularly conducted, instead of tests"
"First time had a quiz, should be conducted for other topics aswell"

Discussion

The paradigm shift that is seen in medical education has introduced a myriad of ways in which medicine is taught and learnt.[11] Many researchers have tried to discern learning styles of students, as claims have been made that students are able to perform better if their learning styles matched the teaching style used to teach them.[12] This was expressed by Dunn and colleagues: "We can no longer afford to assume that all students will learn through whichever strategy the teacher prefer to use".[13] However, it is difficult to cater to individual learning styles of medical students. In addition learning styles of students do not remain constant; they keep changing.

Thus a teaching modality employing various methods to teach one course of NCD's was used in this study. A predominant number of students were satisfied with the mixed teaching modality. According to our research, the majority of students preferred multimodal learning in contrast to unimodal learning, which emphasizes the use of multiple teaching methods by medical faculty.[14] A greater number of first year medical students at the School of Medicine, Detroit preferred multiple modes of information presentation as compared to using one method only.[15] The review of literature conducted by Cavanagh et al also shows that the use of multiple approaches for teaching purpose is promoted.[16] However, conflicting views also exist and although the use of multiple teaching approaches taking account of individual learning preferences is prudent but it isn't found to be always beneficial.[17]

Researchers have conducted studies on students' preferences and attitudes for various teaching methods. Students of Lahore Medical & Dental College, Lahore preferred skills laboratory followed by interactive lectures for the teaching of both basic and clinical science subjects[2]. Shah et al have documented students favoring media sites (videotaped lectures, available online) as compared to live lectures.[9] Studies have investigated students' views for individual teaching modalities, such as lectures, problem based learning, team based learning and demonstrations but literature review was unable to identify a study conducted on students opinion regarding the use of a combination of teaching modalities to teach one course. The mixed modality used in the study was perceived by the students to increase their participation, involve them actively in the course and improve their communication skills.

The medical classroom consists of students having different learning styles, and in order to make the teaching and learning experience meaningful it is important to use a variety of teaching methods.[18] All this can be achieved by being more aware of our students' preferences which will increase the likelihood of providing an effective learning experience and environment.[19] Teaching students in their preferred method leads to increased level of satisfaction among them

Conclusion

The major limitation of this study is that its findings are generated from a single medical school and cannot be generalized to other medical schools. Similar studies performed across different medical schools across different subjects and different years of college should be the next step forward. Future research needs to address the gender differences in student preferences, and the academic performance of students taught using this method.

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Research
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Wireless Sensor Networks in Health Care Applications

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Abstract
The objective of this work is to focus on health-related applications of wireless sensor network and to enhance the performance of the sensor networks by considering security and privacy as important metrics. There is a rapid need to provide constant care and support to the disabled and elderly which has become the foremost challenge of the scientific community. Dependence is a situation in which a person needs important assistance from others to perform their daily activities such as essential mobility, object and people recognition or domestic tasks. The significance of developing new ways for providing care and support for the elderly is underscored by this trend, and the creation of secure and adaptable environment for monitoring become vital. In this review, various healthcare applications using wireless sensor networks are studied. This study reveals that security and privacy are important measures for sensor networks.

Key Words
Wireless medical sensor networks; Intra Ocular Pressure; Personal Digital Assistance; Triaxial accelerometer; intraocular space.

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1. Introduction

Currently, healthcare using wireless medical sensor networks (WMSN) is one of the most important applications of wireless sensor networks. Wearable medical devices in sensor networks and emerging applications will improve general living standard in under-served populations with the advances of wireless and mobile communication technologies. Remote health monitoring is emerging as a key area of research that integrates wireless telecommunications, sensing, and health care. Low-cost sensor nodes, with local sensing and processing have short-range wireless communication capabilities. Healthcare application uses wireless medical sensor networks (WMSNs) for patient monitoring in real-time senses the patient's body data and transmits it to the professionals by embedding inexpensive sensors at the body of patients. A medical device interfaced with a sensor communicates its data to a sink .The sink is connected to smart phone that communicates the data through wireless network to the hospital.

2. System Architecture

The system architecture of wireless sensor networks is in Figure 1 Sensor nodes are responsible for collecting physical information and sends it to a sink node, which receives the information gathered by the network and delivers it to the end-user.

2.1. Healthcare Sensor Network Model

The healthcare architecture has three active entities, namely, user/professional, medical sensors and base station/gateway. A Wireless Sensor Network (WSN) consists of individual sensor nodes that are able to sense the environment, collect physical parameters, perform data processing, and transmit data to a sink. The patient vital signs are queried and monitored within the hospital ward room using smart phone and laptop.

2.2. Hardware Architecture

The proposed architecture of the WBSN node has three main blocks which performs sensing, processing and transmitting the data to a PC.

The processing capability is provided by a low-power microcontroller and analog-to-digital converter and processing unit controls the communication power by minimizing the interference with other electronic instruments in the hospital or home. Figure 2 illustrates the sensor network model.

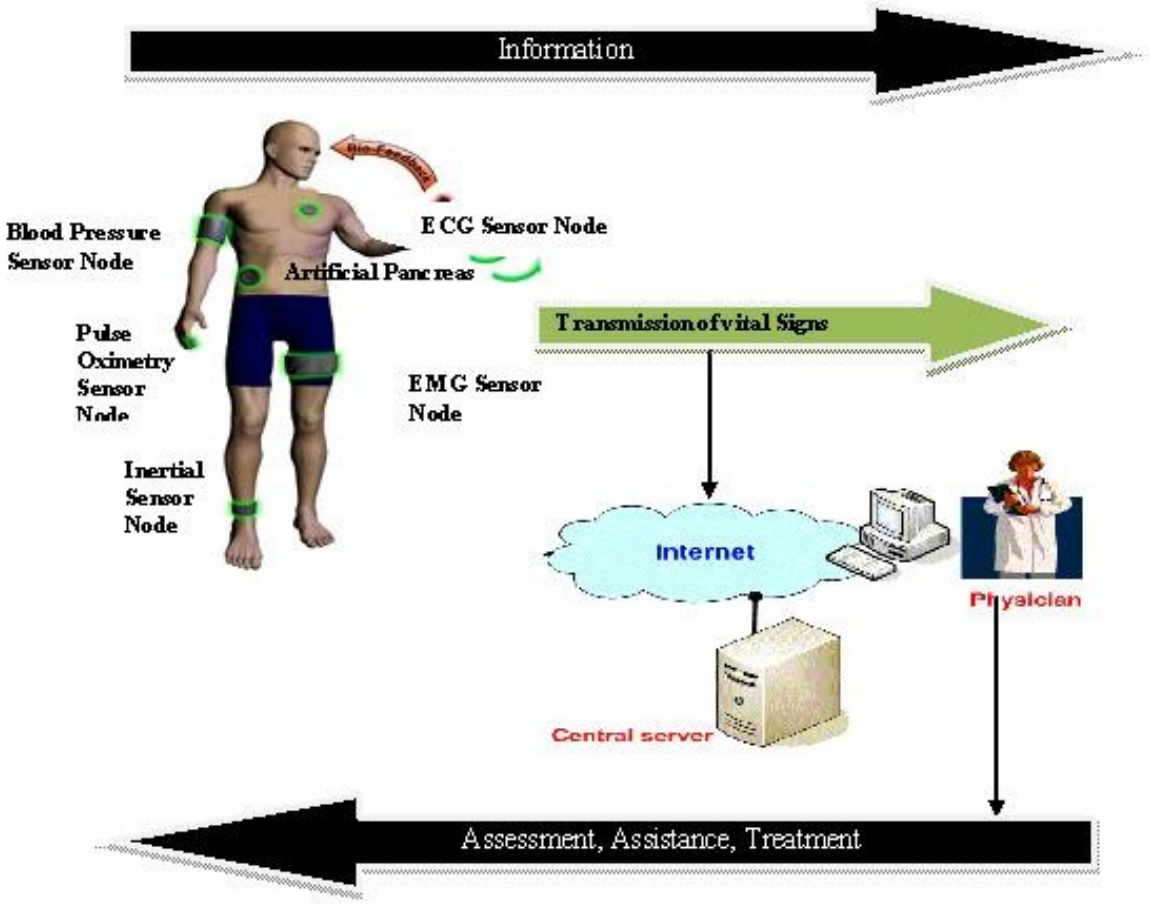

Figure 1: Sensor Network in Health Care Applications

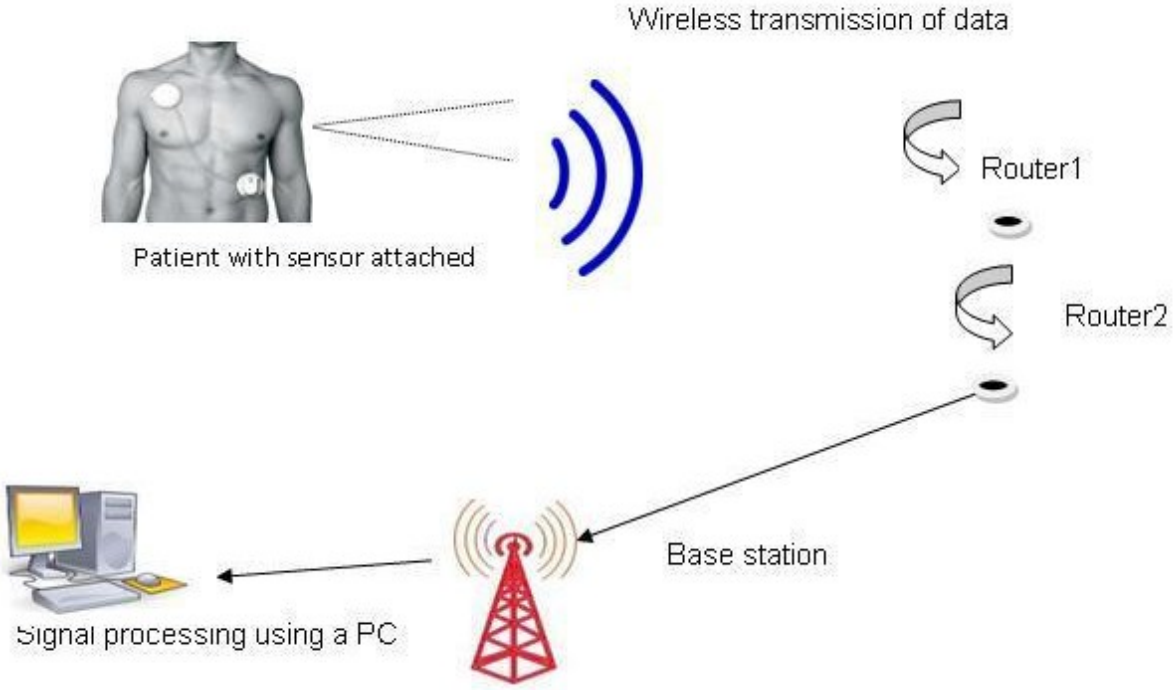

Figure 2: Hardware Architecture

3. Medical applications of wireless sensor networks:

Wireless devices have invaded the medical area with a wide range of capability. There are several health monitoring applications in which wireless sensor network will play a significant role[1]. They are illustrated below:

3.1. Chronic Disease Monitoring

Chronic diseases include stress, diabetes, asthma, heart diseases, cancer and sleep disorders. Asthma is defined as a chronic hypersensitivity of the bronchial airways. Oletic (2009[2]) described the employment of low power wireless sensor networks paired with smart phone technologies focusing on allergic asthma by retaining the disease in a controlled state by continuous monitoring of respiratory function. The wireless body sensors described by Falck et al (2006[3]) enable health monitoring of chronically ill patients by improving the treatment of chronic obstructive pulmonary disease and enhancing the ambulatory chemo therapy of women suffering from breast cancer. Boilot et al (2002[4]) described an array of 32 polymer carbon black composite sensors used to identify species of bacteria responsible for eye infections.

3.2. Personal Wellness Monitoring

Personal Wellness Monitoring monitors the health of elderly, their emotions, daily activity and behaviour. It helps in deducing the elderly wellness indices by informing the health care providers about the real-time activity behaviour and human emotion identification through telecare system[5] . Ahmed et al (2012[6]) illustrated the behaviour of the people suffering due to epileptic seizures can be monitored with the help of body sensors by detecting abnormal brain activity. The Ultra Wide Band (UWB) microwave carrier impulse radar has been used to track the human respiratory rate with both the mechanical chest phantom and human subject measurements [7]. An implantable pressure sensor for continuous wireless measurement of Intra Ocular Pressure (IOP) used in direct hydraulic contact with intraocular space provides IOP measurements in real time [8].

3.3. Fall Detection and Report Monitoring

Fall induced injuries among elderly people have become important. Huang et al (2010[9]) described a fall detection system using a wearable sensor and a head mounted triaxial accelerometer which captures the movement of human body. Taleb et al (2009[10]) proposed an elder monitoring and emergency detection, ANGELAH (Assisting ELders At Home) framework which integrates sensors and actuators for monitoring elder people.

3.4. Mobility Monitoring for Patients at Home

Continuous monitoring of ambulatory patients at home by means of resource-limited sensors described by Gonzalez et al (2011[11]) which are used for vital sign collection of patient. When the patient moves, the sensor network coordinator forward vital signs data through one of the wearable sensor nodes. Jeong et al (2007[12]) described sensors and a sensor system that can be used to monitor activity volume and recognizes emergent situations such as falling through analysing activity patterns in daily life is presented. Tseng et al (2007[13]) illustrated an integrated physical fitness testing system (iFit) to evaluate the physical fitness of older adults through a wireless sensor network that will enable users' fitness state.

3.5. Vital Sign Monitoring

Vital sign monitoring system involve monitoring blood glucose level, blood pressure, electrocardiograph (ECG) patterns, heart rate, respiration rate, blood oxygen saturation, electromyography (EMG), photoplethysmography (PPG) etc. Sheng et al (2009[14]) explained a continuous, non-invasive blood pressure monitoring system detects blood pressure with photoplethysmography sensors to obtain the pulse transit time. Fisal et al (2010[15]) described the monitoring of ECG data concerns with the development of ECG sensor board which consists of ECG electrodes and signal amplifying circuits.

Rotariu et al (2012[16]) illustrated the continuous measurement of heart rate using sensor node which has an ECG based heart rate detector attached on the patient. Lee et al (2010[17]) described wireless bio -signal transmitter, monitors the user's health using a photoplethysmography (PPG) sensor for detecting pulse wave signals. A wearable ECG sensor proposed by Nemati et al (2012[18]) measures heart rate. A compressed sensing data methodology is proposed by Zhang et al (2013[19]) to recover EEG signal using EEG sensors. Shin et al (2011[20]) described an Infrared motion sensor used to measure the motion signals and values such as activity, mobility and non response interval level of heart rate.

Andre et al (2010[21]) proposed the monitoring of sleep-disordered breathing activity and breathing rhythm of athletes using a capacitive micro sensor. Tamura et al (2011[22]) analysed the monitoring and evaluation of systolic blood pressure changes using sensors. Merritt et al (2009[23]) proposed a prototype textile-based capacitive-sensor respiration belt used for measuring respiration rate. HaomingLi et al (2011[24]) discussed a wireless ECG system which synthesizes 12-lead ECG signals for cardiac

monitoring. Shahriyar et al (2009[25]) focused on Intelligent Mobile Health Monitoring System which provides medical information through mobile devices based on the information collected by sensors. Klack et al (2011[26]) is meant for patients with end-stage heart failure implanted with mechanical circulatory support devices. Hulsbusch et al (2009[27]) illustrated the weight and activity with blood pressure monitoring system used for preventing, monitoring and treatment of heart diseases on daily basis for Congestive heart failure.

3.6. Infant Monitoring

Dasoqi et al (2009[28]) proposed an infant monitoring system based on highly sensitive microphone circuit and wireless networking hardware. Singh et al (2010[29]) described sensor nodes which have been designed for temperature monitoring of infants. Fletche et al (2012[30]) described a new technology for long-term monitoring of autonomic nervous system and motion data from active infants, children, and adults.

4. Discussion

The seven applications of biomedical sensors in various areas of healthcare are described above. Different metrics which evaluates wireless sensor networks include lifetime, coverage, cost and ease of deployment, response time, temporal accuracy, security, privacy, reliability, speed and effective sample rate. Enhancing the performance of one metric may stipulate the decrease in performance of another metric. Among all the above metrics, privacy and security in wireless sensor networks in health care perspective is vital. The health related data must always be secured. Some of the attacks in wireless sensor networks are due to inconsistent routing of data packets, eavesdropping, modifications and forging of alarms on medical data, denial of service, location and activity tracking of users, physical tampering with devices jamming attacks etc. Security has to be provided for all the above attacks for the sensor devices because these devices are less prone to security. The health related data are always private in nature. Privacy issue arises due to personal belief, social/cultural environment and public/private causes. A serious threat to the life of an individual happens due to above issues. So these two issues must be mainly considered in future work. The metrics for all the applications in the existing work are discussed in Table 1.

Existing Work	Metrics Used				Drawbacks
	Accuracy	Cost	Speed	Reliability	
Chronic Disease Monitoring [2,3,4]					Privacy, Security
Personal Wellness Monitoring [5,6,7,8]					Privacy, Security
Fall detection and report monitoring [9,10]					Privacy, Security
Mobility monitoring for patients at home [11,12,13]					Privacy, Security
Vital Sign Monitoring [14-27]					Privacy, Security
Infant monitoring [28,29,30]					Privacy, Security

Table 1: Comparison of related work in wireless sensor network

5. Conclusion

All the applications discussed here principally uses different types of biomedical sensors to monitor the physiological signals of patients to detect chronic diseases, fall detection, monitoring vital signs, infant monitoring and wellness monitoring. Though many issues prevail in the development of all existing applications, the most significant ones are security and privacy. Future research should focus on mitigating these issues for wireless sensor networks in healthcare.

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Integrated Academic and Clinical Training Programmes in the United Kingdom

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Abstract
This article summarises the academic medical career pathways available and details the structure, application processes and expected output for each. It includes the perspectives of two doctors who have had experiences of the academic training programme at different stages.

Key Words
Academic Clinical Fellowship, Academic Foundation Programme, Foundation Programme

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The Foundation Programme

The Foundation Programme (FP) is a two-year training programme comprised of six, 4-month placements in a variety of medical and surgical specialties (also known as tracks). Currently, upon completion of the first year of FP, trainees receive full registration with the General Medical Council (GMC).

FP jobs are obtained through a competitive national selection process. Applicants register on the Foundation Programme Application System (FPAS), apply to a UoA (Unit of Application, otherwise known as Deaneries) and rank the tracks available according to their own personal preferences. Trainees must complete an application form which is comprised of different components and scored out of a maximum of 100 points. The score that an applicant receives determines which UoA and track they are allocated to, with the more competitive track requiring higher scores to secure. Tracks are usually selected to include a placement in the specialty you are interested in. This is not because it is essential to have experience working within the specialty you apply for, but it can certainly be beneficial. If the track does not contain the relevant specialty, it is possible to use study leave to do taster weeks, and/or projects that demonstrate your commitment to the specialty you are interested in.

The Academic Foundation Programme

The Academic Foundation Programme (AFP) is a form of the FP that includes dedicated time for research. This can be organised as one of your 4-month placements, or as time protected each week or month throughout all 6 placements, to conduct research. The project that an AFP trainee undertakes can be research, audit, medical education, or leadership and management-based. AFP opportunities exist in a wide range of specialties and there is great variability between the types of academic placements offered between UoAs.

Both the AFP and the FP lead onto the acquisition of the Foundation Achievement of Competence Document (FACD) (refer to figure 1).

Completion of an AFP puts trainees in a strong position to continue research alongside their clinical work, and apply for an Academic Clinical Fellowship (ACF). It is not however a pre-requisite and trainees can evidence commitment to the ACF during the FP, particularly if you are aware of this from the outset and are organised.
The AFP is competitive to obtain and is currently awarded through a similar process of national selection to the FP, except that there is an additional interview. During the interview process, you are given the opportunity to discuss your previous work, impress the panel with your plans for the job if you get it, and try and convince them you have what it takes. Although academic trainees are well supported, an AFP does require you to be independent, organised and self-motivated. The panel wants to be convinced that if they select you, you will make the most of the opportunity and,

ideally, that you will want to take your interest in integrated academic and clinical opportunities further and apply for an ACF.

The National Institute of Health Research Academic Clinical Fellowship

Application to a National Institute of Health Research Academic Clinical Fellowship (NIHR ACF) is again by national selection and requires attending both an ACF interview and one for the core training post in the speciality you are interested in. The ACF is a 'run-through' post i.e. ACF trainees do not need to apply for an ST post after completion of core training. This means that there is no other application process before obtaining the coveted Certificate of Completion of Training (CCT).

As a NIHR ACF you are again provided with the unique opportunity to work in both clinical and academic medicine. In the first three years, 25% of the time is protected for research activity. As this equates to approximately 3 months per year, for three years, this leads to a Masters in Research (MRes) degree upon completion. The remaining seventy five per cent of the time is devoted to clinical training as a core trainee. Each deanery will have a list of the specialties that are available for NIHR ACF opportunities which can range from cardiology to public health and as with AFP the availability depending on which UoA in the country you are allocated to.

When considering an ACF remember that although clinical work continues, the core training takes a year longer to complete, and the reduced intensity can make it difficult to learn in craft specialties such as surgery. These posts are ideal for those who are passionate about the speciality they want to go into, and already have a sub-speciality interest they would like to do research on. It takes plenty of motivation, perseverance and support to apply, be successful and balance research and clinical life.

PhD Opportunities

ACFs are strongly encouraged to submit a proposal for a PhD, usually based on their previous research projects. If accepted, ACF trainees then interrupt clinical training and engage in full-time research as PhD candidates. This usually takes place after the completion of core training and before the ST grade (but some ACFs do decide to commence their PhDs after their second year of core training.) A PhD can typically last between 3-4 years after which the trainee resumes clinical training and – providing he or she has passed their membership exams and successfully defended their thesis, can apply to become an Academic Clinical Lecturer (ACL).

Academic Clinical Lectureship

The ACL, like the ACF, has both an academic and clinical component albeit the expectations are obviously higher (i.e. the number of publications you are expected to publish in peer-reviewed journals, presentations you deliver in international conferences etc.) The duration of the ACL is five years and upon completion and acquisition of the CCT, trainees can then apply for consultant jobs and senior lecturer positions and professorships with an academic institution.

Conclusion

The academic route provides protected time in order to carry out research alongside continued clinical training. The run-through nature from the ACF means that time out to conduct research full-time is possible and encouraged. It requires commitment and hard work to excel in both research and clinical duties, whilst continuing your professional and personal development.

Integrated academic and clinical programmes provide a fantastic opportunity to present your research findings in international conferences, provide you with a platform to network and collaborate with eminent scholars and colleagues and to develop your knowledge and interest in your chosen speciality. As a trainee in an integrated academic and clinical programme you can conduct important cutting edge research that can make a real positive difference to patient care. It also provides numerous opportunities for personal growth, skill acquisition and self-development.

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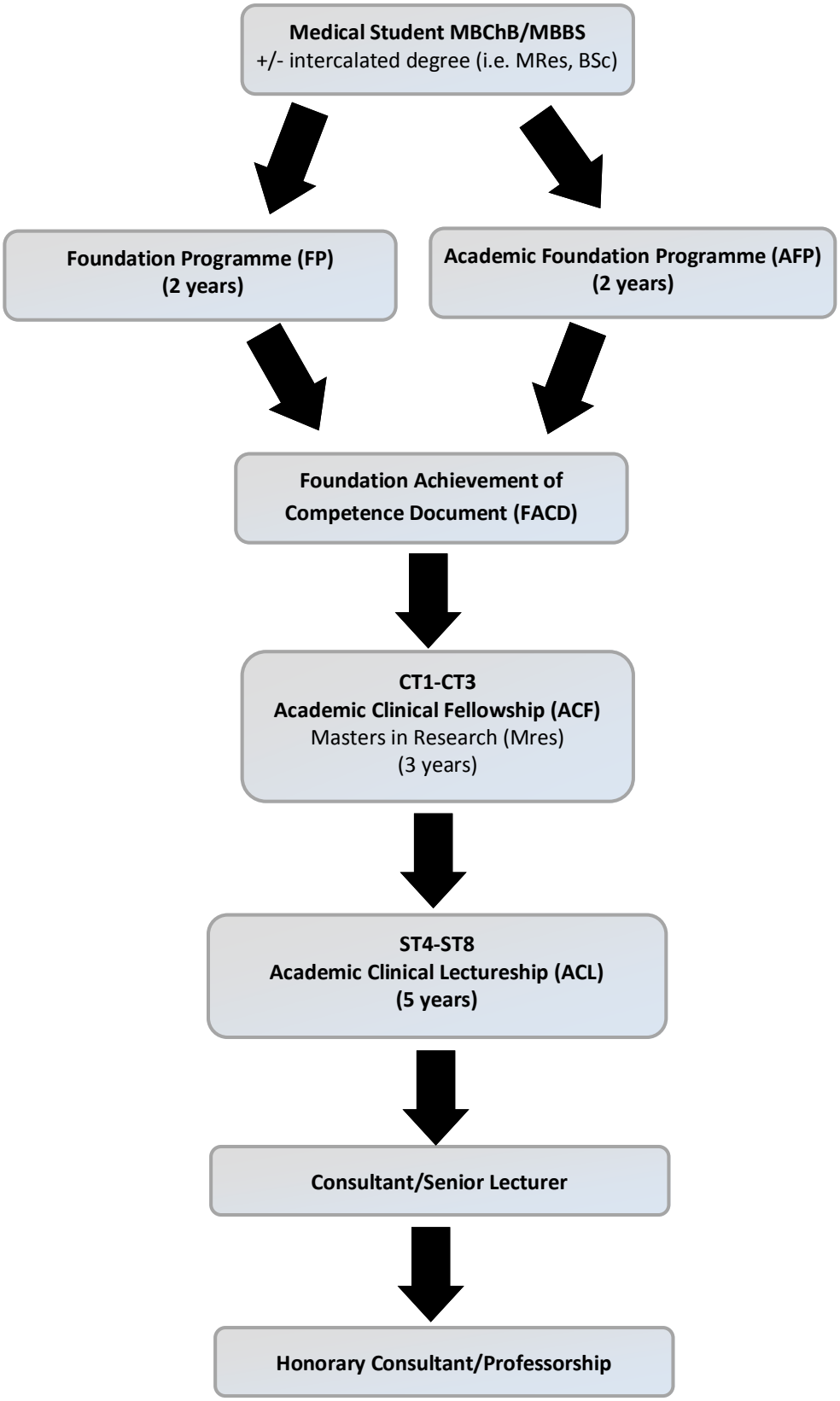

***Figure 1*:** Flowchart Illustrating Trajectory of the Academic Clinical Training in the UK (Incorporating the NIHR ACF)

North Western Deanery Academic Clinical Fellowship (ACF) Fill Rate as at 7th March 2012

Specialty	Number of Posts	Number of Applications	Competition Ratio	Number of accepted applicants	Number of Posts Remaining	Fill rate (%)
ACF Anaesthesia (Lancaster)	1	1	1:1	1	0	100%
ACF Cardiovascular Medicine	1	42	42:1	1	0	100%
ACF Clinical Genetics	1	3	3:1	0	0	0%
ACF Clinical Oncology	1	2	2:1	1	0	100%
ACF Dermatology	1	14	14:1	1	0	100%
ACF Emergency Medicine	1	7	7:1	1	0	100%
ACF Gastroenterology**	1	4	4:1	0	1	0%
ACF Medical Education **excluding surgical specialties**	1	18	18:1	1	0	100%
ACF Obstetrics & Gynaecology	2	35	35:1	2	0	100%
ACF Occupational Medicine	1	1	1:1	0	0	0%
ACF Paediatrics	1	14	14:1	1	0	100%
ACF Psychiatry	1	12	6:1	2	1	100%
ACF Respiratory Medicine	1	14	14:1	1	0	100%
ACF Rheumatology	1	24	24:1	0	0	100%
ACF Rheumatology (Lancaster)	1	5	5:1	0	0	0%

Table 1: ** ACF in Gastroenterology at ST3 level is being re-advertised. You can apply via https://www.nwpgmd.nhs.uk/acf_ataglance until Wednesday 21st March 2012.

*For International Medical Graduates (IMG) and for trainees who have an equivalent to the FACD, the process may be different to that described in this article. For information on this and further information in general please refer to the following website: http://www.nihrtcc.nhs.uk/intetacatrain/acfs

About the authors: Miss Laura Derbyshire Academic Foundation Trainee 2010-2012

Introduction: As a Foundation Doctor I was part of the Academic Foundation Programme (AFP) in the North West Deanery. This meant that my first 4 month job in my second year (FY2) was dedicated to research. The application process was a formal interview which revolved mainly around my academic interests and aspirations. I was keen to get an AFP post to allow me time to develop my basic research skills, complete a substantial project which I could present and publish, and develop other skills such as teaching and leadership.

Specialty Interest: Since medical school I have wanted a career in Urology. I therefore wanted an AFP that allowed me to conduct research in this area. I worked closely with my supervisor and his team to plan and set up the project I ultimately carried out. This was vital to allow me to run an approved and interesting research pilot study. I was conscious I wanted to continue to develop my surgical skills and knowledge as well, and my team were supportive about this.

Academic Output: I obtained a Core Surgical post themed in Urology after my AFP. The research I carried out has been presented in regional and national conferences and is currently being written up for publication. It is worth remembering that the output from research is not immediate, particularly if it involves a number of people.

I gained a valuable insight into research during my AFP and enjoyed being in control of my own project. However, I did miss the patient interaction of clinical work. This is one reason I did not pursue an Academic Clinical Fellow post, although I continue to do clinical research alongside my training and may take formal time out in the future.

I believe that careful planning and patience is the key to a successful project and placement, and would highly recommend the experience to anyone with a passion for research or their specialty.

About the authors: **Dr Ahmed Hankir NIHR ACF Psychiatry**

Introduction: I entered the conventional Foundation Programme in Pennine Acute Trust in August 2011 and obtained the FACD (FACD in full please) in August 2013. (Any specific time devoted to research?) I have recently been appointed National Institute of Health Research Academic Clinical Fellow in Psychiatry with Manchester University. I am also a core trainee in psychiatry in Central Manchester University Hospital Trust.

Areas of Interest: I consider my interests wide-ranging and eclectic and I have published articles in the following areas: the health humanities (particularly autobiographical narrative and psychopathology), the portrayal of mental illness in film, literature and the media, broadening participation, the mental health of doctors, mental healthcare policy/provision in conflict areas and the association between bipolar disorder and the artistic temperament. I have been fortunate enough to present my research findings in conferences all over the world (Montreal, Tel Aviv, Cambridge, London and New Jersey).

ACF in Psychiatry : *"As psychiatrists we straddle a unique blend of science and humanity. Bridging the social, medical and neurosciences, we strive to improve the mental health of individuals, families and societies, and provide strong leadership throughout the care pathway."*
Sue Bailey, President of the Royal College of Psychiatrists
I chose the ACF in Psychiatry as I felt that this was the specialty that I was most suited for in terms of my skill-set, my passion to fathom human emotion, thought and behaviour and also my personality traits and character. The attractions of clinical psychiatry are also well documented by Damanhuri et al (1) and Sivasubramanian (2) in the literature. Dr Kamran Ahmed, founder of the UK's first ever medical film festival *Medfest* and author of the Royal College of Psychiatrists Morris Markowe Award Winning article entitled, '*Beards and Bow Ties*' also describes how intellectually stimulating and rewarding being a psychiatrist is (3).

Academic Psychiatry is at the frontier of health sciences research. Recent advances in the neurosciences in particular have led to exciting novel technologies in the diagnosis and treatment of many neuropsychiatric illnesses and hence academic psychiatry offers a plethora of research challenges and opportunities.

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Case Report
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Management of Paediatric Trauma in Siblings with Pyknodysostosis: A Case Report

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Abstract

Pyknodysostosis is a rare autosomal recessive bone disorder characterized by osteosclerosis, short limbs and short stature. Other features include delayed closure of cranial sutures, frontal and occipital bossing and short broad hands with nail hypoplasia. Patients often suffer multiple long bone fractures following trivial trauma.

We present a case report of two children, a brother and sister, who both have Pyknodysostosis. Both are currently well but have suffered multiple lower limb fractures requiring prolonged treatment before weight bearing (mean 5 months). They have both suffered spinal complications including cervical spine fractures and lumbar sclerosis, fortunately with no neurological impairment.

The diagnosis of Pyknodysostosis is an important differential in patients who present to accident and emergency or fracture clinic with fractures secondary to trivial injury. Medical personnel should be aware of this condition, it's characteristic features and should not confuse it with non-accidental injury.

Key Words
Pyknodysostosis, Paediatric, Trauma, Cathepsin-K, Surgery

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Introduction

Derived from the Greek 'pycnos' meaning 'dense' and 'ostosis' meaning 'condition of the bone',[1] Pyknodysostosis was first described in 1962 by Maroteaux and Lamy[2] and has an incidence of 1.7 per million.[3] Pyknodysostosis is a rare autosomal recessive disorder of osteoclast activity causing osteosclerosis. The genetic defect maps to chromosome 1.[4]

Recognized physical signs of Pyknodysostosis include short stature (under 1.5 meters), short broad hands with stubby fingers, nail hypoplasia, frontal and occipital bossing, scoliosis, delayed closure of cranial sutures, hypoplastic clavicles and multiple long bone fractures following minimal trauma. They may also have a growth hormone deficiency or develop sleep apnoea. Mental and sexual development is usually normal.[5, 6]

Radiographic signs may include osteosclerosis with narrow medullary canals, aplasia of terminal phalanges, reduced bone age, clavicle hypoplasia, fronto-parietal bossing, calvarial thickening, nasal beaking, persistence of primary teeth, delayed cranial suture closure, obtuse angle of mandible with a short body and sclerosis of vertebral bodies.[5, 6]

Differential diagnoses include Pyknodysostosis, osteopetrosis, renal osteodystrophy, flurosis, lead poisoning and Caffey's Disease.

We present a case report of two patients, a brother and sister, who both have Pyknodysostosis. No other relatives are known to have had the condition.

Patient 1 – The older brother

The brother is now aged 16; he was initially referred to our cardiology and endocrine physicians by his general practitioner aged 1 year with a heart murmur and slow growth. Aged 18 months he then suffered Humerus, Radius and Ulna fractures following minimal trauma. This raised the concern

of non-accidental injury and was investigated thoroughly. As part of the investigation a skeletal survey was performed. It was then that the diagnosis of Pyknodysostosis was suspected.

Subsequent genetic testing of the patient and both parents confirmed the diagnosis. He later underwent surgical correction of pulmonary stenosis and an Atrial-Septal defect, aged 4 years (unrelated to Pyknodysostosis). He requires growth hormone replacement due to an isolated hormone deficiency. He has sustained recurrent mid-shaft Tibia and Fibula fractures annually since the age of 12. Each time these have been treated with closed reduction and plaster cast, taking 4-6 months to heal to weight bearing (See figure 1). He has also developed lumbar spine sclerosis and pars defects at L4 and L5, for which he is treated with analgaesia.

On general physical examination he demonstrates short stature, frontal and parietal bossing, short broad hands and nail hypoplasia (see figures 2 and 3). Radiographs show generalized bone sclerosis with reduced medullary canal size throughout the upper limbs, lower limbs, pelvis and spine. They also demonstrate reduced bone age, distal phalangeal aplasia of the hands, an obtuse mandibular angle with a short body and super-numeric teeth (see figures 4 and 5). Older films also demonstrate delayed cranial suture closure and a congenital C2 spondylolisthesis.

Patient 2 – The younger sister

The sister is now aged 10 years; she initially presented aged 2 months via general practitioner referral for an x-ray skeletal survey to investigate frontal bossing and a wide posterior fontanelle. It

Figure 1: a) Mid-shaft Tibia fracture following a trip from standing. Treated with manipulation under anaesthetic and plaster cast. b) Six months post-injury, patient only just weight bearing.

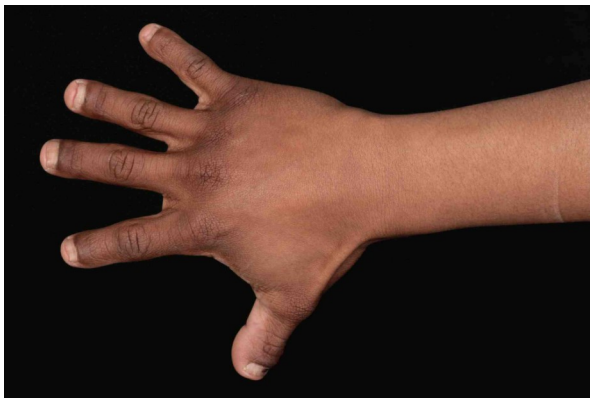

Figure 3: The brother's hand demonstrating a short, broad hand and nail hypoplasia.

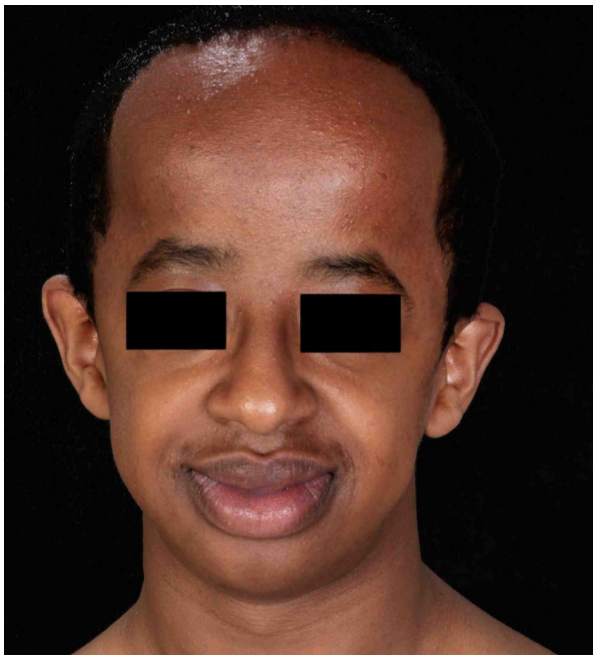

Figure 2: Facial view of the brother aged 16 demonstrating frontal bossing.

Figure 4: Pelvic radiograph showing diffuse bony sclerosis and loss of femoral medullary canal bilaterally.

was then that features of Pyknodysostosis were noted and subsequent genetic testing confirmed the diagnosis.

Unlike her brother she does not have any cardiac problems but does also have congenital C2 spondylolisthesis and an isolated growth hormone deficiency. However, her growth hormone treatment was stopped after 18 months as she developed obstructive sleep apnoea. She now requires continuous positive airways pressure (CPAP) ventilation at night. She has sustained multiple fractures including her fifth metatarsal, clavicle and several Tibial fractures, all following minimal trauma. Each fracture has been treated conservatively with closed reduction and prolonged casting, except the clavicle, which was simply monitored. She has also sustained multiple cervical spine fractures (C2, C3 and C4) and subluxation from performing a forward roll at home. This required Halter traction initially followed by prolonged neck collar treatment (18 months in collar). The C3 and C4 fractures healed but the C2 never has, however she has no symptoms from this.

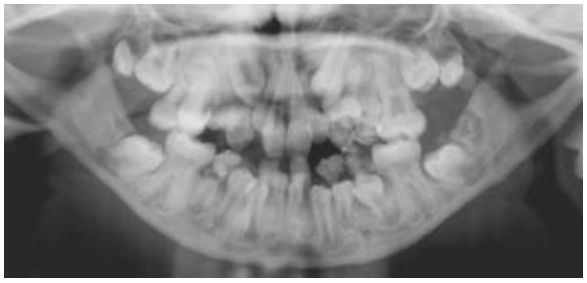

Figure 5: Orthopantomogram demonstrating super-numery teeth. These required multiple extractions

Figure 6: Facial view of the sister aged 10 demonstrating frontal bossing, depressed nasal bridge and midface hypoplasia.

Figure 7: The sister's hand demonstrating a short, broad hand and nail hypoplasia.

On general physical examination she has short stature, frontal and parietal bossing, depressed nasal bridge, midface hypoplasia, short broad hands and

Figure 8: Radiographs of the sister's right foot demonstrating bony sclerosis and a fractured base of the fifth metatarsal following a minor trauma at home.

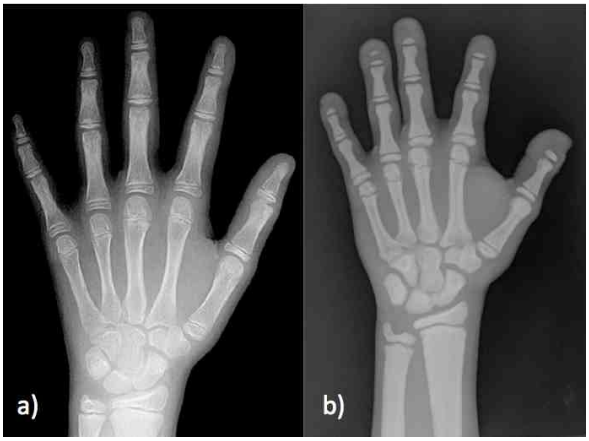

Figure 9: a) Left hand radiographs of a standard 10-year-old girl. b) The sister's left hand radiograph demonstrating reduced bone age, bony sclerosis and aplasia of distal phalanges.

nail hypoplasia. (See figures 6 and 7)

Radiographs demonstrate the same signs as her brother with the addition of distal phalanx aplasia of the feet (See figure 8). Figure 9 demonstrates hand signs and reduced bone age.
Both children are currently well and show normal physical and mental development.

Discussion

The genetic defect of Pyknodysostosis maps to chromosome lq21 and causes a deficiency in Cathepsin K.[4] Cathepsin K is a lysosomal enzyme expressed in osteoclasts. It catabolizes Type I collagen in bone reabsorption, which forms the majority of bone matrix. Increased release is stimulated by bone and soft tissue injury. A deficiency in Cathapsin K causes a reduction in bone reabsorption resulting in abnormally dense and brittle bones.[7] Due to its known bone reabsorptive function Cathepsin K inhibitors are being explored as potential treatments for osteoporosis. [8,9] Growth hormone deficiency is also seen in Pyknodysostosis. As short stature may be problematic for some patients, hormone replacement therapy is often used as it can increase long bone length and therefore improve linear growth. [10]

In our experience fracture reduction and indirect immobilization (i.e. casting, neck collar) are adequate treatment for patients presenting with closed fractures associated with Pyknodysostosis. However prolonged treatment is often required due to slow bone healing. Other methods of fixation such as intramedullary nailing may be difficult, or not possible, due to bone brittleness and reduced medullary canal size, particularly in children. Case reports of intramedullary nailing being used in adult patients were found in the literature,[11, 12] with some authors even recommending its routine use to prevent future fractures. No cases using intramedullary fixation in children were found. The use of screw and plate based fixation techniques may be possible, but again difficult due to increased bone density and brittleness. No reports of this being used were found in the literature. Anaesthetic approach to these patients also requires careful consideration as intubation is often challenging. The use of spinal or regional anaesthesia may be more appropriate in some patients. [13]

Pyknodysostosis is a rare condition and patients may well know their diagnosis well before presenting to you. However, it is important to be aware of this condition and be able to recognize the classical features, as presentation to accident and emergency departments or fracture clinic may be their first presentation. Although an index of suspicion should always be maintained when children present with injury patterns not in keeping with the history, Pyknodysostosis should not be confused with non-accidental injury.

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Case Report
DAUIN 20140056

Synchronous Colorectal Cancers: A Case Report and Review of Literature.

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WJMER, Volume 7, Issue 1, 2014

Abstract

Synchronous colorectal cancers (SCRC) constitute about 1.1 to 5.3% proportion of colorectal cancers. It is rather vital to diagnose a SCRC in order to avoid surgical re-intervention and poorer prognosis. This report documents a 61 year old female with persistent bleeding per rectum with history of weight loss. Family history of colorectal malignancy was present. Colonoscopy showed multiple polypoidal growths at 20cms, 40cm, and 65 cm from the anal verge, near hepatic flexure and caecum. Histology of these four polyps are consistent with adenocarcinomatous change. CT abdomen reported as wall thickening in the proximal third of transverse colon with luminal narrowing and multiple polyps in the caecum, ascending colon, descending colon and sigmoid colon. No regional lymphadenopathy was seen. Patient underwent total colectomy. Pathological analysis of the surgical specimen confirmed the diagnosis of multiple intestinal adenocarcinoma. This case report emphasizes the need for a pre-operative diagnosis to ensure a good patient prognosis in colorectal malignancies.

Key Words

Synchronous colorectal cancer, High grade dysplasia, Index lesion, Concurrent lesion

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Case Presentation

A 61-year-old female was evaluated for bleeding per rectum for the past twenty days.

There was history of mucus in the stools mixed with blood and significant loss of appetite with weight loss of 10 kilograms over a period of 3 months. She denied of any pain or protrusion of any masses on while defecation. She had lost 10 kilograms over a period of 3 months. Family history of colonic malignancy was present. Her sister underwent treatment for left sided colonic cancer 2 years ago.

General physical examination was unremarkable. There was no pallor. On abdominal examination a vague mass was palpable in the right lumbar region. There was no hepato-splenomegaly or ascites. Digital rectal examination was normal. There was no growth palpable. Colonoscopy (figure 1) and computed tomography of the abdomen (figure 2) done.

Investigations

Colonoscopy revealed multiple polypoidal growths at approximately 20cm, 40cm, 65cm from the anal verge and near hepatic flexure and caecum (Figure 1). Biopsies of these polyps were taken and sent for histology.

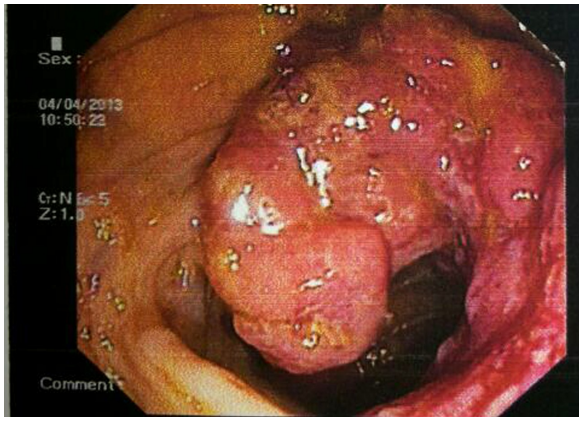

Figure 1: Ulcerative growth in the proximal transverse colon on colonoscopy 65 cms from the anal verge.

Computed tomography of the abdomen showed a short segment circumferential wall thickening in the proximal third of the transverse colon (extending for a length of 4.3cm) with luminal narrowing. Polyps were noted in the caecum, ascending colon, descending colon (posterior wall) and sigmoid colon

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Figure 2: Computed tomography of the abdomen showing a short segment circumferential wall thickness extending for a length of 4.3cm in the proximal third of transverse colon with luminal narrowing and polyps in the caecum and descending colon.

(Figure 2). There was no evidence of calcifications within and no evidence of obstruction. Liver was normal in size and attenuation. There was no free fluid in the abdomen. CEA and chest X-ray was normal.

The final histopathology of four proximal polypoidal lesions was reported as well-differentiated intestinal adenocarcinoma. The other colonic polyps in sigmoid colon was showing adenomatous changes with high grade dysplasia.

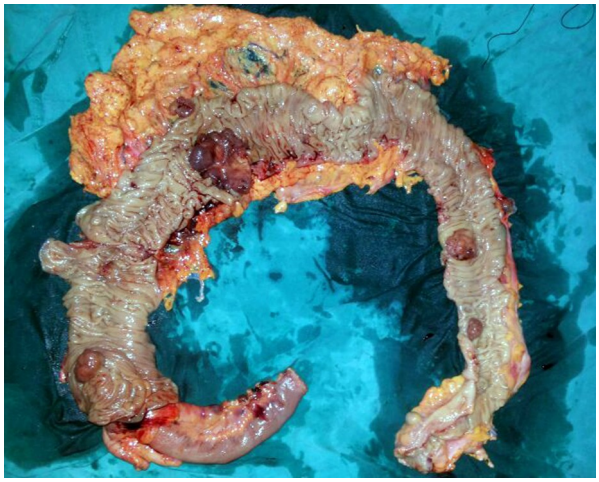

Figure 3: Resected total colectomy specimen showing the growth in the proximal transverse colon with polyps in the caecum and descending colon.

Treatment

Patient underwent total colectomy with ileo- rectal anastomosis (Figure 3). Surgical margins were free of tumour and all the 15 lymph nodes that were sampled showed reactive hyperplasia.

Outcome and Follow-up

Postoperative period was uneventful. In view of stage (stage 2A), she was advised 5-FU chemotherapy with capacetabine. She refused any further treatment and hence was advised for a 3 monthly follow-up with colonoscopy, ultrasonography and CEA.

Discussion

Colorectal malignancies were previously thought to be predominant in the western world.

However, due to the recent changes in diet and lifestyle in the eastern world, these malignancies are a common picture in the Asian subcontinent and the Asia Pacific region as well[1]. The Global Cancer Statistics also adds Eastern Europe to the picture.

According to the Global Cancer statistics, colorectal cancer (CRC) is the third most commonly diagnosed cancer in males and the second most in females[2]. The incidence being 4.4% in males and 1.7% in females in the developed world and 1.4% in males and 0.8% in females in the developing world[2]. To add to the burden, synchronous colorectal cancers (SRCS) are also on the rise. Its prevalence ranging from 1.8% - 2.3% to 12.4%[1, 3]. Although SCRCs encompass a significant proportion; 1.1%- 5.3%[4], there is very little literature regarding its aetiology, diagnosis, treatment and prognosis[1, 4].

The definition of a synchronous tumour was first described through the Billroth's criteria in 1879: "1) tumours should have different histological appearance, 2) to have the point of start in different epithelia of that organ; 3) each tumour should generate their metastasis"[3]. Warren and Gates later incorporated the above definition to clinically diagnose SCRCs. This criterion entails that: "1) each tumour must present a definite picture of malignancy, 2) each tumour must be distinct, 3) the probability of one being a metastasis of the other must be excluded, 4) the synchronous lesions must be diagnosed simultaneously or within six months of the initial diagnosis"[1].

SCRCs exhibit significant differences in pathological and molecular features from CRCs.

A study by Oye et al found that SCRCs were

predominantly located in the left colon, penetrated the wall less and were more common in advanced lesions. The index lesion (the most advanced lesion) when compared to the concurrent lesion (those other than index lesion) were found to be larger in size, moderately differentiated, penetrated the wall more and grossly appeared ulcerated. The study also found that the incidence of concurrent adenomas was significantly higher in patients with SCRCs[1]. A study by Nosho et al revealed that SCRCs are more commonly associated with BRAF mutations (especially the proximal colon tumors), LINE-1 methylation, CIMP-high, and MSI-high. Tumours in concordant locations exhibited a pattern of CpG island methylation as opposed to tumours in discordant locations[4].

There is no concrete evidence for risk factors and aetiology for SCRC. Although there are numerous theories dwelling upon the male sex, older age groups, smoking and alcohol, none have been able to definitely prove what actually causes synchronous lesions. It is postulated that people from the older age group develop SCRC because of decreased resistance to carcinogenic agents, environmental factors and immunological changes[5, 6]. Some studies suggest that the presence of testosterone has a negative impact on tumour immunity and female sex steroids such as oestrogen has a protective one. Hence, it is more common to find synchronous tumours in men than in women[7].

In our case the patient was a 61 year old female. Recent genetic analysis of these tumours has gained some insight. It has been observed that these tumours show different types of p53 mutations than the traditional colorectal cancers[1]. Studies by Nosho et al and Gonzalo et al found that there was methylation at the promoter region especially the MGMT1, MGMT2 and RASSFIA genes[4, 5]. Studies by Nosho et al demonstrated mutations in the cell cycle signalling gene BRAF. This study also found microsatellite instability was more common in SCRC than in CRC[1, 4, 8].

When there is a case of colorectal malignancy, a possibility of synchronous tumours should always be kept in mind whether pre-operatively, intraoperatively or postoperatively.

The most important time being the pre-operative period[3]. During the 70s, preoperative diagnosis was rare and most were diagnosed intraoperatively through bowel manipulation or simply as a chance occurrence[9]. Important investigative procedures include double contrast barium enema, colonoscopy, Computed tomographic (CT) colonography, MRI and a combination of CT Colonography and PET scan. Barium enema may not be able to detect multiple growths and visualization may become difficult as the tumour may be obscured by bleeding, inadequate bowel preparation, retained faeces and presence of annular carcinoma. Colonoscopy is a better option, provided that the bowel is adequately prepared. CT colonography is a much superior option. MRI and CT colonography with PET scan can also be substituted[1]. Intra-operatively, it is imperative that the entire colon be palpated. This has its fair share of disadvantages since it is associated with a high chance (upto 69%) of missing a diagnosis of SCRC [3, 9]. Therefore, a thorough pre-operative clinical and radiological intervention is necessary. Post-operative total colonoscopy is extremely important as well. This can reveal small synchronous tumours which otherwise go unnoticed during surgery.

The primary mode of treatment for SCRC is surgical resection. Some cases have reported a successful single incision laparoscopic total abdominal colectomy with an ileo-rectal anastamosis and intra-operative CO_2 colonoscopy[1]. A right hemicolectomy or anterior resection of rectum is recommended for lesions in contiguous intestinal segments while transanal endoscopic microsurgery (TEM) has been advocated for lesions in distal colonic segments[9]. It has been noticed that TEM is associated with a decreased postoperative complications and morbidity[9]. Palliative approach would be a terminal colostomy or a segmental colostomy.

Overall, SCRCs have a worse prognosis than single CRCs[4, 9]. Possible reasons for high mortality could be due to understaging of the cancer, increased incidence of postoperative complications or varying molecular features[4].

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Abstracts from the 4th International Academic and Research Conference 2nd August 2014, University of Manchester

Prize Winning Abstracts

Doctors Academy Award in Academia and Research 2014
Winner of Grand Prize

THE MAGNETICALLY-INDUCED MIGRATION OF ADIPOSE-DERIVED STROMAL CELLS AND ITS APPLICABILITY IN TENDON TISSUE ENGINEERING

Kwan TD*, El Haj AJ
Keele University, United Kingdom

The localised targeting of therapeutic agents using magnetic particles has been studied since the 1970s and more recently explored in the field of tissue engineering as a means of localising cells. We explored the use of superparamagnetic iron oxide nanoparticles (SPIONs) to promote migration of adipose-derived stromal cells (ADSCs) in response to a magnetic field. ADSCs were isolated from rabbits and observed to internalise 1μm SPIONs when added to the media. We demonstrated this internalisation, along with the concurrent application of two different strength magnetic fields, had no effect on viability, nor on the multi-lineage differentiation potential. Further to this a magnetotactic response through collagen gel could be induced in cells in response to an applied magnetic field. This response could be modified depending on the strength of the applied field. To explore this concept in vivo we implanted permanent magnets into the Achilles tendons of rabbits and percutaneously injected autologous SPION-labelled or unlabelled cells around the tendon within a collagen gel. After a period of 48 hours we observed cell populations migrating into the tendon sheath in all groups with SPION-labelled cells, but in only one of those with unlabelled cells. In conclusion the combination of ADSCs with nanomagnetics appears to have no effect on cell potency and may present a new way of targeting cell populations to regions of tendon injury and damage.

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Doctors Academy Grand Prize for Best Five Abstracts

Abstract 1
Clinical and Patient Related Work Category

KNOCK OUT OF THE EXTRACELLULAR CALCIUM-SENSING RECEPTOR FROM VASCULAR SMOOTH MUSCLE CELLS RESULTS IN REDUCED BLOOD PRESSURE AND SECONDARY CARDIAC OUTCOMES.

Edwards PJ*, Schepelmann M, Davies T, Yarova P, Brennan S, Chang W, Krssak M, Kemp P, Riccardi D
School of Biosciences, Cardiff University, Cardiff, United Kingdom

The extracellular calcium-sensing receptor (CaSR) is expressed in all three layers of arterial blood vessels, where its primary function remains unclear. By knocking out CaSR in vascular smooth muscle cells (VSMCs) using LoxP-Cre recombination (SM22a-Cre x LoxP-CaSR) we aim to further investigate the roles of the CaSR in VSMCs. Even though lifespan and reproductive capabilities were unchanged between wild-type (WT) and knock-out (KO) mice, strong differences were found in the cardiovascular phenotype of the animals. At 3 months of age, KO mice showed a significantly reduced diastolic blood pressure ($p<0.01$) and mean arterial blood pressure ($p<0.01$) compared to WT controls, measured using radiotelemetry. Histological analysis of WT and KO aortas revealed no difference in aortic wall thickness or tunica-media collagen content. At 14 months of age, cardiac magnetic resonance imaging revealed no difference in end-diastolic (ED) left ventricular (LV) wall thickness but a significant increase in end-systolic (ES) LV wall thickness ($p<0.05$) and LV wall thickening (DES-ED $p<0.05$). Histological analysis of WT and KO hearts demonstrated a marked reduction in variance of cardiac fibrosis, but no difference in cardiomyocyte cross-sectional area. At 6 months of age, there was no difference between the wet heart weights of KO animals compared to WT controls, but by 18 months of age, KO hearts were significantly heavier than WT controls ($p<0.05$), suggesting a late onset of cardiac hypertrophy. In conclusion, the CaSR in VSMCs appears to play a key role in regulating blood pressure and its loss may result in multiple secondary cardiac outcomes.the most effective prompt for regular BMI assessment. Calculation of BMI should be a core part of COC prescription.

Doctors Academy Grand Prize for Best Five Abstracts

Abstract 2
Clinical and Basic Science Research

THE ROLE OF ROUTINE FOETAL ANOMALY ULTRASOUND SCANS IN DETECTING AUTISM IN UTERO.

Salter L*, Stanfield A, Walker J, O'Hare A
University of Edinburgh, United Kingdom

Background: The routine Foetal Anomaly Scans (FAS) conducted in the Lothians since December 2008 offer a window into the foetal development of children who later developed autism compared to controls. Head circumference (HC), cerebellar diameter (CD), ventricular atrial width (VAW), femur length (FL) and abdominal circumference (AC) are all identifiable on 20 week gestation FAS.

Methods: we used retrospective FAS of children identified as later developing autism and extracted the above measurements from the scans. We compared 36 autistic children's scans with 108 controls. Growth rates between 18 and 24 weeks gestation between the two groups were compared.

Results: HC, CD, FL and AC all showed a significant effect of group and gestational age with factorial ANOVA analysis. There was also a significant effect of interaction, suggesting that the autistic children were growing at a faster rate during this period of foetal development. No significant VAW effects were found.

Conclusions: These results suggest that children with autism grow at a different rate to controls in the beginning of the 2nd trimester; notably, both their brains and bodies appear to grow faster at this stage. Autism may thus be detectable much earlier in development, allowing for targeted early treatment of the condition.

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Abstract 3
Clinical and Basic Science Research

ROLE OF HYPOXIA IN PROMOTING NEUTROPHIL-MEDIATED TISSUE INJURY.

Chen C*, Hoenderdos K, Condliffe AM, Chilvers ER
Addenbrooke's Hospital, United Kingdom

Background: Neutrophils are key effector cells of the innate immune system and play a major role in microbial defence. They are critical for microbial killing at sites of infection or inflammation through phagocytosis and release of cytotoxic granules. Many lung diseases are characterised by significant neutrophil infiltration into a hypoxic environment. Neutrophil function is modulated by hypoxia through hypoxia-inducible transcription factor, causing delayed apoptosis, impaired killing of bacteria and increased degranulation. Investigation into the pathological neutrophil phenotype is instrumental in gaining further insight into the pathophysiology of these lung diseases.

Methods: A neutrophil granule staining protocol, supported by a neutrophil elastase activity assay, was developed to examine the changes in the actin cytoskeleton and granule distribution after cell activation in a hypoxic environment. A549 cells were incubated in neutrophil supernatants and stained for cleaved caspase-3. Images were captured on a Leica TCS SP5 confocal microscope and analysed using ImageJ.

Results: Hypoxia caused polarised granule redistribution in neutrophils after N-formyl-methionyl-leucyl-phenylalanine activation. Hypoxia alone did not induce neutrophil granule redistribution. Hypoxic granulocyte macrophage colony-stimulating factor-activated neutrophil supernatants caused a clear enhancement in cleaved caspase-3 signal from the A549 cells as well as significantly increased cell-detachment ($p < 0.05$). Alpha-1-antitrypsin inhibited cell-detachment in a dose-dependent manner.

Discussion: Hypoxia primes neutrophil degranulation by stimulating signalling pathways for redistribution of the actin cytoskeleton, resulting in increased release of active neutrophil elastase. Hypoxia also induces a pro-apoptotic phenotype in neutrophils, mediated by a serine protease, most likely to be neutrophil elastase.

Conclusions: The hypoxia-modulated neutrophil phenotype shows characteristics that may be implicated in the pathophysiology of many lung diseases. Further elucidation would improve current understanding of disease pathology as well as development of future treatments.

Doctors Academy Grand Prize for Best Five Abstracts

Abstract 4
Clinical and Patient related work

BEDBOUND WITH BACK PAIN IN LATE PREGNANCY - A LOGISTICAL MANAGEMENT DILEMMA.

Chutter L*, Jones E, Conner C
Department of Obstetrics, University Hospital Wales, Cardiff

Back pain is common in pregnancy affecting approximately 56% of women. This can be attributed to physiological changes during pregnancy but can also be due to pathological causes. Approximately 1 in 10,000 women will have symptomatic lumbar disc herniation during pregnancy. Of these women, less than 2% will develop cauda equina. This report describes a 26-year-old primigravida presenting with worsening back pain. Neurological examination revealed reduced tone, sensation, power, co-ordination and reflexes in the right leg with up-going plantar reflex. Reduction in anal tone and saddle anaesthesia was also noted. MRI revealed a large L5/S1 disc herniation. An emergency caesarean section was performed under general anaesthetic but the following day the patient developed fulminant cauda equina requiring emergency discectomy. There is symptom overlap between cauda equina and pregnancy, for example urinary incontinence and back pain. Due to a high prevalence of back pain among pregnant women, red flag symptoms can be overlooked if a practitioner does not have a high level of suspicion. Logistically, management can be very difficult; weight gain, gestational age and gravid uterus impacts on surgical options and recovery, with minimal case publications for reference and help. It is vital to involve all of the multidisciplinary team in the care of these patients. Unfortunately, this patient continues to suffer from disability secondary to cauda equina. We hope that this case emphasises the need for detailed history and examination, with involvement of the multi-disciplinary team to enable quicker diagnoses, appropriate treatment and hopefully better functional outcomes.

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Doctors Academy Grand Prize for Best Five Abstracts

Abstract 5
Clinical and Patient related work

ELLAONE IN PRACTICE.

Rimmer M*, Sephton V
University of Liverpool

Aims/Objectives: To audit the day-to-day use of emergency contraception and compare the failure rates of levonorgestrel (previously the first line choice for emergency contraception) and ulipristal acetate (the new first line choice of emergency contraception) since the implementation of new guidelines from the faculty of sexual and reproductive health.

Background: Unplanned pregnancy is a multifactorial problem affecting up to 7% of women each year. Despite emergency contraception, many women still become pregnant and require termination of pregnancy (TOP). Increased effectiveness of emergency contraception and less reliance on TOP has positive benefits on a women's social mental and physical wellbeing. Studies looking at follicles close to ovulation have shown that levonorgestrel inhibits 14.6 % of follicles where as ulipristal acetate inhibits 58.8%.1 This suggests that ulipristal acetate works closer to ovulation, when risk of pregnancy is highest. This resulted in a change in guidance from the faculty of sexual and reproductive health to offer ulipristal acetate (trade name - ellaOne) as first line of emergency contraception over levonorgestrel.

Methods: An audit of women, receiving ulipristal acetate as 1st line emergency contraception was compared to a retrospective audit of women who received levonorgestrel as 1st line.

Results & Conclusions: 662 women received ulipristal acetate of which 1 required a TOP (failure rate of 0.0015106); 1397 received levonorgestrel of which 5 required a TOP (failure rate 0.0030157).

The odds ratio (of the failure rates) between ulipristal acetate compared to levonorgestrel is 0.50. (Calculation: Odds Ratio = 0.0015106 / 0.0030157 = 0.50091189)

This demonstrates that the change in faculty guidance is justified and that data from studies suggesting that ulipristal acetate is more effective than levonorgestrel is reflected in clinical practice.

References: 1. Brache V et al., Hum Reprod, 2010; 25: 2256–63.

Winners in Individual Categories
Oral presentations

First Prize
Category: Clinical and Basic Science Research

KNOCK OUT OF THE EXTRACELLULAR CALCIUM-SENSING RECEPTOR FROM VASCULAR SMOOTH MUSCLE CELLS RESULTS IN REDUCED BLOOD PRESSURE AND SECONDARY CARDIAC OUTCOMES.

Edwards PJ*, Schepelmann M, Davies T, Yarova P, Brennan S, Chang W, Krssak M, Kemp P, Riccardi D
School of Biosciences, Cardiff University, Cardiff, United Kingdom

The extracellular calcium-sensing receptor (CaSR) is expressed in all three layers of arterial blood vessels, where its primary function remains unclear. By knocking out CaSR in vascular smooth muscle cells (VSMCs) using LoxP-Cre recombination (SM22a-Cre x LoxP-CaSR) we aim to further investigate the roles of the CaSR in VSMCs. Even though lifespan and reproductive capabilities were unchanged between wild-type (WT) and knock-out (KO) mice, strong differences were found in the cardiovascular phenotype of the animals. At 3 months of age, KO mice showed a significantly reduced diastolic blood pressure ($p<0.01$) and mean arterial blood pressure ($p<0.01$) compared to WT controls, measured using radiotelemetry. Histological analysis of WT and KO aortas revealed no difference in aortic wall thickness or tunica-media collagen content. At 14 months of age, cardiac magnetic resonance imaging revealed no difference in end-diastolic (ED) left ventricular (LV) wall thickness but a significant increase in end-systolic (ES) LV wall thickness ($p<0.05$) and LV wall thickening (DES-ED $p<0.05$). Histological analysis of WT and KO hearts demonstrated a marked reduction in variance of cardiac fibrosis, but no difference in cardiomyocyte cross-sectional area. At 6 months of age, there was no difference between the wet heart weights of KO animals compared to WT controls, but by 18 months of age, KO hearts were significantly heavier than WT controls ($p<0.05$), suggesting a late onset of cardiac hypertrophy. In conclusion, the CaSR in VSMCs appears to play a key role in regulating blood pressure and its loss may result in multiple secondary cardiac outcomes.the most effective prompt for regular BMI assessment. Calculation of BMI should be a core part of COC prescription.

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Winners in Individual Categories
Oral presentations

Second Prize (Joint)
Category: Clinical and Basic Science Research

THE ROLE OF ROUTINE FOETAL ANOMALY ULTRASOUND SCANS IN DETECTING AUTISM IN UTERO.

Salter L*, Stanfield A, Walker J, O'Hare A
University of Edinburgh, United Kingdom

Background: The routine Foetal Anomaly Scans (FAS) conducted in the Lothians since December 2008 offer a window into the foetal development of children who later developed autism compared to controls. Head circumference (HC), cerebellar diameter (CD), ventricular atrial width (VAW), femur length (FL) and abdominal circumference (AC) are all identifiable on 20 week gestation FAS.

Methods: we used retrospective FAS of children identified as later developing autism and extracted the above measurements from the scans. We compared 36 autistic children's scans with 108 controls. Growth rates between 18 and 24 weeks gestation between the two groups were compared.

Results: HC, CD, FL and AC all showed a significant effect of group and gestational age with factorial ANOVA analysis. There was also a significant effect of interaction, suggesting that the autistic children were growing at a faster rate during this period of foetal development. No significant VAW effects were found.

Conclusions: These results suggest that children with autism grow at a different rate to controls in the beginning of the 2nd trimester; notably, both their brains and bodies appear to grow faster at this stage. Autism may thus be detectable much earlier in development, allowing for targeted early treatment of the condition.

Winners in Individual Categories
Oral presentations

Second Prize (Joint)
Category: Clinical and Basic Science Research

ROLE OF HYPOXIA IN PROMOTING NEUTROPHIL-MEDIATED TISSUE INJURY.

Chen C*, Hoenderdos K, Condliffe AM, Chilvers ER
Addenbrooke's Hospital, United Kingdom

Background: Neutrophils are key effector cells of the innate immune system and play a major role in microbial defence. They are critical for microbial killing at sites of infection or inflammation through phagocytosis and release of cytotoxic granules. Many lung diseases are characterised by significant neutrophil infiltration into a hypoxic environment. Neutrophil function is modulated by hypoxia through hypoxia-inducible transcription factor, causing delayed apoptosis, impaired killing of bacteria and increased degranulation. Investigation into the pathological neutrophil phenotype is instrumental in gaining further insight into the pathophysiology of these lung diseases.

Methods: A neutrophil granule staining protocol, supported by a neutrophil elastase activity assay, was developed to examine the changes in the actin cytoskeleton and granule distribution after cell activation in a hypoxic environment. A549 cells were incubated in neutrophil supernatants and stained for cleaved caspase-3. Images were captured on a Leica TCS SP5 confocal microscope and analysed using ImageJ.

Results: Hypoxia caused polarised granule redistribution in neutrophils after N-formyl-methionyl-leucyl-phenylalanine activation. Hypoxia alone did not induce neutrophil granule redistribution. Hypoxic granulocyte macrophage colony-stimulating factor-activated neutrophil supernatants caused a clear enhancement in cleaved caspase-3 signal from the A549 cells as well as significantly increased cell-detachment ($p < 0.05$). Alpha-1-antitrypsin inhibited cell-detachment in a dose-dependent manner.

Discussion: Hypoxia primes neutrophil degranulation by stimulating signalling pathways for redistribution of the actin cytoskeleton, resulting in increased release of active neutrophil elastase. Hypoxia also induces a pro-apoptotic phenotype in neutrophils, mediated by a serine protease, most likely to be neutrophil elastase.

Conclusions: The hypoxia-modulated neutrophil phenotype shows characteristics that may be implicated in the pathophysiology of many lung diseases. Further elucidation would improve current understanding of disease pathology as well as development of future treatments.

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Winners in Individual Categories
Oral presentations

Third Prize
Category: Clinical and Basic Science Research

IN VITRO INDUCTION OF REGULATORY T CELLS AND THEIR POTENTIAL IN TRANSPLANTATION.

Lee J*, Pettigrew G, Ali J
Addenbrooke's Hospital, University of Cambridge, United Kingdom

Introduction: Transplantation is now the treatment of choice for end-stage organ failure. Its success though is limited by the inevitable development of chronic rejection, despite current immunosuppressive therapy. Regulatory T-cells (Tregs) are well characterised as immunoregulatory cells of the adaptive immune system and have become an attractive treatment option. Here we investigate the potential of in-vitro induced Tregs as an immunomodulatory therapy to prevent the development of chronic rejection.

Methods: A heterotopic model of murine cardiac transplantation was investigated, utilising wild-type C57BL/6 recipients and bm12.Kd.IE donors (mismatched at both MHC class I and II loci). Naïve C57BL/6 CD4 T-cells were isolated and subjected to a 5-day period of in-vitro culture under various conditions to generate both polyclonal and donor antigen-specific Tregs. Treg induction was confirmed by demonstrating expression of CD25 and FOXP3 using flow cytometry. The regulatory phenotype was also assessed by performing in-vitro suppression assays.

Results: Both polyclonal and antigen-specific induced Tregs were successfully generated. Polyclonal, but not antigen-specific, Tregs suppressed in-vitro proliferation of polyclonally stimulated T-cells, likely reflecting the antigen specificity of their regulatory activity. Transfer of both antigen-specific and, to a lesser extent, polyclonal Tregs to transplanted mice resulted in a significant reduction in the progression of chronic rejection as evidenced by a reduction in antibody production and the development of allograft vasculopathy.

Conclusion: Early results in a murine model suggest that antigen-specific induced Tregs may be a particularly effective immunomodulatory therapy in transplantation, with the potential to attenuate or prevent the development of chronic rejection.

Winners in Individual Categories
Oral presentations

First Prize
Category: Clinical and Patient related work

BEDBOUND WITH BACK PAIN IN LATE PREGNANCY - A LOGISTICAL MANAGEMENT DILEMMA.

Chutter L*, Jones E, Conner C
Department of Obstetrics, University Hospital Wales, Cardiff

Back pain is common in pregnancy affecting approximately 56% of women. This can be attributed to physiological changes during pregnancy but can also be due to pathological causes. Approximately 1 in 10,000 women will have symptomatic lumbar disc herniation during pregnancy. Of these women, less than 2% will develop cauda equina. This report describes a 26-year-old primigravida presenting with worsening back pain. Neurological examination revealed reduced tone, sensation, power, co-ordination and reflexes in the right leg with up-going plantar reflex. Reduction in anal tone and saddle anaesthesia was also noted. MRI revealed a large L5/S1 disc herniation. An emergency caesarean section was performed under general anaesthetic but the following day the patient developed fulminant cauda equina requiring emergency discectomy. There is symptom overlap between cauda equina and pregnancy, for example urinary incontinence and back pain. Due to a high prevalence of back pain among pregnant women, red flag symptoms can be overlooked if a practitioner does not have a high level of suspicion. Logistically, management can be very difficult; weight gain, gestational age and gravid uterus impacts on surgical options and recovery, with minimal case publications for reference and help. It is vital to involve all of the multidisciplinary team in the care of these patients. Unfortunately, this patient continues to suffer from disability secondary to cauda equina. We hope that this case emphasises the need for detailed history and examination, with involvement of the multi-disciplinary team to enable quicker diagnoses, appropriate treatment and hopefully better functional outcomes.

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Winners in Individual Categories
Oral presentations

Second Prize
Category: Clinical and Patient related work

PERILS IN A PROGRESSIVE NECK SWELLING: WHEN IS A HOOF PRINT NOT A HORSE?

Kanzara T*, Hall A, Namnyack S, Owa T
Lister Hospital, Stevenage

Introduction: Neck swellings due to rapidly growing Mycobacterium, are uncommon in immunocompetent people. Diagnosis relies on accurate microbiology analysis and a high index of suspicion. Misidentification of offending organisms can create problems in management resulting in patients receiving inappropriate treatment.

Case Report: An immunocompetent 31-year-old black African man presented with a 6-month history of progressive neck swelling originating from the occiput and tracking along the anterior border of the sternocleidomastoid muscle terminating next to the thyroid cartilage. Magnetic Resonance Imaging showed abnormal signalling in the subcutaneous fat overlying the posterior spinal muscles in the midline and the left sternocleidomastoid muscle with no muscular infiltration. Analysis of samples from fine needle aspiration using Analytic Profile Index performed locally identified Rhodococcus equi on 2 separate occasions. Antibiotics were commenced based on sensitivities. However, the swelling increased in size despite treatment with a variety of antibiotic combinations thereby necessitating surgical management. Partial sequencing of 16s rDNA gene sequencing analysis of debrided tissue surprisingly identified Mycobacterium Fortuitum; not Rhodococcus Equi. Surgery and molecular analysis of tissue proved crucial in managing the patient providing valuable lessons in management of cases that fail to respond to 'correct' treatment.

Winners in Individual Categories
Oral presentations

Third Prize
Category: Clinical and Patient related work

ASE REPORT: A RARE CASE OF CANNABINOID HYPEREMESIS SYNDROME.

Samee T*
Colchester General Hospital, United Kingdom

Background: The association between cannabis use and hyperemesis was first proposed 10 years ago following the observation of cyclical vomiting patterns amongst 19 patients in southern Australia. Coinciding with the rising popularity of cannabis use, Cannabinoid Hyperemesis Syndrome (CHS) has gained some recognition but the medical community remains largely unaware of it.

Case: A 23-year-old lady was admitted during a surgical take for the 5th time in 6 months and 3rd time in 5 days with severe colicky abdominal pain, nausea, bouts of retching and vomiting. In hospital she displayed compulsive showering habits (8-9 per day) which provided her with temporary symptomatic relief as well as admitted being a heavy cannabis user. Her abdomen was SNT with regular and normal bowel openings. Her routine bloods and recent and past radiological exams (XR/USS/CT) failed to reveal a source of her symptoms. CHS was suspected and a urine tox-screen was performed, revealing cannabis+++. She was managed conservatively for 4 days with IV fluids and analgesia until her symptoms settled.

Discussion: Six months prior to admission, our patient started experiencing cyclical vomiting which lasted for 4-5 days and was accompanied by intense colicky abdominal pain and severe nausea. She also reported unintentional weight loss of 12 kgs over the last 6 months. The patient's multiple admissions prior to diagnosis is typical of CHS. The lack of awareness of the syndrome leads to extensive investigations of unexplained symptoms and can remain undiagnosed for several years causing much frustration to doctors and its sufferers.

Conclusion: Following the diagnosis in August 2013, the patient has remained asymptomatic and has not had any further admissions. Accurate recognition of the cause of her symptoms has helped the patient make the right choices to return to a normal life and prevented further hospital admissions.

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Winners in Individual Categories
Oral presentations

First Prize
Category: Clinical Audit

ELLAONE IN PRACTICE.

Rimmer M*, Sephton V
University of Liverpool

Aims/Objectives: To audit the day-to-day use of emergency contraception and compare the failure rates of levonorgestrel (previously the first line choice for emergency contraception) and ulipristal acetate (the new first line choice of emergency contraception) since the implementation of new guidelines from the faculty of sexual and reproductive health.

Background: Unplanned pregnancy is a multifactorial problem affecting up to 7% of women each year. Despite emergency contraception, many women still become pregnant and require termination of pregnancy (TOP). Increased effectiveness of emergency contraception and less reliance on TOP has positive benefits on a women's social mental and physical wellbeing. Studies looking at follicles close to ovulation have shown that levonorgestrel inhibits 14.6 % of follicles where as ulipristal acetate inhibits 58.8%.1 This suggests that ulipristal acetate works closer to ovulation, when risk of pregnancy is highest. This resulted in a change in guidance from the faculty of sexual and reproductive health to offer ulipristal acetate (trade name - ellaOne) as first line of emergency contraception over levonorgestrel.

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References: 1. Brache V et al., Hum Reprod, 2010; 25: 2256–63.

Winners in Individual Categories
Oral presentations

Second Prize
Category: Clinical Audit

COULD ATTENDANCE AT LECTURES AND TEACHING SESSIONS BE IMPROVED BY BETTER TIMETABLE PLANNING, COMMUNICATION BETWEEN EDUCATIONAL SITES AND TAILORING LEARNING OBJECTIVES TO STUDENT'S REQUESTS? A PROSPECTIVE STUDY OF THIRD YEAR MEDICAL EDUCATION.

Moori P, Alexander L,Richards B, Blessed R, Bleasdale V, Nevins E*
University of Liverpool, United Kingdom

Undergraduate medical students require exposure to varied educational opportunities to supplement learning. This prospective study presents quantitative data concerning attendance throughout clinical rotations during third year at Liverpool University Medical School. Records of attendees at lectures, ward teaching and problem based learning sessions were collated through head counting. Compulsory lectures were better attended than non-compulsory lectures (90% vs 79% p=0.0005). When PowerPoint slides were accessible prior to the lecture or long timetable gaps were present, attendance was lower (74% vs 89%, p=0.0012). Attendance was higher for lectures not on the university campus, likely due to lectures being given at the placement hospital for which they were already scheduled to attend (91% vs 79%, p=0.0066). Whereas on campus, students are not motivated to travel in. The University of Liverpool embraces self-directed learning, which includes some unsupervised PBL sessions that showed excellent attendance where students were expected to sign in and poor attendance where no monitoring was present (100% vs 0%, p<0.00001). The same trend was observed for lecture attendance. This was possibly due to fear of repercussion at sites where attendance is scrutinised. Improved attendance could result if lectures and tutorials coincided with hospital placements. The use of sign-in sheets, fewer gaps between lectures and multiple sessions within a day would see a marked increase in attendees. Smaller ward based training sessions are better attended and fulfil the teaching requests of students. In future, medical schools should take these factors into consideration to enhance student motivation to attend these learning opportunities.

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Winners in Individual Categories
Oral presentations

Third Prize
Category: Clinical Audit

IMPLEMENTATION OF A COMBINED CARDIOPULMONARY RESUSCITATION AND TREATMENT ESCALATION PLAN DOCUMENT IN A DISTRICT GENERAL HOSPITAL.

Stockdale C*, Trivedi B, Jerome E, Salih S, Huntley C, Cooke E
Musgrove Park Hospital, Taunton

Documentation of appropriate escalation of treatment was identified as a problem for junior doctors and Critical Care Outreach Nurses at Musgrove Park Hospital. An audit of resuscitation and escalation documentation of all wards found that of the patients who were not for Cardiopulmonary resuscitation (and therefore not for full escalation of care), 78.4% had no documentation of the appropriate level of escalation of treatment should they deteriorate. The majority of junior doctors had experienced cases where they felt that inappropriate treatment had been given, where no escalation plan was documented. Using several Plan, Do, Study, Act (PDSA) cycles, we developed a treatment escalation plan (TEP) tool to be included in the resuscitation form to prompt the responsible clinician to consider and document appropriate escalation of treatment. The CPR-TEP form was trialed using a quasi-experiment design allowing the aim to be tested using two groups – intervention and control. All patients in the intervention group were not for CPR and therefore had their TEP-CPR form filled in fully (n= 68). The control group consisted of patients who were not for CPR but who did not have a TEP form filled in (n=36). The appropriateness of OOH (out of hours) treatment in those patients who experienced clinical deterioration was judged by questionnaire-based feedback from the in -hours team the following morning and indicated that 11.1% of patients in the group with the new CPR-TEP document had received inappropriate OOH care compared to 44 4% of patients in the group without the document. Using the TEP alongside resuscitation documentation prompts the responsible clinician to consistently consider and document the appropriate escalation of care for their patient, improving communication with the out-of-hours team and appropriate escalation of care in the event of patient deterioration.

Winners in Individual Categories
Poster presentations

First Prize

UNDERSTANDING TYROSINE KINASE INHIBITOR RESISTANCE IN ENDOMETRIAL CANCER CELLS.

Liu JKH*, Fearon AE, Grose RP
Bart's and The London School of Medicine and Dentistry, United Kingdom

Introduction: Several oncogenic mutations in the fibroblast growth factor receptor 2 (FGFR2) have been identified in approximately 10% of cases of endometrial cancer. PD173074 is a novel FGFR2 inhibitor that targets the ATP-binding pocket and blocks FGFR2 signalling. However, these endometrial cancer cells eventually develop resistance to PD173074.

Aims and Objectives: We aim to assess the effects of PD173074-resistant endometrial cancer cells grown in the absence of PD173074 by employing a strategy of discontinuous inhibitor treatment for 7 days and then exploring its impact on cell survival and some of the mechanisms the tumour cells use to maintain drug resistance. Hypothesis: We hypothesise that PD173074-resistant endometrial cancer cells cannot survive and proliferate as efficiently in the absence of PD173074.

Methods: A PD173074-resistant AN3CA cell line was grown in PD173074-free medium for 7 days. Its effects on cell survival were measured by cell counting and possible mechanisms of drug resistance were detected using Western blotting.

Results: There was no significant difference in cell survival when the PD173074-resistant cells were grown in PD173074-free medium compared to the control after 7 days. However, these cells showed upregulation of p -ERK compared to the control.

Conclusion: Growth of PD173074-resistant endometrial cancer cells is not inhibited in the absence of PD173074 and these cells demonstrate upregulation of specific compensatory signalling pathways that have been implicated in drug resistance.

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Winners in Individual Categories
Poster presentations

Second Prize

AUSTERITY BRITAIN: CAN WE AFFORD SURGICAL MANAGEMENT OF MALIGNANT SPINAL CORD COMPESSION

To WKL*, Sian P, Vazquez B, Killingworth A, Grainger M, Stirling A
The Royal Orthopaedic Hospital, Birmingham, United Kingdom

The cost of health care is increasing both directly through more sophisticated treatment and indirectly through longer survival. However, it is currently an age of austerity and health care spending is facing increasing scrutiny. Therefore, it is imperative that the predicted and actual cost of service provision is accurately audited. It is not clear what the financial implications of managing spinal oncology are. This study aimed to look at the financial cost of managing patients with malignant spinal cord compression at a UK tertiary orthopaedic centre over a period of 6 months. Human Resource Group codes were generated from following all referrals taken in the defined period. Services included in the analysis were verbebroplasty, CT guided biopsy, stabilisation and decompression, curative excision, outpatient clinic, and multi-disciplinary team meeting. This actual cost of the services provided were compared to the income received by the Hospital Trust. The costs and incomes from different aspects of service provision were stratified. Over the study period, the total cost of providing a specialist service to spinal oncology patients is £545,266, compared to an income of £365,155. The area of significant shortfalls were providing surgical intervention, vertebroplasty, and obtaining biopsy under radiological guidance. The results will be discussed in the context of alternative treatment modalities such as radiotherapy and conservative management. Suggestions of ways to improve current organisation of spinal oncology will be made.

Winners in Individual Categories
Poster presentations

Third Prize

IMPROVING LUMBAR PUNCTURE (LP) PRACTICE WITHIN ACUTE MEDICINE.

E.Bunting*, R.Wood*, A Mahdi, W.Munro, B.Ridha
Royal Sussex County Hospital (RSCH), Brighton and Sussex University Hospitals NHS Trust (BSUH)

Background: Within BSUH a number of LP related 'near-misses' were highlighted. Additionally there were concerns over the variable experience in those performing LPs, the receipt of inadequate CSF volumes in the laboratory and a lack of documentation. Through an audit process we aimed to identify current issues and develop local guidelines to promote best practice.

Methods: We retrospectively audited all LPs performed at the RSCH in November 2012. Cases were identified from laboratory records; we excluded LPs performed in ITU, paediatric and HIV patients, and outpatients. 29 cases were identified; information was obtained from computer databases and 21 casefiles. We reviewed the indication for LP, the procedure itself, any adverse outcomes and the clinical significance of the results.

Results: LPs were performed on average once per day. 50% were performed by junior doctors and 14% did not have a coagulation screen prior to the procedure. Documentation was limited; 81% had inadequate documentation of consent, needle size and type were only documented in 71% and 62% respectively, and no opening pressure was recorded in 24%. Samples received by the laboratory were frequently inadequate (a paired serum sample was received in only 52%). One third of cases were discussed with a neurologist; following discussion 2 LPs needed to be repeated. 9% of patients had post-LP headache, in keeping with published rates.

Discussion: Three areas for improvement were identified; the need to standardise documentation, ensure correct, sufficient samples reach the laboratory and promote appropriate and timely neurology input. To this end we developed a guideline, proforma, LP pack (with appropriate needles) and a patient information leaflet.

Conclusion: The results of the audit were disseminated to local medical teams and the guidelines and proforma introduced. A re-audit will be performed in July 2014 to evaluate the interventions and continue the cycle of development of best practise.

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Oral Presentations

Category: Clinical and Basic Science Research

OCRL1 INTERACTS WITH CD2AP AND IS EXPRESSED IN HUMAN PODOCYTES.

Kirkwood-Wilson R*, Hamidi H, Lowe M, Lennon R
University of Manchester, United Kingdom

Introduction: Mutation of the inositol polyphosphate 5-phosphatase, OCRL1, causes the X-linked disorder oculocerebrorenal syndrome of Lowe (Lowe syndrome), characterised by eye, brain and kidney defects. The renal phenotype comprises a proximal tubulopathy characterised by low molecular weight proteinuria; additionally, a subset of patients have been found to have glomerulosclerosis on renal biopsy. We therefore hypothesised that OCRL1 plays an important role in podocyte function, possibly in the maintenance of the slit-diaphragm, which is a crucial component of the glomerular filtration barrier. As a first step to investigate this hypothesis we investigated OCRL1 expression and its molecular interactions in human podocytes.

Methods: Using wild-type human podocytes (ref Saleem, MA et al 2002), we performed immunoblotting, immunoprecipitation, protein pull-down experiments and immunocytochemistry to characterise expression, interaction and localisation of OCRL1. In addition we reviewed a renal biopsy from a patient with Lowe syndrome and renal dysfunction.

Results: We found that OCRL1 is expressed in human podocytes, as expected, and went on to demonstrate an interaction with CD2AP, which likely occurs indirectly via IPIP27A, a key regulator of endocytic traffic. Within podocytes, both OCRL1 and CD2AP co-localise with components of the early endocytic pathway, providing evidence that OCRL1 may function, in a protein complex with CD2AP and IPIP27A, to regulate these pathways within the podocyte in vitro. In addition, we found evidence of glomerular pathology in a patient with Lowe syndrome.

Discussion: Our findings suggest that OCRL1 may have a role in endocytic trafficking in podocytes in addition to renal tubular cells and future studies will focus on defining this functional role. In parallel, further investigation of patients with Lowe syndrome will help to determine whether they are at risk of developing glomerular dysfunction.

POLYCYSTIC OVARY SYNDROME IN FIRST VERSUS SECOND GENERATION ASIAN WOMEN; A COMPARATIVE ANALYSIS.

Ribbons H.A*, Karasu T, Lashen H
University of Sheffield, United Kingdom

What are the phenotypical differences between first and second generations Asian women with Polycystic Ovary Syndrome (PCOS)? First and second generation Asian women differ with regards to age of onset of symptoms, presenting complaint and SHBG levels. There have been no published studies assessing if differences exist between the first and second generations of Asian women in the UK. This is a retrospective cohort study of 144 patients to examine the differences between first (102) and second (42) generations of Asian PCOS women in the UK. These women are from the Indian subcontinent, suffering from PCOS (Rotterdam Criteria). Several parameters were compared between the two groups. The first and second generation Asian women were identified and compared with each other. In this Asian population; the second generation patients presented at an earlier age ($p=0.027$) than first generation women. Significantly more first generation patients presented with infertility ($p=0.001$) while significantly more second generation patients presented with PCOS related symptoms ($p=0.001$). There are significantly higher levels of SHBG in second generation patients ($p=0.022$). The study identifies statistically significant differences between first and second generation Asian women suffering from PCOS.

PROGRESS TOWARDS GENETIC MANIPULATION OF MICROSPORIDIANS USING CELL FREE CULTURE AND LASER PERMEABILISATION TECHNIQUES.

Filipescu T*
University of St Andrews, United Kingdom

Introduction: Microsporidians are obligate intracellular parasites affecting immunocompromised patients. They are genetically reduced organisms which have lost a number of metabolic pathways and steal host ATP energy in order to complete a complicated life cycle. Our project's aim was to investigate methods for reversible permeabilisation of intracellular vegetative stages of microsporidia for purposes of genetic manipulation. In current literature there are no reports of successful microsporidian permeabilisation experiments.

Laser poration: Rabbit kidney cells infected with T. hominis microsporidia have been covered with propidium iodide fluorescent dye. Using an inverted microscope, a laser beam has been focused on the desired infected cell. The membranes of the host cell and the parasite were successively perforated to ensure parasite viability and dye diffusion. Cell free culture: T. hominis infected rabbit kidney cells were broken open and cultured in a mixture containing cell cytosol and an ATP regenerating system. Cells were fixed and embedded for electron microscopy.

Results: Using laser poration, there was good permeabilisation of the host and parasite cells but the survival rate was low. Using cell free culture, the EM investigations showed the presence of viable parasites in the synthetic environment.

Conclusions: The cell free culture and synthetic environment use open up the possibility of genetic manipulation of intracellular parasites using standard transfection reagents that are currently used in mammalian cells. This technique can be adapted for other organisms, including malarial parasites. NB – Please do NOT publish this abstract in any journal for data protection purposes.

POLYAMINE CONJUGATES - A NEW MEANS OF ANTICANCER DRUG DELIVERY.

Welsh S*
University of Aberdeen, United Kingdom

Background: Polyamines (putrescine, spermine and spermidine) are ubiquitously expressed polycationic molecules recognised for their essential role in cell growth. Intracellular polyamine concentrations are maintained by the dynamic interaction between *de novo* biosynthesis and uptake of preformed polyamines from extracellular sources via a polyamine transport system (PTS). A variety of proliferating cancer cells have demonstrated disrupted polyamine metabolism and pathophysiologically elevated intracellular concentrations for which PTS hyperactivity has been recognised as the primary cause. Despite much research the PTS remains poorly understood, however, it is recognized for its poor specificity which has led to its targeting in the development of novel targeted anticancer therapies. It may be possible to exploit the accelerated PTS demonstrated selectively in proliferating cancer cells with polyamine-cytotoxic conjugates, providing a Trojan -horse approach of bringing cytotoxics into cancerous cells.

Method: The cytotoxicity of three naphthalane diimide-polyamine conjugates (CM3, CM32, CM52) against pancreatic carcinoma cell line, PANC1, was investigated using MTT assays. Thereafter, the contributing role of the PTS in conjugate uptake was assessed indirectly by pre-treating cells with difluoromethylornithine (DFMO). DFMO is a potent irreversible suicide inhibitor of key polyamine biosynthetic enzyme, ornithine decarboxylase (ODC), resulting in polyamine depletion and subsequent accelerations of any pre-existing PTS hyperactivity. This would theoretically increase conjugate uptake, resulting in an enhanced conjugate cytotoxicity profile, provided the conjugate is recognised by the PTS. Cell protein and polyamine content was quantified with Lowry assay and liquid chromatography mass spectrometry respectively.

Results: Dose-dependent cytotoxicity profiles were established with mean half inhibitory (IC50) concentrations ranging from 5.17(±2.02) to 15.50(±3.28) µg/ml (values expressed as mean±standard deviation

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(n=3)). DFMO pre-treatment did not significantly lower cytotoxicity and polyamine studies revealed incomplete polyamine depletion.

Concentration: Incomplete polyamine depletion undermines the ability to determine the role of the PTS in conjugate uptake although conjugates do demonstrate promising potency warranting further investigation.

VARICOSE VEINS AS MARKERS FOR ARV COMPLIANCE IN HIV PATIENTS AN IMPLICATIONS FOR RESOURCE POOR COUNTRIES - A RANDOMISED OBSERVATIONAL STUDY.

Lemon TI*
York Hospital, York

Aims: To establish the prevalence of chronic venous insufficiency in HIV/AIDS patients. To investigate links between ARVs, chronic venous insufficiency and disease severity.

Methods: During an HIV/AIDs clinic in Uganda, 127 people with laboratory diagnosed HIV/AIDs were examined and interviewed for signs and symptoms of chronic venous insufficiency. Medication history and CD4 counts were recorded. Patients with unconfirmed HIV/AIDS, not currently on ARVs or with other risk factors for chronic venous insufficiency were excluded. Ethics approval was gained from the governing hospital.

Results: Of the 127 identified, 115 (91%) patients were included. These patients had a mean age of 38 years and were 82 (71%) female. The mean length of infection was 65 months. The mean length of ARV treatment was 47 months. 104 (90%) patients had a history of Aspen combination therapy. 76% of patients had varicose veins. This was strongly correlated to low CD4 count and previous/current use of ARV combinations, particularly Zidovudine. There was some correlation between a lower CD4 and larger varicose veins. 111 (97%) patients described symptoms of some degree of venous insufficiency.

Conclusions: This study, the largest of its kind, shows patients with low CD4 and ARV therapy have a tendency to acquire chronic venous insufficiency. This has potential for disease and compliance monitoring in resource poor settings. It also highlights the importance of venous management in HIV/AIDs patients. Further work is needed to identify the exact cause for the varicose vein appearance. Either way, these findings may have an important impact on global health and HIV/AIDs management.

CROSSTALK BETWEEN C5a AND FATTY ACIDS IN MONOCYTES.

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C5a is the most effective anaphylactic agent generated after complement activation. It initiates production of inflammatory cytokines and facilitates swelling and infiltration of immune cells into the affected tissue. In obese subjects, up to 40% of the adipose tissue can be made up of macrophages which become associated with inflammation. Certain fatty acids (FA) and adipokines (produced by adipocytes) can interact with these macrophages, modulating the inflammation. This exploratory project aims to investigate the effects, in an in vitro model, of saturated and omega-3 FA on the C5a and LPS induced activation of macrophages. Two mouse macrophage cell lines (RAW264.7 and J774.2) were used. TNFa secretion, as tested by ELISA, was used as a measure of activation. Changes in C5aR expression were analysed by western blotting and flow cytometry. Immediate activation events of the C5aR were assessed using Fura-2 calcium indicator. RAW264.7 and J774.2 mouse macrophages respond to C5a and LPS stimulation with an increase in TNFa secretion. C5a and LPS induced TNFa secretion was down-regulated by the unsaturated FA eicosapentaenoic acid (dose dependently) but had no down-regulatory effect on expression of C5aR, or calcium signalling ability of the C5aR. This project presents novel finding on the inhibitory effect of EPA on C5a mediated inflammation. The crosstalk between these mediators that occurs in vivo is likely to be more complex than can be replicated in this study. Modulation of inflammation-associated pathologies by EPA may lead to development of novel therapeutics.

MEGALOBLASTIC ANEMIA – AN INDICATOR TO DO PAP TEST?

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Background: Aberrant DNA methylation is a recognized feature of human cancers, folate is directly involved in DNA methylation via one-carbon metabolism. HPV targets the DNA to cause cervical pathology. Due to this common link between folate and HPV, this study aims at finding whether there is any co-relation between Megaloblastic anemia and cervical pathology. The objective was to compare and study the cervical cytomorphology between the two groups. If significant co-relation is obtained, women megaloblastic anemia could be advised to do Pap test regularly for early detection of cervical pathology and future aversion of complications.

Methods:
Type of study: Case-Control study.
Study Population: 62
Study group: Female patients diagnosed as megaloblastic anemia on Bone marrow aspiration in the age group of 25-60 years of age. (n=20) OR MCV > 100 fl on CBC.
Control group: Non-anemic (hemoglobin above 12g/dl) (n=42)

Exclusion criteria: ANC/unmarried women.

Results:
• The pap smears of 8 cases and 41 controls were NILM
• 8 cases were reported as ASCUS.
• 4 cases showed inflammatory atrophic smear pattern. (Age > 50 years).
• No case of HSIL was seen.
• 1 "suspicious for malignancy" was reported from the control group.

Conclusion:
• Megaloblastic Anemia itself is not an indicator to do Pap test but if the woman also presents with hematological derangement such as low RBC folate and severe anemia she could be advised to take Pap test in the future.
• Data obtained was not statistically significant as there was no significant difference in the two groups.
• A larger study over a longer period of time is necessary to confirm or to negate the hypothesis.

MEASURING OUTCOME AFTER SUBARACHNOID HAEMORRHAGE; THE DEVELOPMENT OF A NEW SAH-SPECIFIC OUTCOME TOOL: THE SAHOT (SUBARACHNOID HAEMORRHAGE OUTCOME TOOL).

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Background: Assessment of patient outcome post SAH is not standardized – at present; there is no outcome tool specific to subarachnoid haemorrhage. We aim to construct and validate a new questionnaire (SAHOT) to be utilized by health-care professionals, to assess patient outcome and clinical need, and for use in SAH research.

Materials/methods patients: SAH patients were recruited from neurovascular specialist nurse and neurosurgical clinics at Southampton General Hospital. Patient inclusion criteria were aneurysmal SAH (with any/no form of treatment) and fluency in English.

Design: Following a literature search, a multi-disciplinary team with frequent contact with SAH patients developed a preliminary set of points for this questionnaire, which was presented to a focus group of SAH patients on several occasions for input on usability, design, alteration of items and suggestion of additional items. The final 60 point tool has 4 sections – General Aspects of Daily Life, Physical Aspects, Cognitive

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Aspects, and Behavioural/Psychological Aspects. The SAHOT was administered to patients and next-of-kin, together with Glasgow Outcome Score (Extended Version) and modified Rankin Scale.

Results: Over 9 months, 95 patients and 90 next-of-kin were interviewed by one medical student, at 3 months post-SAH, 6 months post-SAH, or both time points. Rasch analysis of the data is currently ongoing.

Conclusions: The SAHOT is the first attempt to develop a neurological patient-reported functional outcome tool specific for subarachnoid haemorrhage.

THE DECLINE IN AGE AT MENARCHE AND ITS ASSOCIATION WITH BODY MASS INDEX IN SAUDI ARABIA.

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Introduction: Rationale Increasing rates of childhood obesity and rapid changes in socio-economic status in the Kingdom of Saudi Arabia resulted in a decline in age at menarche which contributes to a number of diseases affecting women's future health.

Objectives: To investigate the mean age at menarche in girls ages 9-16 in Riyadh, Saudi Arabia, and observe its relationship with their body mass index and other covariates.

Methods: A cross-sectional study was conducted on 364 students in both private and governmental schools in Riyadh, Saudi Arabia, during March 2013 Data on demographics, socioeconomic status, physical activity, diet, and age at menarche were collected using self-administered questionnaires distributed on students and their mothers Physical examinations were conducted to provide anthropometric measurements.

Results: A total of 304 students were included, with a mean age (SD) of 12 52(2 08), 165 (54 3%) of whom attained menarche Mean menarcheal age (SD) for the girls was 12 08 (1 28), and 13 13 (1 67) for their mothers, the difference between them was found to be significant (P<0 001) The mothers mean age at menarche was positively correlated with their daughters (r=0 411, P<0 001) There was no significant correlation between BMI and age at menarche (P>0 05) A significant difference was present in the mean age at menarche (SD) between governmental and private school students, 12 34 (1 19) and 11 59 (1 3) years, respectively (P<0 001).

Recommendations: The declining trend in age at menarche suggest that its modifiable influencing factors should be monitored and taken into account in strategies that aim to combat the potentially adverse.

NOVEL VERSUS STANDARD PERCUTANEOUS VERTEBROPLASTY.

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Background: Percutaneous vertebroplasty is a minimally invasive procedure that aims to treat vertebral compression fractures by reducing the affected patients' pain and immobility symptoms. Various methods have been developed over the years to improve the vertebroplasty procedure. The lack of control over the needle direction has led to the development of a steerable-tipped 'Osseon' needle which aims to provide the operator with better control over the direction of the delivery needle. No such study has been previously reported. Aim: To compare the radiological and clinical outcomes of unipediculate vertebroplasty using a novel steerable needle (Osseon Therapeutics, US) versus a standard straight needle (Stryker Interventional Spine, US).

Methods: 19 patients (36 levels of vertebrae) were operated on at the LGI between 1st Sep 2010 and 31st Mar 2011. Either the novel steerable needle (Osseon Therapeutics, US) or the conventional straight needle (Stryker International Spine, US) was used. Post-operative radiographs (AP) were used to calculate percentage of cement projection across the midline. Pre-and post-operative pain scores were used to evaluate clinical outcome. Mean values were analysed using the Student t test.

Results: Midline cement projection was significantly higher with the steerable needle (n=9, vertebrae=14, mean age 60 yrs) at 57.5% (0-100%) compared to 34.5% (0-81%) with the straight needle (n=10, vertebrae = 22, mean age 67 yrs) (p=0.046) Cement extravasation was higher with the steerable needle (44% versus 30%) but no clinical complications were reported in either group. Of the pain scores available, there was 100% improvement in the steerable needle group (n=3), compared to 33% improvement in the straight needle group (n=6).

Conclusions: Vertebroplasty with a novel steerable needle provides better radiological and clinical outcomes than with a standard straight needle. A larger, randomized multi-centre prospective trial would be invaluable in confirming these findings.

RETROSPECTIVE OUTCOME STUDY OF JOINT SYNCHRONOUS HEPATOBILIARY AND COLORECTAL RESECTION SURGERY.

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Background: Colorectal cancer (CRC) is one of the most common types of cancers, accounting for the 2nd highest mortality from all cancers in the UK. With thousands of patients presenting with metastatic colon cancer it is becoming a growing concern. Synchronous colorectal and hepatobiliary surgery is currently the only curative option available, however the question remains on the feasibility behind such an extensive procedure for patients to undergone, many who are close to the end stages of their life; is it acceptable to take the risk for such a procedure?

Objective: Determine the outcomes of patients who have undergone hepatic and colon resection and assessing its feasibility. Furthermore assess prognostic factors based on patient's age, gender, co-morbidities, ASA status, histology staging and type of procedure.

Methods: In this single-center study, we retrospectively analyzed patients with metastatic colon cancer within the past seven years and recorded their outcomes and complications.

Results & Discussion: We identified a total of 17 patients who had undergone this procedure synchronously. Out of these, 16 patients required this procedure for metastatic adenocarcinoma of colorectal origin. 71% (n=12) patients presented with a significant post-operative complication that increased hospital stay or significantly affected quality of life. There was a reoccurrence rate of liver (n=5) and rectal (n=1) of 38%, along with a mean survival of all patients of 20 months; further questioning the feasibility of this procedure. Other various complications were also reported with the commonest being Intra-abdominal fluid collections and one patient with anastomotic leak requiring urgent surgical intervention.

Conclusions: Although this is currently the only surgical procedure available, with results of 71% of patients presenting with complications, it is important to consider whether prolonging life for an average of 20 months is feasible to justify the cost and most importantly the patient's quality of life.

OSTEOARTHRITIC CARTILAGE CELLS AS A SOURCE FOR NEO-CARTILAGE PRODUCTION.

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Background: Osteoarthritis affects over 8-million people in the UK. Alternative procedures to treat osteoarthritis by regenerating articular cartilage through tissue engineering are being explored. Osteoarthritic cartilage is characterised by the presence of cell clusters thought to originate from progenitor cells in an attempted repair. Isolation of chondroprogenitor cells depends on the identification of appropriate biomarkers.

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Materials and Methods: Single cells and cell clusters from human osteoarthritic cartilage were isolated using dispase and collagenase digestion. These were separated by a cell filtration step and fixed at 8 different time points (Day 0 to Day 7), followed by immunohistochemical analysis with antibodies 3B3(-) and 7D4, CD105 and CD166.

Results: The modified dispase and collagenase procedure facilitated the isolation and separation of single cells and cell clusters, retaining an intact pericellular matrix. This maintained pericellular epitope expression and allowed immunohistochemical analysis of epitopes recognised by antibodies 3B3(-), 7D4, CD105 and CD166. Expression of all epitopes was present in single cells and cell clusters. Epitopes recognised by antibody 3B3(-) were initially expressed pericellularly, later becoming intracellular with a punctate pattern. Epitopes recognised by antibodies 7D4, CD105 and CD166 were located pericellularly. CD105 displayed bimodal labelling with a proportion of single and cluster cells staining at high intensities.

Discussion and Conclusion: These results suggest that osteoarthritic single cells and cell clusters may represent a population of mesenchymal stem cell-like progenitors which can be identified by monoclonal antibodies 3B3(-), 7D4, CD105 and CD166. The osteoarthritic origin of these cells represents an accessible, ethical source of progenitor cells for articular cartilage regeneration. In addition, our isolation technique sufficiently separated single cells and cell clusters, allowing direct comparison of the cell subpopulations and assessment of their progenitor potency. Further characterisation of chondroprogenitor cells and epitope expression will improve the understanding of their therapeutic role in osteoarthritic defect repair.

MEASURING DRUG-INDUCED MITOCHONDRIAL DYSFUNCTION AS A DETERMINANT OF CELL DEATH.

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Background: Mitochondria are a frequent drug target and play a central role in human physiology being primarily responsible for the production of more than 90% of cellular ATP via oxidative phosphorylation (OXPHOS). A Pfizer study of 550 drugs revealed that 34 % of drugs displaying organ toxicity impaired mitochondrial function. Therefore testing for MD during early preclinical safety studies is crucial. However the current methods used are not ideal and account for the late detection of MD. Experiments performed in the Department of Pharmacology validated the glucose-galactose cell model devised by Marroquin for the detection of MD. A decline in the ATP levels of HepG2-galactose cells was seen following exposure to the positive controls, prior to evidence of cytotoxicity. It was subsequently hypothesised that early MD could also be detected in HepG2-glucose cells through measuring mitochondrial respiration.

Methods: The Oxygen Consumption Rate (OCR) and Extracellular Acidification Rate (ECAR) of HepG2-glucose cells was measured for 2 hours after treatment with a vehicle control, amiodarone, buspirone, nefazodone, troglitazone, tolcapone, CCCP, rotenone or antimycin. The Mitochondrial Membrane Depolarisation (MMD) of HepG2-glucose and HepG2-galactose drug-exposed cells was measured in a TMRE assay.

Results: Determining the changes in the OCR and ECAR of HepG2-glucose cells when exposed to test compounds provided an indication of mitochondrial function. Signs of early MD were evident and mechanisms of MD were deduced. Analysing the percentage change in TMRE Fluorescence of HepG2-glucose and HepG2-galactose drug-exposed cells provided an indication of MD, although added little mechanistic value.

Conclusion: The XF96 proved to be a novel high-throughput and highly sensitive method for the prediction of MD. This assay has great implications for drug development and clinical practice. The detection of early MD can serve as a 'window period' for drug withdrawal or therapeutic intervention before the development of potentially fatal organ toxicity.

INDUCTION OF ANGIOGENESIS AND OSTEOGENESIS IN IMPACTION BONE ALLOGRAFTS.

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Background: Between 30-50% of joint replacement patients will require revision surgery, where bone augmentation will be necessary as prostheses wear out over time. The demographic challenges of an advancing aged population emphasise the need for innovative approaches to skeletal tissue reconstruction. Currently bone augmentation procedures in hip revision surgery, involve the impaction of allograft into femoral and acetabular defects. The problems associated with these techniques are recreating an interactive osteogenic and angiogenic environment which is essential for optimal bone growth and vessel formation within the graft.

Aim: This study investigated the potential of co-culturing vascular cells (endothelial) with Human Bone Marrow Stromal Cells (HBMSC) to enhance osteogenesis and angiogenesis of impacted allograft constructs for bone revision arthroplasty. The study will also look at the culture of vascular cells in a 3D gel (un-impacted) to compare osteogenic and angiogenic induction with that of the impacted allografts with co culture cells.

Methods: Bone allografts were seeded with either HBMSC, endothelial cells, or as a co-culture of both cell types, impacted and cultured for 7days in basal tissue culture medium (TCM). Similarly, these groups of cells were cultured within a gel (matrigel) scaffolds for 7 days. These were then analysed using histology and immunohistochemistry.

Results: Fluorescent cell viability demonstrated that the cells survived impaction and remained metabolically active. Alkaline phosphatase expression (early marker of osteogenesis) was elevated in the coculture impacted samples compared to the other groups. Alcian Blue (proteoglycans)/Sirius red (collagen) staining was shown to be increased in the co-culture and HBMSC group. Similarly, osteoid (un-mineralised organic extracellular matrix) determined by bone was shown to be in greater quantity in the co-culture and HBMSC samples using a Goldners Trichrome stain.

Conclusion: The results are indicative that HBMSC and HUVECS have the ability to survive impaction and enhance osteogenesis.

ACUTE UPPER GASTROINTESTINAL BLEEDING IN PATIENTS WITH AND WITHOUT USING ANTICOAGULANT AND NON-STEROIDAL ANTI-INFLAMMATORY DRUG THERAPY.

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Background: Although conjoint use of NSAIDs and oral anticoagulants (OAC) may increase the risk of gastrointestinal tract bleeding, still many patients use them.

Aims: To identify patients who have upper gastrointestinal bleeding (UGIB) due to usage of OAC and NSAIDs; which OAC cause severe UGIB; to reveal any relation between severity of bleeding and the place of bleeding, being in Intensive Care Unit (ICU), longer hospitalization and exitus letalis.

Methods: Retrospective, prospective mixed cohort study (on-going) conducted in Riga Eastern Clinical University Hospital in 5-month time.

Results: Out of 81 patient, seven (8,6%) used OAC (2,5%- novel OAC, 6,5% -warfarin), three had bleeding stomach ulcer FIIC. Two (2,5%) had Mallory-Weiss syndrome, five (6,2%) had Dieulafoy's lesion, two used OAC (p = 0,057). The most frequent bleeding site was duodenum - 48,1% (n=39). From 81 patient, 21 used NSAIDs,7 used Ibuprofen. Nine (33, 3%) patients with FIIB bleeding had used NSAIDs (p=0,028, Chi-Square Test). FIA patients had to stay in ICU longer than FIIB patients (n=27, p=0,020,Mann-Whitney Test). There

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was no statistically significant link between severity of bleeding, time spent in hospital and exitus letalis (p>0,05).

Discussion: Including patients with hemorrhagic gastropathy is in study plan. With more patients, it will be possible to divide them in equal groups to see in which one UGIB prevalence is higher and which OAC causes more severe UGIB. The hope is to see how the in-patient treatment affects the severity of bleeding, time spent in the hospital and outcome.

Conclusion: Patients with severe bleeding (FIA) had to stay in ICU longer. Patients who used OAC had FIIC class bleeding and Dieulafoy's lesion. Patients who had used NSAIDs had FIIB bleeding class. No link between severity of bleeding, time spent in hospital and exituls letalis was found.

SENILE SCLERAL PLAQUES REVISITED WITH ENHANCED DEPTH IMAGING ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY.

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Introduction: Senile scleral plaques are sharply demarcated greyish areas located anterior to the insertions of the horizontal rectus muscles and often contain calcifications. The incidence of calcified plaques has been reported to be up to 7% in radiological studies. The aim of this study was to characterize senile scleral plaques using enhanced depth imaging spectral domain anterior segment optical coherence tomography (AS-OCT). Methods Senile scleral plaques of 32 patients were imaged with a Spectralis AS-OCT. Standardized color monophotographs of senile scleral plaques were also obtained.

Results: Senile scleral plaques (SSP) were exquisitely located at the insertion sites of the horizontal recti muscles. The mean distance from the limbus was 2.24 mm for nasally located SSP and 3.22 mm for temporally located SSP. The mean horizontal diameter was 2274 µm and the vertical diameter for the nasally located SSP was 3063 µm and for the temporally located 3730 µm. The SSP had an average surface area of 4.8 mm2 nasally and 6.4 mm2 temporally. The mean SSP thickness was 577 µm.

Conclusion: Senile scleral plaques are a frequent finding in the elderly population. Using OCT with enhanced depth imaging we were able to image these plaques in vivo for the first time. Using OCT these plaques presented as non-reflective spaces at the insertion of the horizontal recti muscles, in keeping with previously published histology reports showing marked degeneration of collagen within the plaques.

CUTANEOUS ADVERSE DRUG REACTIONS IN HOSPITALISED PATIENTS IN BENGHAZI, LIBYA.

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Background: Adverse drug reactions (ADRs) are a common occurrence in hospitalised patients, and one that all physicians will experience during their clinical practice. Few studies have examined the incidence and clinical presentations of cutaneous ADRs in hospitals in Libya.

Methods: Archival clinical and laboratory data on all inpatient dermatology consultations in a tertiary care hospital in Benghazi with a diagnosis of cutaneous adverse drug reaction between 1st January 2013 and the 30th June 2013 was retrospectively analysed.

Results: A total of 62 patients were diagnosed with cutaneous adverse drug reactions. Seven different clinical reaction patterns were noted, namely maculopapular rash (46.8%), drug exanthems (22.6%), fixed drug eruption (16.1%), urticaria/angioedema (6.5%), erythema multiforme minor (3.2%), generalised exanthematous pustulosis (3.2%), and toxic epidermal necrolysis (1.6%). The medications responsible for the

reactions included antimicrobials (51.6%), non-steroidal anti-inflammatory drugs (19.4%), anticonvulsants (12.9%), chemotherapeutic agents (6.5%), intravenous contrasts (6.5%), allopurinol (1.6%), and oral contraceptives (1.6%). The total number of patients admitted to the hospital in the study period was 26,183, therefore the total incidence of cutaneous ADRs was 0.24%.

Conclusion: Cutaneous ADRs are a common occurrence in hospitalised patients, and early identification of cutaneous ADRs and their putative medications are key in the management and prevention of more severe, and sometimes avoidable, drug reactions.

PROOF OF PRINCIPLE: THE SUCCESSFUL AMPLIFICATION OF MICRORNAS AND THEIR POTENTIAL IN THE FUTURE OF PERSONALISED TREATMENTS.

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Background: Micro-RNAs are small, non-coding RNA molecules that have recently been researched in clinical medicine as possible novel biomarkers for cancer to assist in tailoring treatments to individual patients. The aim of this study is to prove that micro-RNAs can be robustly extracted at a detectable level by qRT-PCR, using late-stage colorectal adenocarcinoma FFPE blocks, and observing any differences between the levels of micro-RNA extracted from different tissue types, such as between tumour and normal tissue, and between KRAS mutant and KRAS wild-type tissues, and the stability of stored micro-RNA was compared to that of cDNA.

Methods: hsa-miR-21 was chosen as the target micro-RNA for this study. Using ten anonymised FFPE adenocarcinoma blocks, total RNA was extracted and checked for contaminants using a spectrophotometer The RNA was then reverse transcribed specifically for hsa-miR-21 to cDNA and stored at -20°C. The qRT-PCR was performed using a TaqMan® probe for hsa-miR-21, and the results were analysed using student t-tests at the 5% significance level on Microsoft Office Excel 2007. A synthetic micro-RNA-21 was used as a positive control.

Results: The qRT-PCR successfully detected hsa-miR-21 above the set ?Rn threshold (0.2) in 90% of samples There were no significant differences found in the levels of hsa-miR-21 between tumour and normal samples ($p=0.16$) and between KRAS mutant and KRAS wild-type samples ($p=0.42$) It was found that micro-RNA degrades significantly when stored as RNA at -80°C compared to when it is stored as cDNA at -20°C ($p=1.19x10^{-13}$)

Discussion and Conclusion: This was a successful proof of principle study, showing that it is possible to extract hsa-miR-21 under diagnostic laboratory conditions from FFPE blocks. However, the results show that the methodology does not yet have enough integrity to produce reliable readings. For future considerations, the methodology should be improved upon.

THE ANALYSIS OF THE DISCREPANCY OF CLINICAL AND PATHOANATOMICAL DIAGNOSES BASED ON THE OPERATIONAL AND SECTIONAL MATERIALS.

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Aims: Analysis of the cases of discrepancy of clinical and pathoanatomical diagnoses by sectional and operational material based on materials of hospital of emergency care.

Research problems: 1. To define the categories of the discrepancy of clinical and pathoanatomical diagnoses; 2. To specify the causes of discrepancy of the diagnoses by sectional and operational material Research methods: 1. Analysis of 7 cases of the discrepancy of clinical and pathoanatomical diagnoses by sectional material for 2013; 2. Analysis of 35 cases of the discrepancy of clinical and pathohistological diagnoses by operational material for 2012-2013.

Relevance of research: One of the indicators of effective activity of the medical institution is the percentage of discrepancy of clinical and pathoanatomical diagnoses, herewith collation of diagnoses carried out in three main headings:
• Underlying disease;
• Its major complications;
• Major comorbidity.

Obtained results: According to the hospital of emergency care in 2013 by sectional material revealed: 7 cases of discrepancy of clinical and pathoanatomical diagnoses by cerebral infarction from 97 cases of stroke. The age category: -Adulthood - 2 cases (36-60 years) -Advanced age - 3 (56-74 years) -Senile age– 2 (75-90 years). According to the hospital of emergency care for 2012-2013 by operational material revealed: 35 cases of discrepancy of clinical and pathohistological diagnoses from 21250 cases, which is equal to 0.16%. From 35 cases of operating-biopsy material were determined: - In 27 cases – tumours; - In 8 cases non-tumorous (inflammatory) diseases.

Conclusions: The analysis of the sectional and operational materials showed that the discrepancy of clinical and pathoanatomical diagnoses associated with objective factors such as severity of condition of the patients at the admission, short duration of hospital stay with age, and that demands from surgeons oncological alertness.

HAEMATOPOIETIC STEM CELL TRANSPLANTATION MAY CURE THE IMMUNE DEFICIT ASSOCIATED WITH STAT-3 DEFICIENT HYPER-IgE SYNDROME.

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Background: Hyper-IgE syndrome (HIES) resulting from STAT3 mutation is a rare autosomal dominant primary immunodeficiency. Presentation is often with a newborn pustular rash1. The disease is typified by recurrent infections, eczema, characteristic facies, failure of deciduation, scoliosis, easily fractured bones, bronchiectasis, pneumatocoeles, eosinophilia and a high IgE >2000IU/ml1. A report of negative results following haematopoietic stem cell transplantation (HSCT) for HIES in 20002 potentiated largely supportive treatment thereafter.

Methods: A retrospective review of 3 patients with STAT3 deficiency who have undergone HSCT.

Results: A 24-year-old woman who suffered from birth with recurrent infections and highly frequent hospitalisation, was transplanted 18 years ago. Despite 100% donor chimerism, the procedure was described as unsuccessful following IgE increase, but there has since been improvement. Infrequent hospital admissions, few infections and improvement of skin and lung function are all evident. IgE levels have since remained low. She no longer requires immunoglobulin support despite impaired IL17 production, which indicates incomplete Th17 reconstitution IFN-? and IL12 response and production are normal. A 22-year-old man suffered from childhood with frequent severe bronchopneumonia and bronchiectasis resulting in lobectomy, osteopenia causing pathological fractures, chronic dermatitis and repeated hospital admissions; negatively impacting development. Following transplant 9 years ago, he has 100% donor chimerism with low IgE, significant improvement in lung function, decreased infections and hospital admissions, despite impaired IL17 production. A 13-year-old patient was transplanted 1 year ago. Lung function has improved. Post-HSCT IL17 production is normal.

Discussion: Associated complications including lowered bone density, bony deformity and parenchymal lung abnormalities remain. These patients however, have improved immune function, sufficient to allow cessation of immunoglobulin therapy and reduce infections. Additionally, outcomes have permitted re-integration into academic, social and physical activities

Conclusion: HSCT for HIES may cure the underlying immune deficit, and should be considered for a select group of patients.

THE EFFECT OF ECONOMIC DOWNTURNS ON MM IN PREGNANCIES WITH ABORTIVE OUTCOMES WORLDWIDE: 1981-2010

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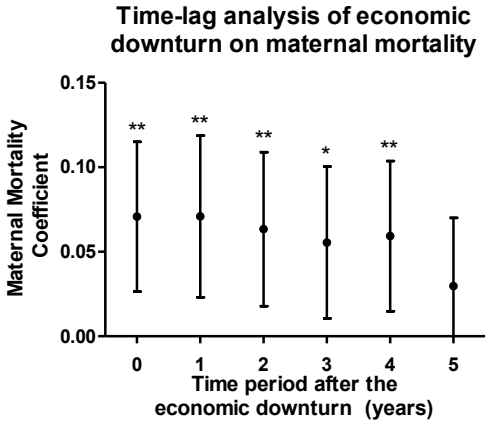
Background: Maternal mortality remains a major health burden and efforts in reducing maternal mortality and morbidity have lagged behind other global health priorities. Millennium development goal 5 (MDG 5) has focussed on improving maternal health. Abortion related mortality occurs exclusively from complications of unsafe abortion; these include haemorrhage and infection. Currently, there is limited literature on the impact of macroeconomic fluctuations on maternal mortality. Our study evaluated the effects of economic downturns on maternal mortality in pregnancies with abortive outcomes worldwide.

Methods: Comparative country level data were obtained for countries over a 30 year period (1981-2010). Economic and population data were obtained from the World Bank and maternal mortality data were obtained from the World Health Organization database. An economic downturn was defined as an annual decline in GDP per capita. Multivariate regression models were used, controlling for country specific differences in healthcare, infrastructure, population size and demographic structure. Effects were evaluated using a dummy variable for economic downturns. Time lag analyses were performed to determine the effects 1-5 years after the downturns occurred.

Results: Data were available for 81 countries. Economic downturns were associated with a significant increase in maternal mortality rates from pregnancies with abortive outcomes (coefficient 0.0708, $p<0.01$, CI: 0.0264, 0.1151) in comparison to non-recession years. The impact on maternal mortality was sustained for up to 4 years after economic downturns (year 1- coefficient 0.0709, p value 0.0037, CI: 0.0231, 0.1187; year 2- coefficient 0.0634, p value 0.0065, CI 0.0178, 0.1089; year 3- coefficient 0.0554, p value 0.0157, CI: 0.0105, 0.1004; year 4- coefficient 0.0593, p value 0.009, CI: 0.0148, 0.1037). The effects were still present when accounting for additional economic and infrastructure controls. However, the negative impact of a downturn on mortality was removed when controlling for hospital resources including number of physicians and hospital beds.

Conclusions: Economic downturns are significantly associated with increased maternal mortality which may occur through a variety of mechanisms such as changes in government health spending and the supply of healthcare resources. With unsafe abortion being one of the top three causes for maternal mortality, our study demonstrates that a global economic downturn may be one of the factors slowing down the reduction in the maternal mortality ratio, hindering the achievement of MDG 5.



Time-lag analysis of economic downturn on maternal mortality.

Multivariate regression analysis was used to assess the relationship between maternal mortality and economic downturn. The maternal mortality coefficients and their corresponding confidence intervals are displayed for a time frame of up to 5 years after the downturn. **p<0.01, *p<0.05

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NON-RENAL PARENCHYMAL HYPERTENSION: AN EMERGING PROBLEM IN TODAY'S CHILDREN.

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Background: The prevalence of childhood hypertension is increasing in conjunction with obesity and sedentary lifestyles increasingly predominating westernised societies, it is thought that childhood hypertension is undergoing an epidemiological shift with non-renal parenchymal aetiologies becoming more prevalent. To investigate whether this holds true in the UK population we conducted a retrospective study assessing the aetiology of non-renal parenchymal hypertension in a tertiary paediatric centre.

Methods: Patients attending a nephrology clinic at the Royal Manchester's Children Hospital and its district general hospitals during 2012 were analysed. Patients with a confirmed diagnosis of pre-hypertension or hypertension with a non-renal parenchymal aetiology were categorised as essential, renovascular, cardiac, other vascular lesions, endocrine, metabolic or others. Age, gender, ethnicity and body mass index of the 7 groups were compared.

Results: 130 pre-hypertensive and hypertensive patients attended a nephrology clinic over the 1 year study period. Of the 130 patients: 38 (29.2%) had a non-renal parenchymal aetiology. Essential was the commonest aetiology (45.9%), followed by cardiac (16.2%), renovascular (16.2%), metabolic (8.1%), other vascular lesions (5.4%), endocrine (5.4%) and others (2 7%). Non-renal parenchymal HTN had a significantly higher proportion of overweight and obese patients than the renal parenchymal cohort (?2= 7 817, p=0.01). Ethnic, age and gender differences were of no significance.

Discussion: Determining whether other non-renal parenchymal aetiologies have diverged from their past prevalence is essential for elucidating the developmental origins of HTN in today's adults. This study provides evidence of the changes between the past and present aetiologies.

Conclusion: In view of the obesity epidemic, non-renal parenchymal hypertension, specifically essential hypertension, is more prevalent in UK children and adolescents than previously reported. This emphasises the need for routine blood pressure measurements, implementation of preventive measures and early diagnosis of HTN to address this.

CROSSWORDS, WORD SEARCH, AND WORD MATCHES AS USEFUL GAMES TO CONSOLIDATE THE RETENTION OF THE PRINCIPLES OF CARDIOPULMONARY RESUSCITATION.

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Background: Studies show that the skills and knowledge related to cardiopulmonary resuscitation tend to deteriorate over time.

Methods: Two hundred sixty Italian medical students participating in a course of theoretical and practical BLSD were randomized into two groups of 130 people each. Before the start of the course and at the end of it, they completed a questionnaire consisting of 11 questions (each question had four possible answers of which only one was correct). In the six-month period following the course, each member of just one of the groups was sent by email a word game to play every month on his or her own. The games were created based on the steps and procedures of cardiopulmonary resuscitation. Both groups were retested by questionnaire six months after the end of the course.

Results: After six months, students in the group that played the post-course games showed a median of 10 correct answers (mean 9.74, Q1:9 Q3:11), which was statistically significant (p = 0.022) compared to the control group, which had a median of 9 (average 9.24 Q1:8 Q2:10). Furthermore, comparing within each

group the results of those completing the questionnaire at six months with their previous questionnaire results obtained immediately post-course, we found that the results for the group that played the games were not statistically significant variation of results (p=0.21), but there was a decline in the knowledge retention in the control group (p=0.016).

Discussion: The results show that the group members that were stimulated over time by simple word games had better theoretical knowledge of BLS than the control group and that this theoretical knowledge was retained over time.

Conclusion: Requiring BLS course participants to play word games based on course contents consolidates and enables retention of previously acquired theoretical principles.

BREAST CANCER DETECTION RATES IN PATIENTS WITH B3 BREAST LESIONS: A 13 YEAR RETROSPECTIVE REVIEW.

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Background: B3 lesions comprise a heterogeneous group of breast lesions with an increased risk of subsequent breast malignancy. Although traditionally B3 lesions have been surgically excised, increasing workload and potential of over-treatment of such lesions have meant that breast units in the United Kingdom have looked towards alternative percutaneous diagnostic and treatment methods. Many units now manage these lesions with large volume core needle biopsy and 5 yearly mammographic follow up. This study aims to establish the incidence, nature and timing of malignancy associated with B3 lesions, and to assess whether such mammographic surveillance programmes are appropriately targeted.

Methods: Retrospective, single-centre, review of all screen detected B3 lesions (identified on core or diagnostic excision biopsy) between 1995 and 2008.

Results: 188 B3 lesions identified. Each patient had a median of 6 follow-up mammograms (range 0-9). 16 cases (9%) subsequently developed breast cancer (13 invasive, 3 high grade DCIS). Median time-to-diagnosis was 5 years (range 1-18yrs). 4 patients were diagnosed after 1 year (3 at the original site, 1 contralateral nodal metastasis). 12/16 cancers were in the ipsilateral breast, but only 7/12 were at the same site as the index lesion. The spectrum of B3 diagnoses that subsequently developed into cancer varied.

Discussion: The observed cancer detection rate of 9% is higher than expected for a screened population (cancer detection rate is approximately 5-7 per 1000 for similar age group). However, in this cohort, subsequent cancer occurred either early, representing a failure of initial assessment, or much later, consistent with studies suggesting that the presence of B3 lesions are a risk factor for breast cancer development.

Conclusion: We propose a more appropriate and cost effective follow-up strategy of a single mammographic review at one year followed by return to the routine NHS breast screening programme.

PROFILE OF THE OCULAR DIMENSIONS, INTEROCULAR ASYMMETRY AND THEIR ASSOCIATIONS IN AN OLDER WHITE POPULATION: THE EDINBURGH EYE STUDY.

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Introduction: Interocular asymmetry of biometric dimensions such as axial length (AL), corneal curvature (Km) and anterior chamber depth (ACD) is associated with many disabling eye conditions and has been shown to reduce vision-related quality of life. However there is limited reported data on the influence of environmental factors towards these biometric dimensions. This was the first large-scale European study to evaluate the associations of ocular dimensions and interocular asymmetry with adult stature and socio-demographic status.

Methods: This was a population-based cross-sectional study of adult Caucasians with cataract aged =50 in Scotland. Data were available for 231 males and 279 females with phakic eyes. AL, Km and ACD were measured using partial coherence laser interferometry. Interocular asymmetry was the absolute difference of these dimensions between both eyes. Scottish Index of Multiple Deprivation (SIMD) was used to examine the sociodemographic distribution of the sampling population. A comparative analysis of the mean values for male and female was performed. Multivariate regression models were constructed to examine the effect of height, weight and SIMD on the ocular biometric components and interocular asymmetry.

Results: Interocular asymmetry in all AL, Km and ACD were higher in females ($p<0.001$). Height, weight and SIMD were positively correlated to AL ($p<0.001$) but not ACD. Height and weight were both negatively correlated to Km ($p<0.001$). Height was inversely correlated to interocular Km asymmetry ($p<0.001$). Weight and SIMD demonstrated no significant correlation with interocular asymmetry of the ocular dimensions.

Conclusion: Longer AL was found in taller, heavier and more affluent adults. Taller and heavier persons have a flatter cornea profile of less convex dioptric power. ACD was free from the influence of adult stature and sociodemographic status. Findings suggest strong environmental determinants for AL, Km and ACD, but not the interocular asymmetry of these ocular dimensions.

AN INVESTIGATION INTO THE EFFECTS OF INTER-INDIVIDUAL DIFFERENCES IN THE EXPRESSION LEVELS OF NEUROCHEMICAL MARKERS IN THE ORBITOFRONTAL CORTEX AND NUCLEUS ACCUMBENS ON REVERSAL-LEARNING.

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Background: Investigations of reversal-learning performance following selective lesions and/or drug administration have established a prominent role for the orbitofrontal cortex (OFC), which depends on the functional integrity of serotonergic inputs to this region. A critical question is how reversal-learning is influenced by innate differences in neurochemical markers. This study examines how the performance of rats in a spatial reversal-learning task is influenced by inter-individual differences in mRNA expression levels of the a7 sub-unit of the nicotinic acetylcholine receptor (a7nAChR), the 5-HT2A receptor and the 5-HT2C receptor in the OFC and nucleus accumbens (NAcc).

Materials/methods: Rats were trained on a spatial discrimination reversal-learning task. Two nosepoke holes were available and only one was reinforced. Following attainment of criterion, three reversals were presented. Rats were stratified according to reversal-learning performance, measured by an index of perseverative responding. mRNA expression levels of the markers were measured using quantitative reverse transcriptase polymerase chain reaction.

Results: We found no association between perseverative responding and expression levels of any of the markers in the lateral OFC. We found that highly perseverative rats showed reduced expression levels of the a7nAChR in the right, but not in the left, NAcc compared to minimally perseverative rats.

Discussion: These findings contrast with conclusions from previous lesion and drug administration studies, implicating primarily the OFC, rather than the NAcc, in reversal-learning. Thus, pre-existing differences in neurochemistry may contribute differentially to reversal-learning performance with respect to selective brain lesions and pharmacological agents. In particular, our findings suggest a previously unrecognised role for the NAcc in reversal-learning.

Conclusion: The results indicate that pre-existing differences in the expression levels of the a7nAChR in the right NAcc influence the performance of rats in spatial discrimination reversal-learning. The present findings may be relevant to neuropsychiatric disorders in which there are reversal-learning deficits, including obsessive-compulsive disorder.

THE DERIVATION AND VALIDATION OF A NEW ALGORITHM FOR THE EARLY DIAGNOSIS OF PANCREATIC CANCER.

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Background: Pancreatic cancer is the 5th most common cause of death in the UK. It has one of the worst 5 year survival rates (<4%) out of the all common cancers. The symptoms are often non-specific, most of which arise later in the disease process when curative surgery is no longer viable. 50% of patients are diagnosed following emergency presentation resulting in lower survival rates compared with other routes of diagnosis. The clinical decision tools QCancer ® and Risk Assessment Tool (RAT) have been developed and used in primary care to identify patients at risk of pancreatic cancer in order to aid early diagnosis. A symptom questionnaire was devised and piloted to determine 1) the efficacy of existing decision tools in identifying symptoms of pancreatic cancer and 2) the prevalence and timing of associated symptoms.

Methods: This was a hospital based case control study which involved the piloting of a novel symptom questionnaire. Symptoms from both current clinical decision tools for pancreatic cancer: the QCancer® tool and the RAT were included. Face to face interviews were conducted with patients with confirmed pancreatic cancer (n=6), cholangiocarcinoma (n=6) and benign pancreatobiliary disease patients (n=13). QCancer ® and RAT score were calculated from recalled symptoms.

Results: The median QCancer ® 2013 score is higher in pancreatic cancer patients (2.47%) compared with cholangiocarcinoma patients (0.74%) and benign pancreatobiliary patients (0.44%). Out of all the symptoms in the questionnaire, unintentional weight loss, abdominal pain, heartburn, back pain, steatorrhoea, diarrhoea, were reported by a majority (>50%) of pancreatic cancer patients.

Conclusion: Use of symptoms in a diagnostic algorithm have a role to play in early diagnosis of patients with pancreatic cancer in a primary care setting. This in turn will benefit improve outcomes and survival rates for patients with pancreatic cancer.

UNDERSTANDING THE PATHOPHYSIOLOGY OF BOWEL DYSFUNCTION IN UROFACIAL SYNDROME.

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Background: Urofacial syndrome (UFS) is a rare autosomal recessive condition that causes an unusual facial expression and bladder-voiding dysfunction, which may progress to renal failure if left untreated. UFS may be caused by loss-of-function mutations in HPSE2 or LRIG2 genes, with mutations hypothesised to cause a peripheral neuropathy affecting the bladder and face. Many individuals with UFS also have bowel dysfunction, including constipation. The pathophysiology of this dysfunction is currently unknown, however, we speculate that it also results from HPSE2/LRIG2 mutations. Normal bowel function depends on complex interactions between the enteric nervous system, the muscular layers of the bowel wall, and the interstitial cells of Cajal, which work in synchronisation to bring about normal digestion and defecation. If any of these components is disrupted, as demonstrated by conditions such as Hirschsprung's disease, constipation and, in more severe cases, obstruction, results.

Methods: Using animal models provides an opportunity to advance knowledge of this condition. Firstly, using a combination of in-situ hybridisation and immunochemistry techniques, we are determining the expression profiles of HPSE2 and LRIG2 genes and encoded proteins within the normal developing mouse bowel. Secondly, using a combination of histological, immunohistochemical and electrophysiological techniques, we are analysing the structure and function of explanted bowel from an HPSE2-deficient mouse model, generated by insertion of a gene trap vector. Biochemical analyses are also determining if these HPSE2-deficient mice have altered transcription of neural or muscular molecules.

Conclusion: Collectively, these experimental approaches are helping to determine the pathophysiology of bowel dysfunction in UFS, which ultimately will assist the development of more specific therapeutic strategies.

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TICAGRELOR VERSUS CLOPIDOGREL: INCIDENCE OF DYSPNOEA AND BLEEDING IN PATIENTS TREATED FOR NEWLY DIAGNOSED ACUTE CORONARY SYNDROME.

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Ticagrelor is an oral antiplatelet agent that achieves greater platelet inhibition than Clopidogrel. Since publication of existing NICE ACS guidelines in 2010, the PLATO study (n=18,624) found the former drug to have a significantly better efficacy in acute coronary syndrome (ACS) patients. Based on this evidence Ticagrelor achieved NICE regulatory approval in 2011. However subgroup analysis identified a possible increased incidence of dyspnoea and non-procedure related bleeding although overall major bleeding rates were similar. Our goal was to assess the relative incidence of these adverse events to determine whether these agents have similar safety profiles. Prospective, open-label study of ACS patients presenting to Worthing Hospital over a six-month period was performed. A total of 66 patients satisfied our inclusion criteria. The Clopidogrel and Ticagrelor groups did not differ significantly in their incidence of dyspnoea (11.7% and 16.7% respectively; P=0.64) or bleeding (5.8% and 4.2% respectively; P=0.77). The dyspnoea was transient and did not lead to discontinuation and benign rectal bleeding that resolved spontaneously was the most common presentation of the latter. This study suggests a similar incidence of dyspnoea and bleeding between the two agents. We recognise the limitations of our small cohort and application of our results however they correlate with larger, international trials (PLATO & DISPERSE) with regard to bleeding. These results, in combination with a previously demonstrated greater efficacy, support the use of Ticagrelor with Aspirin as first line anti-platelet therapy for ACS patients in the UK and formal consideration in future NICE ACS clinical guidelines.

STAPHYLOCOCCUS AUREUS NASOPHARYNGEAL CARRIAGE IN RURAL AND URBAN NORTHERN VIETNAM.

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Oxford University Clinical Research Unit, United Kingdom

Background: Staphylococcus aureus is a common human pathogen that can colonise the respiratory tract. Colonisation is associated with increased of risk of infection. Here we investigate the risk factors associated with nasopharyngeal carriage of S aureus (including MRSA) in northern Vietnam.

Methods: Nasopharyngeal swabs, socioeconomic and demographic data were taken from 1,016 participants aged between 2-90 years in urban and rural northern Vietnam, who were randomly selected from within pre-specified age strata. Data was analysed using Pearson's chi squared test, Fisher's exact test and stepwise backward regression.

Results: Overall *S. aureus* prevalence was 33.8% (95% CI: 29.4-38.8). Carriage was found to be associated with younger age [≤5 years (OR: 3.13; CI: 1.62-6.03), 6-12 (OR: 6.87; CI: 3.95-11.94), 13-19 (OR: 6.47; CI: 3.56-11.74), 20-29 (OR: 4.73; CI: 2.40-9.31), 30-59 (OR: 1.74; CI: 1.04-2.92), with ≥60 as reference], living in an urban area (OR: 1.36; CI: 1.01-1.83) and antibiotics use (OR: 0.69; CI: 0.49-0.96). MRSA was detected in 7.8% (CI: 5.9-10.4). Being aged ≤5 years (OR: 4.84; CI: 1.47-15.97), 6-12 (OR: 10.21; CI: 3.54-29.50), 20-29 (OR: 4.01; CI: 1.09-14.77) and wealth (>3/5 wealth index; OR: 1.63; CI: 1.01-2.62) were significant risk factors for MRSA carriage. Prevalence of nose only carriers, throat only carriers, and nose and throat carriers were 8.7% (CI: 7.0-10.6), 13.9% (CI: 11.8-16.2), and 7.2% (CI: 5.7-9.0) respectively.

Discussion: Nasopharyngeal carriage of *S. aureus* (26.4% MRSA) was more prevalent among children. Pharyngeal carriage was more common than nasal carriage. Those ≤5 years had lower than expected *S. aureus* carriage, potentially due to high antibiotics use (41.2%). Wealth was a risk factor for MRSA carriage, which might be due to increased access of the wealthy to health care settings.

Conclusion: Risk factors to S. aureus carriage in northern Vietnam were identified and can be used to design infection prevention strategies.

PAD INHIBITION: A NOVEL PATHWAY FOR CARDIOPROTECTION.

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Background: Rapid reperfusion of cardiac tissue is the most effective method for minimising infarct size following acute myocardial infarction (AMI). Reperfusion, however, can paradoxically result in the death of cardiomyocytes. Peptidylarginine deiminases (PADs) are a group of enzymes that convert arginine residues to citrulline in posttranslational modification. PADs become active in high calcium states and have recently been shown to exert harmful effects during in vivo reperfusion in a mouse. Here, a novel PAD inhibitor is tested for cardioprotective effects in simulated ischaemia reperfusion of primary rat ventricular cardiomyocytes.

Methods: Hearts from male Sprague-Dawley rats were retrogradely perfused on a Langendorff apparatus. Collagenase digested the tissue to give viable ventricular cardiomyocytes that were plated on laminated dishes. These cells were subjected to three hours of either hypoxia or normoxia. They were then all reoxygenated for an hour with 1ul of a control vehicle, 2ul of insulin, or 1ul of two different concentrations of the PAD inhibitor (100uM and 1uM). The cells were then stained and imaged. A percentage of cell death was obtained for each group.

Results: A significant reduction in cell death was observed in the cardiomyocytes reoxygenated in the presence of the higher dose of the PAD inhibitor (34.0%) compared to the control (56.8%) ($p=0.01$).

Conclusion: This novel PAD inhibitor has demonstrated cardioprotection in a simulated ischaemia reperfusion model of cardiomyocytes. Further work is needed to assess this drug's potential for use in the prevention of reperfusion injury in an acute clinical setting.

INVESTIGATING MECHANISMS OF RADIORESISTANCE IN NON-SMALL CELL LUNG CANCER: IMPLICATIONS OF REPAIR, DAMAGE TOLERANCE ANS LESION COMPLEXITY IN A MULTIFACTORIAL PROCESS.

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Radiotherapy (RT) is the common treatment modality in non-small cell lung cancer (NSCLC) however, efficacy is limited, with local control rates of only 30-50% and 20% for stage I and III respectively. Poor outcomes of RT are largely attributed to radioresistance of tumours to ionising radiation (IR). Currently attention has been paid to measures of DNA damage formation and repair as prospective mechanisms and predictors for cancer cell radiosensitivity; theorising that higher induced DNA damage levels and deficiencies in DNA repair mechanisms confer increased radiosensitivity.

In this study we attempted to determine potential mechanisms of radioresistance in NSCLC, whilst attempting to validate the use of the alkaline comet assay (ACA) as a viable single end point test to predict lung cancer cell radiosensitivity. To achieve this, IR-induced DNA damage formation and repair responses in a NSCLC model were analysed using both ACA and γ-H2AX assays, and compared with the cell survival responses from clonogenic assay.

Radioresistance was found to differ within the NSCLC model, with significant differences seen in DNA damage, repair and cell survival ($P<0.05$) (one-way ANOVA). The observations in this study highlight radioresistance in NSCLC as a multifactorial process, implicating both DNA damage repair and tolerance as resistance mechanisms. Interestingly, DNA damage levels did not totally reflect IR sensitivity, suggesting the potential role of lesion complexity in survival and repair responses. The findings also highlight the pitfalls of using a single end-point as a predictive measure of radiosensitivity, suggesting multiple-end point analyses would provide a more accurate predictor.

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OBSTRUCTIVE SLEEP APNOEA SYNDROME (OSAS) AND TYPE 2 DIABETES (T2D)

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OSAS is a sleep disorder in which there are recurrent episodes of upper airway collapse (apnoeas). Transient hypoxia and increased sympathetic drive lead to repetitive arousals and excessive daytime sleepiness (EDS). The three main symptoms of OSAS are EDS, snoring, and witnessed apnoeas. The prevalence of OSAS in the general population is approximately 3%. There is an independent association between T2D and OSAS which may be bidirectional. In this study we assessed the prevalence of OSAS in T2D patients in Wales using a questionnaire. 50 patients attending diabetes clinics participated in this study. The questionnaire incorporated elements from the Berlin Sleep Questionnaire, Wisconsin Sleep Questionnaire, and the Epworth Sleep Scale. Body Mass Index (BMI), HbA1c, and blood pressure data were collected. Participants were scored for symptoms of OSAS. 10 patients had symptoms indicating OSAS. Of these 4 patients were already diagnosed with OSAS, 1 had three symptoms of OSAS and 5 had two symptoms of OSAS which would indicate referral for specialist assessment. The prevalence of patients with significant OSAS symptoms or previously diagnosed OSAS is 22.2% A higher BMI indicated a higher risk of OSAS ($p = 0.04$). There was no statistical difference in Hb1AC or hypertension between the groups. These findings are comparable to studies conducted in similar fields. This study is limited by sample size, and would be improved by confirming results with polysomnography. The prevalence of OSAS based on this questionnaire study is increased in T2D in Wales compared to the general population. This finding is important as OSAS is a potentially modifiable factor associated with T2D, obesity, and vascular disease. These results suggest that healthcare professionals involved in the management of patients with T2D should be aware of symptoms suggesting OSAS and that a questionnaire is a useful screening tool.

ADIPOSE-DERIVED STEM CELLS: A SUB-POPULATION OF INTEREST FOR FAT GRAFT SUPPLEMENTATION.

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Background: Autologous fat grafting is widely used in soft tissue reconstruction, however it has unpredictable survival rates. A new experimental technique aims to improve graft survival by supplementing it with Stromal Vascular Fraction (SVF) generated from enzymatically digested fat. SVF contains high levels of adipose-derived stem cells (ASCs), as well as other cell types. ASCs can be characterised by CD surface markers, with CD24+ and CD34+ sub-populations postulated to harbour adipocyte progenitor cells.

Methods: CD34 and CD24 expression was studied in SVF from fresh adipose tissue samples and in cultured ASCs by flow cytometry. Sub-populations sorted for these markers (via magnetic activated cell sorting, MACs) were further assessed for proliferation (MTS assays) and adipogenic differentiation (PCR for PPAR?, FABP4 and ELISA for leptin).

Results: All ASC populations demonstrated multi-lineage differentiation and surface markers in keeping with mesenchymal stem cells (MSCs). Immunohistochemistry further revealed a putative CD34+/CD90+/CD31-/CD45- non haematopoietic, non-endothelial population in fresh adipose tissue. In the SVF, we report 49 % CD34+ and 18% CD24+ cells. Sorted CD34+ cells from the SVF were significantly more proliferative and plastic adherent in comparison to unsorted ASCs and CD34- populations ($p<0.001$). Gene expression analysis (PCR) demonstrated greater adipogenic potential of CD34+ populations over unsorted ($p>0.05$) and CD24+ ($p<0.05$) cells. CD24+ cells showed poor attachment and proliferation in vitro but adequate adipogenesis. With time in culture CD34 expression decreased, with no CD24+ cells seen.

Discussion: A CD34+ MSC subpopulation is present in abundance in SVF from fresh fat and in early P0 cells. This subpopulation has a higher proliferation, plastic adherence and adipogenic potential than unsorted SVFs cells.

Conclusion: CD34+ ASC sub-population selection may offer benefit over unsorted SVF cells to supplement fat grafts, improving survival and ultimately clinical patient outcomes.

NS8593 AS A NOVEL ANTI-ARRHYTHMIC AGENT FOR TREATMENT OF ATRIAL FIBRILLATION.

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Background: Voltage-gated ion channels classically mediate the cardiac action potentials. Recently, the role of small conductance calcium activated potassium channels (SK) has emerged. Selective modulation of these channels provides a novel target to prevent atrial fibrillation (AF) without exerting pro-arrhythmic effects on the ventricles. R-N- (Benzimidazol-2-yl)-1, 2, 3, 4-tetrahydro-1-naphtylamine (NS8593) has been previously shown to terminate atrial fibrillation by inhibition of SK channels in mammalian cardiac myocytes.

Aims: To establish the extent to which NS8593 is selective for the SK channels.

Methods: Various current carrying subunits that contribute to cardiac action potentials were expressed in HEK 293 cell lines. Whole cell patch clamp electrophysiology was used to record currents from these channels before and after application of the drug.

Results: NS8593 resulted in a 65.5 ± 43.8% inhibition (n=5) of SK2 currents, reduction of Kv2.1 peak current amplitudes by 18.9± 4.2% (n=4). Kv1.5 current at holding potential of 0mV and 100ms pulse had a reduction of 55 ± 1.5% (n=6) (p= 0.03). Cav1.3 (a2b1 and b2a1) subunits elicited currents by a 300ms test pulse showed reduction of 19.9 ± 7% n=3 and 18 ± 4.46% for pooled data (n=8). Cav1.3 (a2b1 and b2a1 subunits) currents elicited by a 300ms test pulse at voltage clamp of 0 mV showed a reduction in of 19.9 ± 7% n=3 and 18 ± 4.46% for pooled data (n=8). HERG channel currents were blocked by 76.6 ± 22.8% n=8 (p=0.0153) on single tail current protocol.

Conclusions: NS8593 is not SK selective and blocks a range of ion channels underlying the cardiac AP. Therefore, it is not a novel anti-arrhythmic drug. However, it has a potential therapeutic profile comparable to class III anti-arrhythmic drugs.

EVALUATION OF CD69+ HUMAN T-CELL PHENOTYPES AFTER CO-CULTURE WITH GENETICALLY-MODIFIED PIG MESENCHYMAL STROMAL CELLS.

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Background: The increasing worldwide shortage of human organs for transplantation has focussed research on the possibility of transplanting animal organs, especially from pigs, into humans. Xenotransplantation – i.e., the transplantation of organs, tissues, and cells across species, using genetically-engineered pigs as the source, offers the potential to resolve this shortage. A key genetic- modification in donor pigs is the deletion of the a-1,3-galactosyltransferase gene (GTKO). Additionally, pigs which are transgenic for human complement regulatory proteins such as CD46 and CD55 are now available. Mesenchymal stromal cells (MSC), with self-renewal, multi-differentiation, anti-inflammatory, and immunomodulatory properties, have been widely studied in preclinical and clinical trials. We have shown previously that MSC isolated from GTKO pigs additionally transgenic for human CD46 and CD55 (GTKO/CD46/CD55 pMSC) downregulate human T-cell responses to pig antigens in vitro, which is associated with upregulation of CD69 expression on human T-cells. We evaluated the phenotype of CD69+ T-cells after co-culture with GTKO/CD46/CD55 pMSC.

Methods: GTKO/CD46/CD55 pMSC were co-cultured with human PBMC for 48 hours prior to stimulation with phytohemagglutinin (PHA). PBMC proliferation was assessed by thymidine incorporation. After co-culture, CD69+CD4+ and CD69+CD8+ T-cell phenotypes were evaluated by flow cytometry.

Results: Following co-culture with GTKO/CD46/CD55 pMSC, human PBMC, showed a significant reduction in proliferation in comparison to PBMC cultured alone (p<0 05). GTKO/CD46/CD55 pMSC did not induce human T cell apoptosis or upregulate CD25 or Foxp3 expression, indicating that T-regulatory cells were not recruited. Indeed, after co-culture, there were increased percentages of CD69+CD25-CD4+ and CD69+CD25-CD8+ T-cells, in comparison to PBMCs cultured alone.

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Conclusions: Immune regulation of human T-cells by GTKO/CD46/CD55 pMSC is not associated with either apoptosis or an increase in regulatory T-cells. Suppression of human T-cell proliferation by pMSC is probably due to a distinct, and hitherto unknown, mechanism related to upregulation of CD69.

MECHANISM AND STRATEGY OF THE TREATMENT OF WOUND HEALING IN DIABETES.

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Diabetic foot ulceration (DFU) remains a serious health concern for diabetic patients and has a major impact on healthcare costs. For diabetic subjects, DFU is a major clinical problem that significantly decreases the quality of life and results in prolonged hospitalization. Impairment in the skin microcirculation of the diabetic foot prevents full vasodilation under conditions of stress, resulting in reduced skin oxygenation. Thus, neuropathy, ischemia and vascular disease factors play a role in the development of DFU, while inflammation, impaired growth factor and bone morphogenetic proteins (BMP) levels are associated with a failure to heal DFU. Neuropeptides that are secreted in the skin from small nerve fibers, such as neurotensin (NT) and others, also play a direct role in regulating local inflammatory responses and angiogenesis. Our primary hypothesis is that the existing pro-inflammatory state in diabetes is coupled to the decrease in levels of BMP7 and the magnitude of this interaction greatly affects wound healing. We propose to examine this hypothesis by studying skin wound healing in a mice model with and without diabetes. Angiogenesis and inflammation in BMP7 heterozygous diabetic and non-diabetic mice and their control littermates were evaluated by histology and immunohistochemistry. The same parameters in this model were evaluated after treatment with NT. Preliminary results have shown a significant improvement in the healing of the female BMP7 heterozygous diabetic mouse wounds after treatment with NT, supporting its role in the inflammatory and regenerative response. Further studies are needed to better understand the role of BMP7 and NT in skin wound healing.

TLR-4 EXPRESSION IS ASSOCIATED WITH ACTIVE ALLERGIC EYE DISEASE AND MAST CELL ACTIVATION.

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Introduction: Allergic Eye Disease (AED) is a common condition, affecting approximately 20% of the population. Typically, patients present with varying levels of conjunctival inflammation that can cause, corneal changes, scarring and visual loss. Aeroallergen exposure and their interactions with the conjunctival epithelium are thought to be an important pathogenic factor. Effects from the innate immune system in damaging the conjunctival epithelium, in patients with AED, have been recognised to be relevant in patients with active AED. It is thought that Toll-Like Receptors (TLRs) play an active role in the pathogenesis, however the actual mechanism is unknown. The aim was to examine TLR-4 expression in the conjunctival epithelium of human subjects with AED. Furthermore, to establish whether there are differences between active/inactive AED and seasonal/non-seasonal AED subjects.

Methods: Seven Seasonal allergic conjunctivitis (SAC), 7 Out of season (OOS) allergic conjunctivitis, 6 Perennial allergic conjunctivitis (PAC) and 5 normal control specimens were examined. Immunohistochemically for TLR-4 expression (anti-humanTLR-4 antibody) and quantified in a masked fashion for the percentage epithelia stained for the marker using Image analysis software.

Results: Mean percentage staining of TLR-4 expression was significantly greater in SAC, PAC and Normal patients in comparison to OOS, respectively ($P = <0.01$, $P = 0.01$, $P = 0.01$).

Conclusion: Conjunctival epithelial TLR-4 was significantly up regulated in SAC and PAC. However, TLR-4 expression was significantly lower in OOS, in comparison. This supports the view that TLR-4 plays an important role in the pathogenesis of AED. While suggesting there is a difference between seasonal and non-seasonal AED.

A STUDY TO ASSESS CONFIDENCE LEVELS IN BASIC SURGICAL SKILLS AMONG INTERNATIONALLY TRAINED JUNIOR DOCTORS.

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Background: Basic Surgical Skills such as safe surgical practices, appropriate handling of surgical instruments and suturing are expected to be performed by every junior doctor all over the globe, irrespective of their future specialization. These skills might also influence them in laying a path to a surgical career. This study assesses the intrepidity of basic surgical skills among a sample of internationally trained junior doctors who are pursuing Master degree in a variety of disciplines in a university, in the UK.

Methods: An anonymous 5 point questionnaire was sent through SurveyMonkey to be filled in by 22 International medical graduates (IMG's) studying at a University in the UK, of which 20 members completed the survey. The results were collated in Excel Spreadsheet, interpreted as ordinal data and relayed to the sample group.

Results: The data on confidence levels were dichotomized into grouped responses -as Confident and not confident. Out of 20 IMG's, 60% stated that they have moderate knowledge on basic surgical operating standards. 63% answered that they are not confident in administering local anesthesia prior to a basic surgical procedure. Half of the IMG's mentioned that they are not confident in the usage of various suturing techniques. 85% of the sample group agreed that they have intensions to train and practice in the UK.

Conclusions: This study evidenced that a significant proportion of IMG's are not confident in performing basic surgical procedures and interprets that they have moderate knowledge on surgical operating standards. An organized, Basic Surgical Skills teaching program for IMG's who have intensions to practice in the UK, may increase the confidence levels and also helps them in adapting to the standards of healthcare system in the UK.

THE PROGNOSTIC SIGNIFICANCE OF ANAEMIA IN THE ELDERLY.

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Background: Anaemia in the elderly is increasingly becoming a cause for concern as the world population of individuals aged 65 and over increases. Anaemic disorders are associated with poor prognosis in the elderly; therefore better understanding of outcomes such as mortality and hospitalisation rates could lead to the development of better treatment and management options for elderly individuals with anaemia, ensuring a better quality of life.

Methods: Electronic searches identified general population based studies that compared mortality and hospitalisation rates in the anaemic elderly with that of the non-anaemic elderly. A meta-analysis used forest plots to explore significant differences in the mortality and hospitalisation rates between the anaemic and non -anaemic elderly populations with the use of risk and hazard ratios.

Results: A meta-analysis of 14 studies with a total of 50,464 subjects and a follow up period ranging from 1.4 to 23 years were included in this study. Of these, 15.9% had anaemia according to the WHO criteria. Forest plots indicated a risk ratio of 2.29 (95% CI, 2.03 – 2.58) for mortality, and a risk ratio of 1.75 (95% CI, 1.53 – 2.02) for hospitalisation in the elderly anaemic population.

Discussion: Anaemia appears to have a poor prognostic significance in the elderly with mortality and hospitalisation rates affected in these individuals. The results of this meta-analysis aid in determining the significance of this effect by addressing the extent of the difference in the mortality and hospitalisation rates of the anaemic elderly compared to the non-anaemic elderly.

Conclusion: Anaemia is of prognostic significance in the elderly with increased mortality and hospitalisation rates observed in this population compared to the non-anaemic population. Early diagnosis and better treatment options for some anaemic disorders in the elderly need to be developed to tackle this issue of poor prognosis.

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THE LANDMARK TECHNIQUE FOR FASCIA ILIACA COMPARTMENT BLOCKS - A CADAVERIC STUDY.

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Background: The fascia iliaca compartment block is commonly used to provide pain relief for femoral fractures. Classically the landmark technique was used, however in the advent of affordable, portable ultrasound machines, ultrasound guided techniques have become more common place. Nonetheless instances still occur where the landmark technique is still employed such as in the emergency department. In this study we used a cadaveric model to assess the potential efficacy of the landmark technique for the anterior approach.

Materials/methods: A single cadaver from the laboratory of Human Anatomy of the University of Glasgow was used following ethical approval. A consultant anaesthetist was invited to simulate a fascia iliaca compartment block using the anterior approach on the left thigh of the cadaver using 20mls of Indian ink mixed with 10% latex. The ink was given 10 days to set before subsequent dissections were performed to investigate the spread of the ink.

Results: Results showed no rostral movement of the ink into the abdomen. Dissection of the left thigh showed the ink travelling in columns caudally, covering the femoral and lateral cutaneous nerve of thigh. The obturator nerve was unaffected by the ink.

Discussion: Results of this study showed the ink to travel in the opposite direction to that expected. Two of the three major nerves of the plexus were reached nonetheless. This corroborates with the literature. Limitations of this study include the difference in the tissues between live patients and cadavers and limited flexibility to allow positioning of the cadaver compared to live patients.

Conclusion: This study provides evidence that the landmark technique for the anterior approach to the fascia iliaca compartment blocks remains an alternative should ultrasound be unavailable; however it remains difficult to reach all three branches of the plexus nerves of the lower limb with a single injection.

ANALYSIS OF RECREATIONAL DRUGS OBTAINED FROM PATIENTS PRESENTING TO THE EMERGENCY DEPARTMENT, LONDON.

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Acute recreational drug toxicity is a common presentation to emergency departments. Recreational drug users face fatal health risks particularly as these drugs are not controlled or supervised by medical professionals. Currently in the UK, routine toxicology screening is not available. This is mainly due to laboratory toxicology results being unavailable in a time frame that would have an immediate impact on the management of the patient. Data on trends of recreational drug use in local areas are often unavailable. This study analysed recreational drugs obtained from patients presenting to St Thomas's emergency department, London with acute recreational drug toxicity. Drug samples were delivered to TICTAC, a drug database company situated at St George's University of London. The contents of each bag were documented and categorised on the basis of their physical appearance. All liquids were analysed via Fourier Transform Infrared Spectroscopy. Tablets and powders were subjected to analysis using Gas Chromatography Mass Spectrometry. A total of 65 samples were analysed. Of these 36 (55%) were liquids, 24 (37%) powders, 3 (5%) and 2 (3%) contained cannabis. Liquid samples were shown to contain either Gamma Butyrolactone (GBL) or poppers. The majority of powders contained Mephedrone (42% of all powders), followed by MDMA (17%), Amphetamine (8%), Methamphetamine (4%), Ketamine (4%). 13% of powders contained the designer drug methoxetamine in addition to 1 bag of Paramethoxymethamphetamine in combination with the novel substances, alpha pvp, 4-mec, 4 fluoromethamphetamine. This study has provided a 'snapshot' on the pattern of recreational drug use in the area surrounding the local emergency department. This will be helpful for doctors by providing knowledge of drug epidemiology in the local area. The results suggest that ongoing analyses are helpful in monitoring the latest trends in drugs and detecting emerging new drugs.

TRAUMATIC BRAIN INJURY - DOES HIGH BLOOD ALCOHOL LEVELS ON ADMISSION AFFECT PLATELET COUNT?

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Aim: This study aims to determine the correlation between blood alcohol concentration (BAL) on admission and platelet count of TBI patients.

Background: In the UK, alcohol can be detected in up to 60% of TBI patients on admission. Studies have shown that platelet production and function is affected by alcohol consumption. Alcohol can inhibit and slow down the production of platelets by the bone marrow and has been shown to decrease platelet aggregation and activity in vitro

Methods: Patients were identified from St Mary's Hospital's neurotrauma database. 175 patients with traumatic brain injury (EDH, SDH, SAH, IVH) who presented to the major trauma centre from 01/01/12 to 01/07/12. The threshold for high BAL is > 80mg/100ml Thrombocytopenia is defined as platelet count <140

Results: 72 out of 175 patients had BAL testing, and out of 72 patients, 39 (54.2%) of them had high BAL. 39 out of 175 (22.3%) had abnormal platelet count on admission or during the first 24 hours. 6/39 (15.4%) of patients had both an elevated BAL and abnormal platelet count 10/33 patients (30.3%) with normal BAL had abnormal platelet count.

Conclusion: Our study did not find a statistically significant correlation between high BAL and platelet count. This could relate to the lack of numbers However, patients with normal platelet count can also develop large haematoma. Therefore, platelet count does not equate to platelet function In order to better understand platelet function, we are collecting thromboelastography (TEG) data in TBI patients with elevated BAL on admission.

ALPHA HAEMOLYSIN AS A MARKER OF INFECTION.

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Hospital acquired infections cause a high rate of death and morbidity, particularly affecting ICU patients who are severely ill often with a degree of immunosuppression. Staphylococcus aureus SA, an opportunistic pathogen which commonly colonises the general population, is a major cause of infection in ICU patients. In our previous studies we have shown that the SA toxin, Alpha Haemolysin, is detectable in 72% of ICU urine samples by Western Blotting (WB). Subsequently, this study has used Enzyme-linked Immunosorbant Assay (ELISA) and WB techniques to screen urine samples from a population of Acute Ischaemic Heart Disease episode patients. Two samples were collected from each patient at the time the episode (AIHD A) and on recovery six weeks later (AIHD B). These samples showed a significantly lower prevalence of AH than was observed in ICU patients, at 29% and 19% respectively. This part of our study shows that the prevalence of AH in ICU patients is very much higher than a control group, but also that in an AIHD population the prevalence is higher following the episode than at follow-up. Differences were observed between AH levels detected by our Enzyme-linked Immunosorbant Assay (ELISA) and WB, with levels apparently higher in WB; our hypothesis is that AH is excreted associated with IgG and therefore undetectable by ELISA. To investigate this we developed an ELISA to screen for AH specific IgG and found that 95% of AIHD A samples contained a detectable amount of IgG. Further work is planned to screen and quantify the ICU and AIHD B samples IgG. This work suggests that toxin levels in urine being a clinically relevant diagnostic technique and raises questions around how toxins are metabolised by the body.

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THE PRONATOR QUADRATUS PEDICLED MUSCLE FLAP; FEASIBLE OR FANTASY?

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Background: Pedicled muscle flaps are of great use in reconstructive and plastic surgery, however, the anterior forearm is an area where there are few viable options for this. The present study discusses the anatomy and use of pronator quadratus (PQ) as a pedicled muscular flap.

Methods: Fine dissection of the anterior forearm was carried out on a cadaveric specimen obtained from the Department of Anatomy at King's College London. Flexor policis longus and flexor digitorum profundus were identified and the anterior interosseous nerve (AIN) and artery (AIA) were seen to be running between them. PQ was then elevated on its pedicle as described by Dellon and Mackinnon (1984, Journal of Hand Surgery).

Results: The AIA and AIN were found to pass deep to PQ before penetrating its posterior aspect. Once elevated on its pedicle, the flap could be moved in a circle with a radius of 5cm, about the point of bifurcation of the ulna artery (giving off the AIA). In this way, the PQ flap could be used over a large area of the anterior forearm from 3cm distal to the elbow to the proximal flexor wrist crease.

Discussion: With the extent of mobility offered by the pedicle, there are multiple potential applications including ulnar/median nerve grafting and the treatment of burns or soft tissue injuries. Importantly, muscular function of the forearm is not compromised due to the action of pronator teres.

Conclusion: In this case, the PQ flap was found to have anatomy consistent with the existing literature. We found that there was scope to manoeuvre the flap to cover an area of the anterior forearm so the PQ could be theoretically used for soft tissue or burns injuries. However, the technical difficulty of this procedure may limit its use.

Category: Clinical and Patient Related Work

CAROTID REVASCULARISATION: CAN OUTCOMES BE IMPROVED WITH NOVEL TECHNOLOGIES?

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Background: The debate of superiority between the two current standard practices in carotid revascularisation – carotid artery stenting (CAS) and carotid endarterectomy (CEA) is ongoing. The most recent RCT showed increased number of stroke with CAS (4.4% CAS vs 2.3% CEA;p=0.005) but less myocardial infarction (1.1% CAS vs 2.3% CEA;p=0.03) and cranial nerve injury (0.3% CAS vs 4.8% CEA; p=0.0001). A novel technology, the Silk Road Medical MICHI system, is promising to offer an entirely new path for carotid revascularisation and integrate the benefits of both CEA and CAS.

Description of Innovation: The MICHI system consists of arterial (placed via transverse incision at the common carotid artery) and venous return sheaths (placed percutaneously in the femoral vein), connected via a flow controller to create a low resistance arteriovenous shunt circuit. Controlled high-flow-rate flow reversal is then achieved without the need to occlude the ipsilateral external carotid artery. By reversing the flow in the internal and external carotid arteries, the embolic debri are diverted away from the brain before any manipulation of the carotid lesion. Following the clamping of the common carotid artery, a guide wire is introduced through the arterial sheath to pass across the lesion to allow stent deployment.

Discussion: The first-in-man single-arm prospective study evaluating the effectiveness of MICHI system showed no major adverse events, including major stroke, myocardial infarction and death, in 75 patients through 30 days follow up. There was a 17% rate of new diffusion weighted MRI hyper intensity brain lesions attributed to the procedural microembolisation. This is the lowest rate reported amongst available carotid stenting strategies (50% in transfemoral distal filter protected carotid stenting) and is comparable for the first time to previously published rates in CEA.

Conclusion: Two trials will be further evaluating this technology (LOTUS in the UK and ROADSTER in the US) to define its role and efficacy.

SELECTIVE IMMUNOGLOBULIN-A DEFICIENCY: A LIFE THREATENING TRANSFUSION REACTION (A CASE SCENARIO IN INDIA).

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Introduction: Selective IgA deficiency is a relatively mild genetic condition with deficiency of IgA in the blood. Patients with IgA deficiency have a tendency to develop recurrent sino-pulmonary infections, gastrointestinal infections and disorders, otitis media, skin infection and allergies etc. In this case, an Indian woman, a known case of colon cancer with anaemia, develops severe life threatening transfusion reaction which is later found out to be as a result of SIAD. In India due to inadequate healthcare facilities many patients succumb without even being diagnosed. Very few cases of SIAD have been reported in India till date.

Case description: A 55-year-old female, a known case of colon cancer with anaemia, presented to the hospital with history of severe transfusion reaction as soon as blood transfusion was started at a peripheral hospital. Investigations for mismatch status were not known. It was decided to transfuse the patient after careful cross-match for minor blood groups also. Patient was admitted in ICU for monitoring during transfusion. As soon as packed red cell transfusion was started, the patient developed dyspnoea, hypotension and tachycardia. Transfusion was stopped and the patient was revived with hydrocortisone and subcutaneous adrenaline. The blood bag was sent for transfusion reaction investigations which came out to be negative. Selective IgA deficiency was thought of and IgA levels were found out to be low during investigations. Finally, saline washed RBCs transfusion was given without any problems. the course of treatment for colon cancer with anaemia.

Conclusion: The patient was diagnosed with selective IgA deficiency in the course of treatment for colon cancer with anaemia.

Discussion: Although uncommon condition in the Asian countries like India, selective IgA deficiency should be investigated for in patients with recurrent mucosal infections and unexplained life threatening transfusion reactions. Early diagnosis is important for the likewise vaccinations and prophylaxis against immunological reactions.

MATERNAL MORTALITY FROM ECLAMPSIA IN MALAWI: A CASE REPORT.

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This is the case report of woman who died from eclampsia in Zomba, Malawi. Having witnessed the tragic death of this patient on my medical elective, I decided to review her case retrospectively in an attempt to discover what factors led to this devastating outcome. AB was a 22-year-old primigravida woman who was referred to Zomba Central Hospital from a neighbouring district having presented with convulsions. Two hours later, she was seen by a doctor who performed a caesarean section through which the 37 week-old baby was saved. Following the procedure, the patient remained unconscious and was transferred to the Intensive Care Unit. My first personal encounter with this patient was being called to see her with the on-call clinician as she was convulsing and struggling to breathe. As the intubation trolley was being set-up, the patient suffered a cardiac arrest and died. Unfortunately, this is not an unusual case in Malawi, with Eclampsia remaining one of the leading causes of maternal mortality. Having reviewed her case, I discovered many pitfalls in this patient's antenatal and emergency care which ultimately led to her completely preventable death. Having presented the case at a departmental meeting in Zomba Central Hospital, I hoped to highlight important issues that potentially could prevent similar tragedies from occurring. Furthermore, by sharing my experience with fellow students and doctors in the UK, I aim to highlight the importance of good antenatal care both in our country and overseas. One woman dies every 90 seconds in pregnancy or childbirth worldwide, a statistics that desperately needs to change. However, the sad reality is that 'women are not dying of diseases we cannot treat. They are dying because societies have yet to make the decision that their lives are worth saving' (Mahmoud Fathalla).

ATRIAL FIBRILLATION IN PATIENT WITH BARTTER SYNDROME.

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Bartter Syndrome (BS) is a hereditary disorder characterized by the association of hypokaliemia, alkalosis, secondary hyperaldosteronism, normal blood pression and polyuria. In BS patients, standard electrocardiography frequently shows a QT interval prolongation, ST segment depression, and, sometimes, an atrioventricular block related to AV dissociation. In addition, hypokalemia may predispose to life-threatening arrhythmias such as torsade de pointes, ventricular tachycardia, and ventricular fibrillation. We report a case of a 38-year-old man with Bartter Syndrome that showed recurrent episodes of paroxysmal atrial fibrillation (AF) associated with paresthesia of the lower extremities and polyuria. Blood tests showed hypokalemia, hypocalcemia, hypophosphoremia, hyperreninemia, hyperaldosteronism, hypercalciuria and low levels of vitamin D. The patient was converted to sinus rhythm with infusion of Propafenone. Subsequently, an oral therapy with Spironolactone, Vitamin D, Calcium and Potassium supplementation has been prescribed. Since then the patient had not recurrence of AF. This case represent the first evidence of AF in patients with BS. We hypothesize that changes in plasma electrolyte concentrations (especially K+, and Ca2+) induce changes in the myocardial cells' action potential. The electrolyte imbalance can lead to an instability in the maintenance of the action potential of the plasma membrane and thus abnormalities of generation and conduction of electrical impulses in the myocardium and to prepare to the onset of AF. However, further studies are needed to analyze the cardiac electrophysiology of these subjects in order to better characterize the abnormalities of generation and conduction of cardiac electrical impulses and prevent the occurrence of life-threatening arrhythmias.

A TROUBLESOME PLEURAL EFFUSION.

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Background: The diagnosis of mesothelioma is a life-changing event for patients, both in terms of the financial compensation that it encompasses and additionally for their quality of life. Secondary pleural effusions can compromise breathing, result in regular hospital visits for their drainage, and be a site of infection with each aspiration. Early diagnosis allows the decision to be taken for pleurodesis, or alternatively for a long-term tunnel drain to be inserted permitting self-aspiration at home.

Case: The case described is an 85-year-old man presenting with a massive right-sided pleural effusion. He was therapeutically drained, the fluid was analysed yielding an exudate however no underlying pathology was identified on cytology. Subsequently he attended his respiratory follow-up appointment with the same presentation. Further imaging showed a hydropneumothroax secondary to an effusion superimposed over a trapped lung. Eventually a diagnosis of mesothelioma was made by pleural biopsy.

Conclusion: The literature highlights that patients presenting with a unilateral exudative pleural effusion, the differential should always include malignant disease. If initial CT scan and cytology are non-diagnostic, a low threshold for pleural biopsy or Video-Assisted Thoracoscopy should be considered in cases with clinical features highly suggestive of mesothelioma. Ultimately recommendation is for all patients with diagnosed mesothelioma or undiagnosed unilateral pleural effusion where mesothelioma is a possible diagnosis to be promptly referred for discussion at a Lung Cancer Multi-Disciplinary Meeting.

A RED HERRING - LÖFGREN'S SYNDROME MISDIAGNOSED AS CELLULITIS.

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Background: Löfgren syndrome is a rare acute variant of sarcoidosis that can be easily missed/misdiagnosed. It is characterised by triad of erythema nodosum, bilateral hilar lymphadenopathy and acute onset polyarthritis. The disease is usually self-limiting and carries a good prognosis. NSAIDs are the mainstay of treatment.

Discussion: A 45-year-old man with no significant past medical history presented to A&E with four days of feeling generally unwell, pain in multiple joints and localised tender erythematous lesion around his right ankle. There were no significant findings on examination. He was systemically well with a mildly elevated inflammatory markers. An initial diagnosis of non-specific viral illness and mild ankle cellulitis was made, and he was discharged with a 7-day course of flucloxacillin. Four days later, he re-presented to A&E with worsening polyarthralgia and increasing number of erythematous lesions on both shins, recognised as erythema nodosum. Chest X-ray showed bilateral hilar lymphadenopathy. His white cell count and CRP were further elevated compared to previous admission and ESR and serum ACE level were also elevated. Diagnosis of Löfgren syndrome was made and patient made complete recovery with a course of oral NSAID.

Case summary: Erythema nodosum is an inflammatory process involving inflammation of fat cells under the skin resulting in tender red nodules that are usually seen on both shins and can be easily misdiagnosed as cellulitis. However, although Löfgren syndrome is rare, this diagnosis should be considered when examining a patient with erythema nodosum and polyarthralgia.

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A CASE OF LMNA GENE MUTATION CAUSING DILATED CARDIOMYOPATHY IN AN INDIVIDUAL WITH VENTRICULAR ARRHYTHMIAS AND CONDUCTION DEFECTS.

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Mutations in the LMNA gene are rare and gives rise to highly penetrant clinical phenotypes. LMNA mutations cause malignant cardiac arrhythmias, progressively worsening heart failure and dilated cardiomyopathy. The arrhythmias may lead to sudden cardiac death. This case study reports a 48-year-old asymptomatic male with a family history of sudden cardiac death who presented with a two year history of ventricular ectopics. ECG revealed type I atrioventricular (AV) nodal heart block and multiple ventricular ectopics. Trans-oesophageal echo cardiogram revealed a normal left ventricular systolic function and a mild dilated cardiomyopathy. Genetic studies confirmed that he had a mutation in the LMNA gene. He was subsequently diagnosed with dilated cardiomyopathy due to LMNA gene mutations. Following this, he had an implantable cardioverter defibrillator (ICD) fitted. Patients with LMNA mutations are at high risk of developing life-threatening arrhythmias even when ventricular function appears to be normal. Therefore, clinicians should have a high index of suspicion for cardiac laminopathies. It can be hypothesised, that the amount of time it takes to progress from arrhythmias to conduction disorders or dilated cardiomyopathy can be used as a marker for prognosis in cardiac laminopathy cases. As such, monitoring these patients for any abnormalities in PR or QT prolongation on ECG can be useful in determining prognosis. The management of individuals change when their conduction deficits or dilated cardiomyopathy are due to LMNA mutations. In these groups of patients, even in the presence of normal ventricular function, placing an ICD improves their prognosis significantly.

BLEEDING STOMAL VARICES: A MARKER FOR UNDERLYING LIVER PATHOLOGY.

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Introduction: Portal hypertension (PHTN) is a rare complication of primary sclerosing cholangitis (PSC) secondary to ulcerative colitis and may cause oesophageal and parastomal varices. Bleeding from parastomal varices has been reported and is usually associated with PHTN. PSC is the second most common cause of PHTN following cirrhotic changes in the liver. Consequent variceal bleeding can lead to large volume blood loss and significant morbidity and potential mortality. Recurrent stomal bleeding in the absence of trauma is a rare occurrence and should prompt further investigations.

Presentation of case: We report a case of a 66-year-old gentleman who presented with stomal bleeding. His ileostomy was re-sited to the left iliac fossa but bleeding persisted. A diagnosis of PHTN was made on the basis of ectatic mesenteric veins on CT which were subsequently embolised.

Discussion: PHTN developed secondary to portal vascular and hepatic parenchymal changes. Management options include beta blockers (partially effective in this case) and transjugular intrahepatic portosystemic shunt (TIPS). The management option carry a risk of severe morbidity which need to be considered by each patient.

Conclusion: Recurrent stomal bleeding in patients with a history of UC should be investigated for portal hypertension. Both diagnosis and management can be challenging.

UPPER EXTREMITY DEEP VEIN THROMBOSIS: A RARE CAUSE OF UPPER LIMB SWELLING.

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Background: Upper extremity deep vein thromboses (UEDVT) are infrequent but responsible for one-tenth of all venous thrombotic events.

Case report: An 83-year-old male was admitted to orthopaedics for arthrotomy and washout of septic arthritis of his hip. Other than this, he suffered a three-week history of disabling right shoulder pain associated with ascending pitting oedema to the elbow. The patient was systemically well with no stigma of superior vena cava obstruction. The overlying skin was intact with no transdermal implants, trauma, phlebitis, or injection sites; and was non-tender to palpate. His radial and ulnar pulses were palpable bilaterally. There was no pallor of limb and capillary refill times were within two seconds at the nail beds. His sensation was intact across C3-T2 dermatomes and power grips were equivocal both sides. Musculoskeletal examination revealed limited active and passive external rotation of his right shoulder to 45 degrees. His blood parameters showed normal white cell counts but moderately elevated C-reactive protein and erythrocyte sedimentation rate. Both X-rays of his chest and shoulders were non-remarkable. Duplex ultrasonography, however, found occluded thrombus in patient's right brachial vein. The patient was treated with therapeutic dose of low-molecular weight heparin and had no pulmonary embolism one month following the diagnosis.

Discussion: Primary UEDVT represents a third of all cases which could be effort-induced or idiopathic. Patients with indwelling central venous catheters, especially in conjunction with malignancies or hypercoagulation disorders are at increased risk of secondary UEDVT. Pulmonary embolism could be as high as 36%. Complication also includes post-thrombotic syndrome which results in reduced venous return; hence incapacitating limb swelling, pain and ulceration.

Conclusion: The post-thrombotic syndrome of UEDVT could mimic the presentation of adhesive capsulitis. This however should be considered as a diagnosis of exclusion.

INSULIN RESISTANT GENETIC DISEASE - ALSTRÖM SYNDROME: A CASE REPORT.

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Introduction: A 27-year-old female, presents with bilateral complete blindness; unilateral deafness; Obesity with BMI: 41.6, Increased upper body muscle mass; stiffness, dyspnea and hyper pigmentation of the skin.

Case History: She had Nystagmus, noted at 4 months old. She developed progressive retinal degeneration and infantile obesity: 16 kgs at 11 months old. At 10 years, she was blind with sensorineural hearing impairment. Initially diagnosed at 12 years with Non-Insulin Dependent Diabetes Mellitus but was recently diagnosed with Insulin dependent Diabetes Mellitus. Never had ketoacidosis. She has chronic "active" hepatitis, recurrent urinary tract infections, incontinence, scoliosis, kyphosis, acanthosis nigricans, normal secondary sexual characteristics with no menstruation, chronic obstructive pulmonary disease and gastroesophageal reflux disease.

Investigations: Laboratory tests showed increased levels of liver transaminases, hypercholesterolemia and hypertriglyceridemia. Cardiac Echography-Systolic dysfunction of the left ventricle was noted with diffuse hypokinesia. Genetic testing-Frame shift in one allele in axon 16 in the ALMS1 gene. Differential Diagnosis: Biedl-Bardet Syndrome; Wolfram Syndrome; Alström's Syndrome.

Conclusion: With genetic testing, showing a defect in the ALMS1 gene, we can conclude this patient has Alström Syndrome. There are about 500 documented cases world-wide. Alström Syndrome is a rare autosomal recessive genetic disorder which affects multiple organs. The ALMS1 gene is on chromosome

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2p13. There is a need to educate doctors on the initial signs and symptoms to enable earlier diagnosis of patients with Alström syndrome in the future. In our patient, treatment includes: Recombinant growth hormone therapy; Hearing aids; statins and fibrates for dyslipidemia; Actos and Lantus for diabetes mellitus.

PREVENTIVE OCCIPITOCERVICAL FUSION IN PATIENTS WITH KNIEST DYSPLASIA.

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Background: Kniest dysplasia is a distinctly rare disorder (1:1,000,000 live births) caused by mutations in the COL2A1 gene, which forms type II collagen. It is inherited in an autosomal dominant pattern. Clinically the condition causes skeletal abnormalities, which are characterized by dwarfism, body dysproportion, kyphoskoliosis, excesssive lumbar lordosis and joint degeneration. Cleft palate, hearing loss due to recurrent ear infections and eye problems are fairly common symptoms.

Methodology: The analysis of medical and radiological record of the treatment path between 1998 and 2012.

Discussion: Two 17-year-old female patients- monozygotic twins were treated at the Children's Hospital because of Kniest dysplasia (Spondyloepimetapyseal Dysplasia Congenita). Both of them have characteristic symptoms of this disorder: dwarfism, dysmorphic faces, escessive lumbar lordosis, genu varum and bilateral coxa's joint contracture. They were repeatedly hospitalized. The aim was to undergo a medical rehabilitation, which should have improved a motion function and muscle strength. In 2002 one of the twins had an accident. Due to the trauma complications the occipitocervical stabilization was performed. The same procedure was used in her sister treatment as a prevention. After 3 years the stabilizations were removed. In August 2011, the second accident happened and resulted the cranio-cervical junction trauma. The patient presented disorders of consciousness, respiratory failure and tetraplegia. Therefore, the second occipitocervical stabilization was performed.

Case summary: The presented case shows multiplicity of complications due to dysfunction of type II collagen. Wherefore, necessity of preventive occipitocervial stabilization should be considered in such cases.

MANAGEMENT OF PREGNANCY COMPLICATED BY RIBOFLAVIN RESPONSIVE MULTIPLE ACYL-COA DEHYDROGENASE DEFICIENCY.

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Riboflavin Responsive Multiple Acyl-CoA Dehydrogenase Deficiency (RR-MAD) is a rare autosomal recessive metabolic condition in which the body is unable to utilise fats and protein for energy. Blood glucose levels can unexpectedly become extremely low and acid levels in the blood can increase. High dose riboflavin is the cornerstone of treatment and should be recommended with oral supplementation of carnitine. Knowledge of the disease and the impact it can have on pregnancy is of paramount importance. A 28-year-old women with RR-MAD presented as an emergency to the antenatal ward at 25+5 weeks unable to tolerate food and drink for couple of days. Blood glucose and ketones were reported and intravenous fluids commenced. Fetal movement was normal however there appeared to be no improvement and her conditioned deteriorated leading to hypotention. Intravenous 10% dextrose was commenced and carbohydrate intake monitored which alleviated her symptoms. Current pregnancy is positive for RR-MAD but expected to respond to riboflavin and/or carnitine supplements. However, a previous pregnancy was terminated due to severe form of RR-MAD and incompatibility with life. A high index of suspicion is needed in women with RR-MAD in order to follow the emergency protocol, as this condition can become life threatening if untreated. Patients themselves also need to be aware of when and how to seek medical attention, as was the situation in this case. Management of pregnancies with RR-MAD requires a multidisciplinary approach, including specialists in maternal-fetal medicine, genetics and dietetics.

MASSIVE HAEMORRHAGE CONTROL, ARE WE DOING IT RIGHT? A CASE REPORT ON UNCONTROLLED HAEMORRHAGE FOLLOWING FACIAL TRAUMA.

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Severe trauma is a worldwide problem as it results in over five million deaths every year. Uncontrolled bleeding is the leading cause of death after a traumatic incident. Effective management of haemorrhage is heavily emphasized as this is a commonly faced situation not only in trauma but many other specialties. The Advanced Trauma Life Support classifies bleeding into 4 groups according to the extent of blood loss. This classification is widely used across multiple countries as an indicator on bleeding severity and when to instigate various treatments. However, it has been pointed out that this classification does not truly reflect how poorly a patient can be and is often unreliable. This paper hopes to explore the challenges faced when assessing haemorrhage severity, looking particularly at the inaccuracies encountered when relying upon common parameters such as vital signs, haemoglobin concentration and haematocrit concentration. Discussion will be based on a case of a 78 year old male who presented with uncontrolled facial haemorrhage after sustaining a blunt non penetrating trauma. An estimated 2.0 litres of blood were lost. Interestingly the patient was able to maintain vital signs and blood results were within normal limits. There will also be a focus on 'Cryptic Shock' which is difficult to identify, thus associated with increased mortality. Additionally, this paper hopes to advocate the importance of addressing 'The Lethal Triad' during massive haemorrhage control. The triad consists of three elements, namely acute coagulopathy, hypothermia and acidosis. These three factors contribute to a vicious cycle that leads to perpetuation of bleeding and patient deterioration. There will also be discussion over 'Permissive Hypovolemic Resuscitation' (PHR), which is a relatively newer approach to fluid administration during active haemorrhage. PHR aims to strike an optimum balance between maintaining adequate tissue perfusion while avoiding Trauma Associated Coagulopathy.

OSTEORADIONECROSIS OF THE TEMPORAL BONE FOLLOWING MIDDLE EAR SQUAMOUS CELL CARCINOMA: A SURGICAL CHALLENGE.

Layton T*
University of Manchester

Aims: Squamous cell carcinoma of the temporal bone is a rare and destructive malignancy. It represents both a diagnostic and therapeutic challenge. This case reports aims to present an interesting and rare example of the significant sequelae that can follow treatment of SCC of the middle ear.

Methods: A 50-year-old patient was treated for a locally advanced SCC of the middle ear. She received a radical mastoidectomy with adjuvant radiotherapy.

Results: Seventeen years post-op there is no evidence of tumour recurrence. However, following radiotherapy of the temporal bone the patient developed osteoradionecrosis that periodically became infected. One episode of infection, two years after surgery, produced an infiltrating osteomyelitis of the temporal bone that lead to the formation of a cerebellar abscess. This was treated with IV antibiotics and surgical drainage and the patient made a full recovery. At present the area of necrotic bone has a small sequestrum and has produced a chronically discharging ear that requires periodic micro suction and toileting.

Conclusions: This case reports illustrates how vital a close follow up is for patients, not only to detect possible recurrence of the malignancy but also to identify post-treatment complications. It provides a rare example of an intracranial abscess being produced from an area of osteoradionecrotic bone.

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A NOVEL CLINICAL ANATOMY TRAINING COURSE FOR MEDICALS STUDENTS AND FOUNDATION DOCTORS.

Lim D*
University of Bristol

Introduction: This is an event taught by surgeons with the purpose of equipping both senior medical students and foundation year doctors with a solid knowledge of applied clinical anatomy. The course aims to bridge knowledge gap in applied anatomy and to produce anatomy trainers who can confidently teach anatomy to their peers.

Methodology: To provide the best interactive learning sessions for the attendees, the course adopts a demonstration approach to surface anatomy in order to illustrate relevant points to everyday clinical practice. Following the highly interactive focus group workshops, attendees were then required to sit for a formal assessment in the form of viva, OSCE and spotters. A minimum of 70% marks is needed to successfully complete the course. Certificate for level 1 will only be valid for 2 years from the date of passing the exam.

Feedback: This course has received very good feedback from majority of attendees. Some of the feedbacks included "An extremely useful day to summarise and clarify old anatomy knowledge", "This is the best course I have ever attended" and "For once anatomy is not taught in a boring way".

Discussion: Attendees were taught important anatomical landmarks that are commonly encountered in routine operations, different ways to place surgical incisions, fundamental principles and above all, structures to avoid or preserved when operating. Some of the topics that were covered in the course include soft tissue injuries and trauma to the upper limbs, facial and neck injuries, stab/gunshot wounds to the thorax/abdomen, wound healing, sutures, and local anaesthetics.

Conclusion: This course is highly recommended to all senior medical students and foundation doctors who are interested in human anatomy and a career in surgery.

LEGAL HIGHS: TWO CASES, DRASTICALLY DIFFERENT OUTCOMES.

Wooding EL*, Kerr Liddell R
Torbay Hospital

Background: Novel psychoactive substances called 'legal highs' constitute a new class of designer substances. Recorded usage is increasing 'legal highs' cause wide ranging physical and behavioural effects, from sympathetic nervous stimulation to psychosis.

Case 1: A 17-year-old male was brought in by ambulance (BIBA) with GCS of 6/15 and inadequate breathing having ingested 'sensate'. He required intubation and ventilation. ABG demonstrated profound respiratory acidosis. On examination extensor posturing was noted, but otherwise was unremarkable. CK was 232, and CT head was normal. He was admitted to ICU overnight, after which he was extubated and discharged, without follow-up required.

Case 2: A 15-year-old male was BIBA with GCS of 12/15, following a witnessed long-lie by his mother, having smoked 'bubble bud'. On examination he had left-sided weakness, hypertonia and hyperreflexia. CT and subsequent MRI scan demonstrated cerebral infarct. CK was 29413. He was under shared care of Paediatricians, Neurologists and the Stroke multidisciplinary team. His mother was charged with neglect. Following a long stay with 6 months multidisciplinary follow-up he was discharged to his father's residence.

Discussion: These cases highlight contrasting outcomes resulting from legal high use. Both patients presented with reduced consciousness but their initial presentation misaligns with long-term morbidity. Patient 1 experienced no known long-term consequences; it is still unclear whether patient 2 will recover fully. TOXBASE suggested both substances were Synthetic Cannabinoid Receptor Agonists. However,

differences in terminology between vendors and our inability to screen produces uncertainty.

Conclusion: To improve outcomes we must educate patients better about the risks of legal highs and address the training needs of frontline staff. Finally, we must share risk and management information inter-professionally through research and TOXBASE, increasing evidence within our healthcare community.

VENTING SPLEEN – AN UNUSUAL DIAGNOSIS FOR PLEURITIC CHEST PAIN.

Parker C*, Pulimood T
West Suffolk Hospital, United Kingdom

A 52-year-old gentleman was found unwell and hypotensive. He had pleuritic chest pain, and vague abdominal pain which outpatient investigation had found no cause for (including a CT KUB for haematuria & polycythaemia). Initially septic, he stabilised with IV Tazocin and fluids. His pain persisted with increasing breathlessness, high d-dimer & CRP. A CTPA was organised to rule out a pulmonary embolus with superimposed infection; after discussion with the radiologist about the CRP we added abdominal views, which revealed a 7cm splenic abscess. Microbiology advised to continue Tazocin as the patient was stable. Over the weekend he developed severe sepsis with periodic fever spikes. Urgent discussion with the on-call radiologist & surgical team led to placement of an ultrasound-guided splenic drain (the surgical team's concern was the risk of rupture with splenectomy, and the radiology team were unhappy with the bleeding risk with simple aspiration). Blood cultures and aspirate grew Streptococcus milleri, and gentamicin was added. Further questioning revealed a 3-year history of an infected molar. Cardiology performed echocardiography to rule out endocarditis, and the maxillofacial team removed the offending tooth. The patient stabilised with conservative management and was discharged on oral clindamycin for 3 weeks. Splenic abscesses are an unusual cause for pleuritic pain, and can be difficult to diagnose. The infective organism was unusual, in that the patient did not have multi-organ involvement or underlying endocarditis. This case highlights the multidisciplinary nature of conservative management. Whilst the problem was ultimately a surgical emergency, Microbiology guided the antibiotics, an interventional radiologist inserted the drain, and care was coordinated by the medical team. Small case series suggest conservative management/drainage has equivalent outcomes to splenectomy, but there are no randomised trials. This rare diagnosis should be borne in mind if a source of sepsis cannot readily be identified.

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Category: Clinical Audit

HIV TEST REFERRALS IN MEDICAL PATIENTS - FULL CYCLE AUDIT.

Lemon TI*
York Hospital, United Kingdom

Background: HIV is prevalent in developing countries, yet the full extent remains unknown. Every available opportunity must be taken to test patients for HIV, improving their outcomes and protecting others. The gold standard in many developing country hospitals is 100% of medical patients whom are HIV negative should be tested if a test has not been carried out within the preceding months. We investigated this in a Ugandan hospital.

Method: Over three days two wards all patients on two medical wards has their case notes reviewed to see whether HIV tests had been requested. We excluded patients whom had a positive result already, or whom had had a test within the previous 3 months. Children of all ages were included. Intervention post audit was a clear poster placed on each ward reminding physicians to consider HIV test referral. The re-audit included 67 patients, with 67 having been tested.

Results: Of a total of 59 patients included in the pre-intervention audit, there were 12 whom had not been tested for HIV. This represented an 80% success rate. Four of these had been tested between 3-6 months ago, 5 were children under 1 year, over which there remains some controversy over whether to test. Three were clear misses. Following our implementation, 67 patients were included to audit its success, and all of these patients had been tested, giving a 100% test rate.

Conclusion: Our simple intervention meant that the gold standard was met. We would advocate use of signs to remind physicians to test for HIV in all HIV prevalent areas. Importance of re-audit and maintenance of the signs encouraging HIV test consideration need to be highlighted. This full audit cycle was a success.

AUDIT OF THE EPISIOTOMY PRACTICE IN HOSPITAL SULTAN ISMAIL (HSI), MALAYSIA.

Tembo T*
Hospital Sultan Ismail, Malaysia

Background: The Malaysian Ministry of Health has stipulated that less than 30% of the total number of vaginal deliveries in local hospitals require an episiotomy, the surgical incision made during labour to ease fetal delivery.

Aims: 1. To determine whether the recommended episiotomy protocol is practiced in HSI by calculating the rate of episiotomies conducted in primigravidas (women's first pregnancy). 2. To identify birth attendants conducting the episiotomies. 3. To report any complications following the procedure.

Methods: A prospective, 4-week audit was conducted in HSI's labour ward by identifying all episiotomies conducted in primigravidas delivering vaginally.

Results: Out of a total 289 vaginal deliveries in primigravidas, 194 episiotomies were conducted, resulting in an episiotomy rate of 67.1%. Nurses and senior doctors conducted 38% and 30% of these episiotomies respectively; midwives and house officers conducted 19% and 13% respectively. Complications included bleeding (6.7%), perineal tears (4%) and vaginal wall tears (2.5%).
Conclusion: HSI's episiotomy rate is more than twice the recommended practice. Variation in training of birth attendants and poor knowledge of hospital protocol may explain this finding. As the department does not publish their episiotomy rate, staff may be unaware of their current practice. Therefore, to reduce the current episiotomy rate further research into staff awareness of hospital protocol is required. Furthermore, birth attendants should be trained on the absolute indications for episiotomies to avoid complications. This audit should be repeated for the department to monitor progress in achieving the recommended guideline.

SCREENING FOR RETINOPATHY OF PREMATURITY (ROP): CURRENT GUIDELINES AND IDENTIFICATION OF HIGH-RISK GROUPS.

McDonald M*, Dhar A
Norfolk and Norwich University Hospital

Background: Early detection and treatment of retinopathy of prematurity (ROP) can prevent devastating consequences in newborns. The Royal College of Ophthalmologists' guidelines suggest that high-risk groups (<32 weeks gestation at birth or <1,501 grams) must be screened at appropriate intervals to avoid unnecessary allocation of resources and irreversible vision loss.

Methods: This audit evaluated the screening of ROP in babies admitted to the Norfolk and Norwich University Hospital's Special Care Baby Unit during the 2012 calendar year using their electronic patient database. Search Criteria: Either <1501g or <32 weeks gestation at birth. This was cross-referenced with ophthalmology notes and patient notes. There were 105 patients in total included in this audit.

Results: Based on the Royal College's screening criteria, outcomes included the appropriate frequency, termination, and follow-up of detection. Of the 69 babies examined, 9 were screened too late, and 21 too early. 28% (10/36 patients transferred) did not have ROP screening mentioned in their transfer documents. 11% of parents (105 patient cohort) were also not informed of the screening process.

Discussion/Conclusion: This audit highlights realities in practice of which other regional health trusts must be aware. The identification of high-risk babies upon admission (i.e. those being transferred or discharged early) cannot be overlooked. This is particularly important for junior doctors and those on neonatal rotation, as it is a condition largely neglected by undergraduate medical curriculums. Adherence will avoid the loss of what we take for granted every day: our vision.

AXILLARY NODE CLEARANCE DOES MORE HARM THAN BENEFIT?: A 2-YEAR RETROSPECTIVE STUDY IN EARLY BREAST CANCER PATIENTS.

Chew P*, Olayinka O
Barnsley District Hospital

Background: Complete axillary node clearance (ANC) is the current gold standard of management in breast cancer patients with diseased lymph nodes found on axillary staging. ANC is effective in controlling regional disease. However, this is associated with multiple surgical morbidities, especially lymphoedema that has a significant impact on patient's quality of life.

Methodology: We report a 2-year retrospective study of complete ANC in breast cancer patients whom found to have positive lymph nodes on sentinel lymph node biopsy (SLNB) or axillary sampling (AS). The aim was to assess the clinical need of ANC in diseased axilla via identifying further positive nodes post axillary staging, and to account for future breast cancer patient's management planning within local trust.

Results: We have found that an average of 25% patients have positive nodes identified post-SLNB and AS. Furthermore, only 16% of positive nodes were found in post-SLNB arm. Hence, at least 75% of patients have negative nodal status on ANC.

Discussion: SLNB has become the standard approach for axillary staging and replacing axillary sampling, therefore the number of patients with diseased lymph nodes in ANC will further reduce. Recent multi-centred trials and international studies have also shown that ANC have no significant benefits in disease survival rate and regional relapse prevention. The development of complications especially lymphoedema is twice as high in ANC compared to axilla-conserving therapies. The clinical advantages of ANC is questioned.

Conclusion: In summary, this audit suggested that majority of breast cancer patients did not benefit from complete axillary clearance after SLNB or AS, and were possessed to avoidable surgical morbidities that might have a significant impact on their quality of life.

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BASIC SURVEILLANCE FOR CARDIAC ABNORMALITIES IN PATIENTS WITH SAH: WHAT IS THE CURRENT PRACTICE?

Al-Othman S*, Harrison O, Foster R,Mc Alister J, Davies B
Salford Royal Foundation Trust

Introduction: Patients suffering from a Subarachnoid Haemorrhage [SAH] are at increased risk of cardiac dysfunction. Studies have estimated 27-100% of patients are affected (Chatterjee 2013). Patients may be asymptomatic. We review the current usage of ECG and Troponin in SAH patients.

Method: Retrospective audit of ECG and troponin use in patients admitted with SAH over 1 year (N=226). Timing of Ictus and admission along with ECG and Troponin results were noted. Analysis of Variance was used to compare ECG and initial troponin findings with time from ictus. Chi-squared was used to compare elevated troponin or a troponin rise with ECG findings.

Results: ECGs were performed in 111/226 (49.1%), of which 78/111 (70.2%) were normal. The majority were performed on admission; 94/111 (85%). Bundle branch block was the most common abnormality 13/111 (11.7%). ST segment changes were only seen in 4/111 (3.6%). A troponin test was taken in 82/226 (36.3%). 69/82 (84%) were elevated (>3). 32/62 (46%) had repeated troponin. All repeated troponin showed dynamic changes. Only 4/32 (12.5%) had a significant rise, for which 2/4 (50%) had normal ECGs. The incidence of ECG abnormalities or value of troponins did not vary with time ($p>0.05$.). An elevated troponin or troponin rise did not predict an abnormal ECG ($p>0.05$).

Conclusion: Troponin and ECGs are not routinely performed in SAH patients but may be abnormal. Troponin values are difficult to interpret and their significance is unclear. SAH patients are generally young and unknown to the tertiary neurosurgical centre, arriving with no indication of cardiac baseline and likely to require general anaesthesia for aneurysm protection. Routine ECG on admission may provide an assessment of cardiac baseline, essential to their ongoing care.

FASCIA-ILIACA COMPARTMENT BLOCK AUDIT FOR PATIENTS PRESENTING WITH FRACTURED NECK OF FEMUR.

Sheppard S*, Sreekumar P
Nevill Hall Hospital, Abergavenny

Fractured neck of femurs are a common injury in the adult population, particularly those aged over sixty five years (median age 84 years) with high morbidity and mortality rates. Analgesia is addressed by a multi-modal approach, including fascia-iliaca compartment block. Fascia-iliaca compartment blocks are an effective and relatively simple analgesia technique. This audit examined the documentation and practice standards of fascia-iliaca compartment blocks administered for fractured neck of femur patients admitted to Nevill Hall Hospital. Case notes and theatre records were reviewed retrospectively for a four month period (November 2013 – February 2014) identifying patients admitted with fractured neck of femurs. The Association of Anaesthetists of Great Britain and Ireland (AAGBI) minimum standards for regional anaesthesia was the audit standard. 69 admissions identified, of whom 48 (69.6%) had fascia-iliaca compartment blocks for analgesia. These were performed by orthopaedic, emergency department and anaesthetic doctors. 16 (33.3%) had consent documented, 24 (50.0%) did not have the dose (volume & concentration) of local anaesthetic recorded, 1 (2.1%) had documented monitoring of observations during and post-procedure and 13 (27.1%) mentioned that the pain score had been re-assessed. This audit demonstrates that documentation of fascia-iliaca compartment blocks does not meet the expected standard which compromises patient safety and has implications when administering further regional anaesthetic techniques. The omission of monitoring may indicate an under-appreciation of the risks of this regional anaesthetic block. The action plan is to educate practitioners, organise local anaesthetic toxicity simulation scenarios and create a protocol for administering fascia-iliaca compartment blocks.

INTENTIONAL AND ACCIDENTAL OVERDOSES IN THE ELDERLY.

Hepworth GV*, Dear J, Morrison E
Royal Infirmary of Edinburgh

Background and aims: Self-poisoning is one of the most common presentations to acute hospital services in the UK. Although the risk of suicide increases with age and accidental overdoses make up a substantial percentage of self-poisoning presentations, there is very little research looking at the acute care and outcomes of intentional and accidental overdoses in patients over the age of 65. This study aimed to determine whether patients over 65 with accidental overdoses stay in acute services longer, die sooner or are more likely to have dementia than patients over 65 who had intentionally overdosed.

Methodology: A retrospective study analysing overdose admissions to A and E in The Royal Infirmary of Edinburgh in patients over the age of 65 from 2003-2013.

Results: Over the study period there were 148 accidental overdoses and 487 intentional overdoses admitted that fitted the inclusion criteria. There was no significant difference between intentional and accidental overdoses regarding length of stay in acute services, one year mortality and the prevalence of dementia.

Conclusions: The results show no significant difference in acute care, cognitive comorbidity or outcomes between the two groups presenting with overdose. However, our results highlight factors that may bias the interpretation of these results, including crucial differences in immediate management and longer-term outcomes of the two groups (intentional overdose patients received a psychiatric review while accidental overdoses did not, intentional overdoses were likely to have repeat overdose admissions unlike accidental overdoses). These considerations have highlighted areas and approaches for further research in this area.

ENHANCED RECOVERY PROGRAMME FOR WOMEN DELIVERING BY ELECTIVE CAESAREAN SECTION.

Brock G*, Hughes P
St. Georges Hospital

Aims & Objectives: The Enhanced Recovery Programme (ERP) has been implemented to improve care for patients undergoing surgical procedures. The main elements this programme can be extended to patients undergoing elective caesarean sections. We have formulated and distributed a questionnaire to patients which addresses pre-operative assessment, reducing physical stress, peri-operative management, and early mobilisation. Our aim is to establish patient satisfaction and adherence to the ERP to close the audit cycle.

Methodology: The sampled data included women undergoing Elective Caesarean Section at SGH between 19/9/2013 and 15/11/2013. Those undergoing Emergency Caesarean Section were not sampled. Women were given a questionnaire to complete at the end of their stay in hospital. All data was kept anonymous.

Results: Twenty-four questionnaires were completed and processed. Two questionnaires were incompletely filled out. 72 were completed and processed in 2012. We found in this cycle, 50% women had their first drink within 30 mins after their operation, compared to 11% in 2012. 67% women cited their pain control as excellent compared to 50% in 2012. However, the majority of women first mobilised from bed >14hrs after their operation. The main reason for this being catheter and drip still in place. There is a significant improvement in length of stay: now 33% women go home on day 1 post procedure, compared to just 4% in 2012. The majority of free comments were positive for staff with only some criticisms.

Conclusions and Actions: There is adherence to the ERP and improvements since the previous year, particularly timing of first drink after procedure. Changes still need to be made regarding patient mobilisation. Further follow up in the community is planned, and we aim to extend the ERP to emergency Caesarean Section. Barriers to early mobilisation will be explored with staff involvement and education.

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THE USE OF THE CHA2DS2-VASc AND HAS-BLED ACRONYMS IN THE MANAGEMENT OF ATRIAL FIBRILLATION IN A DISTRICT GENERAL HOSPITAL.

Sen G*
Royal United Hospital, Bath, UK

Background: Atrial fibrillation (AF) is the commonest cardiac arrhythmia increasing the risk of stroke fivefold. Guidelines from the European Journal of Cardiology recommend the use of CHA2DS2-VASc and HAS-BLED scores to decide on thromboprophylaxis. The CHA2DS2-VASc tool recommends that patients scoring 0 should not be anti-coagulated; a score of 1 should receive aspirin or anticoagulation and scores of =2 should be anti-coagulated. Patients with HAS-BLED scores of =3 are at a greater risk of bleeding.

Methodology: Using the aforementioned guidelines the aim was to assess whether the CHA2DS2-VASc and HAS-BLED acronyms were being used in decision making towards thromboprophylaxis. Data was collected retrospectively from patients' notes presenting with a diagnosis of AF.

Results: Data was obtained from 60 patients. 13% had a CHA2DS2-VASc score documented. There were five patients with a score of 0 and none were anti-coagulated. Eight patients had a score of 1 of which 63% were anti-coagulated. 39 patients had a score of =2 of which 83% were anti-coagulated. The HAS-BLED score was not documented once.

Discussion: The five patients scoring 0 were appropriately not anti-coagulated. Three out of eight patients (37%) with a score of 1 were not anti-coagulated, predisposing them to thrombo-embolic disease. The compliance with standards was better in patients with a score of =2 (83%), but taking into consideration factors such as patient preference and contraindications due to bleeding the compliance rate increased to 98% in this group. Whilst the CHA2DS2-VASc tool is well established, the HAS-BLED is less recognised. There is reluctance to anti-coagulate patients due to fears regarding bleeding but greater understanding of the HAS-BLED acronym should help to reassure clinicians.

Conclusion: In spite of a lack of documentation of CHA2DS2-VASc scores, anticoagulation rates were impressive. The HAS-BLED tool was underused but is essential to enable clinicians to anti-coagulate patients safely.

AN AUDIT AND COMPARATIVE STUDY ON PATIENT SATISFACTION AND CLINICAL OUTCOMES OF IMMEDIATE VERSUS DELAYED LATISSIMUS DORSI (LD) RECONSTRUCTION.

Kataria V*, Ramachandran R
University of Manchester, UK

Background: This audit was carried out as part of on-going clinical governance in the surgical department as Royal Albert Edward Infirmary, Wigan. The primary aim was to assess whether satisfaction in patients undergoing latissimus dorsi flap breast reconstruction was meeting standards as compared to previously published studies, and whether there was any difference between delayed or immediate reconstruction. In addition, we aimed to evaluate whether the breast reconstruction service was meeting recommendations set out by NICE and BAPRAS with respect to patient information and decision making.

Methods: Patients who had undergone LD flap reconstruction were identified through coding data and patient medical records. Demographic data on operation dates, complications and co-morbidities was collected from patient medical records. Patients completed an extensive telephone questionnaire on satisfaction and functional effects following breast reconstruction. Results were tabulated and comparisons between immediate and delayed reconstruction for a variety of outcomes were made.

Results: Overall satisfaction was rated very highly amongst both groups of patients (reported using visual analogue scale); however, patients who underwent delayed reconstruction had significantly higher overall satisfaction compared to those who underwent immediate reconstruction (P=0.044). Patients reported they received sufficient information and support in order to make informed decisions.

Conclusion: Both immediate and delayed LD flap reconstruction after mastectomy yielded high levels of patient satisfaction post-operatively. Surgeons at Royal Albert Edward Infirmary Wigan are meeting standards in patient satisfaction as compared to previously published data. In addition, we are following NICE & BAPRAS recommendations regarding decision making in breast reconstruction.

AN AUDIT AND COMPARATIVE STUDY ON PATIENT SATISFACTION AND CLINICAL OUTCOMES OF IMMEDIATE VERSUS DELAYED LATISSIMUS DORSI (LD) RECONSTRUCTION.

Kataria V*, Ramachandran R
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Background: This audit was carried out as part of on-going clinical governance in the surgical department as Royal Albert Edward Infirmary, Wigan. The primary aim was to assess whether satisfaction in patients undergoing latissimus dorsi flap breast reconstruction was meeting standards as compared to previously published studies, and whether there was any difference between delayed or immediate reconstruction. In addition, we aimed to evaluate whether the breast reconstruction service was meeting recommendations set out by NICE and BAPRAS with respect to patient information and decision making.

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SONOVUE (SULPHUR HEXAFLUORIDE MICROBUBBLES) CLINICAL AUDIT.

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Introduction: SonoVue is an ultrasound contrast agent consisting of sulphur hexafluoride microbubbles which improves display of the blood vessels thus allowing more specific characterisation of liver lesions. NICE guidelines (2012) recommend the use of SonoVue to characterise incidentally detected focal liver lesions, focal lesions in a cirrhotic liver and investigate potential liver metastases. The guidelines advise that this should be performed at the first presentation to ultrasound where possible.

Methodology: Retrospective review of contrast-enhanced ultrasound scans (CEUS) performed between April – September 2013 in two centres offering this service.

Results: 41 CEUS were identified in the first audit round. 46% of the cases were newly presented cases with incidental liver lesions on unenhanced ultrasound. 26% of these cases offered CEUS at the same appointment or within a 7-day return local policy. 74% of cases had a delayed CEUS with the medium delay of 2 months (range 0-5). Action plan included staff training and production of the "Focal liver lesion ultrasound pathway" flowchart displayed in the ultrasound scanning rooms to remind of the current guidelines.

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Discussion: A re-audit was conducted (October 2013-March 2014). 62 CEUS were identified. 48% of the cases were newly presented cases with incidental liver lesions on unenhanced ultrasound. There was a much improved compliance rate of 67% with CEUS being offered at the same appointment or within a 7-day return local policy. 33% of cases had a delayed CEUS with the medium delay of 3 months (range 0-9). A repeat audit will be carried out in 6 months to assess the maintenance of standards.

AUDIT ON THE MANAGEMENT OF POSTPARTUM HAEMORRHAGE (PPH) AT THE ROYAL LONDON HOSPITAL.

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Royal London Hospital

Introduction: PPH is the leading cause of maternal mortality and a major cause of maternal morbidity. Primary PPH is defined as blood loss greater than 500mls within 24 hours after delivery. Major primary PPH is blood loss of 1,000mls or more within the same period. The Royal London Hospital audits all of its cases of primary PPH of 1,500mls or greater to identify areas for improvement.

Methods: All patients with a primary PPH of 1,500mls or more were identified from all deliveries that took place from 1st April to 30th September 2013 at Royal London Hospital. Data was extracted retrospectively from patients' notes and entered into an audit proforma, designed to collect data pertinent to maternal age, parity, risk factors of PPH and treatment interventions. The data was then analysed using Excel.

Results: For the defined period there were a total of 2,325 births. Fifty-eight cases satisfied the criteria of the audit of which 54 (93%) were audited. The prevalence rate of primary PPH of 1,500mls or greater was 2 5%. Three women suffered a primary PPH greater than 5,000mls. 63% of the patients were of Asian origin. 74% of patients were either primigravida (43%) or had a parity of 1 (31%). 54% of the patients had a Caesarean-section, of these, 72% had an emergency Caesarean-section. 44% did not have hourly urine output monitoring.

Conclusion: Caesarean section is a known risk factor for PPH and appears to be a particularly significant risk factor in this group, with emergency caesareans carrying a greater risk. Although research shows multiparity is a risk factor for PPH, our audit interestingly suggests that a reduced parity may also be a risk factor. In light of our findings further research needs to be conducted to determine whether reduced parity is indeed a risk factor for PPH.

AN AUDIT OF IMPLEMENTATION OF DELAYED CORD CLAMPING PROTOCOL AT PRINCESS OF WALES HOSPITAL

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Background: There has been a national shift from early cord clamping to delayed cord clamping (DCC). DCC was endorsed in the Guidance for Management of Third Stage of Labour Policy at Princess of Wales hospital (POWH) eighteen months prior to audit. The purpose was to explore staff attitudes and practises affecting compliance following the change.

Objective: To audit DCC in POWH, as recommended in the Guidance for Management of Third Stage of Labour Policy.

Method: Retrospective analysis of the first 35 deliveries of March 2013. Two semi-structured questionnaires explored opinions on DCC of the maternity staff and mothers.

Results: DCC was recorded in 100% of instrumental delivery (ID) and caesarean section (CS) records, and recorded in 0% of normal labour pathway records (NLP). DCC was implied in 89% of NLP records by midwives recording syntometrine administration>1minute post-delivery. Maternity staff interviews revealed unanimous agreement of DCC and its documentation. Interviewing mother's found they were content with best outcome for baby, with most being unable to remember being told about DCC.

Conclusions: The DCC guideline has been successfully implemented. NLP records are intended to minimise documentation, but currently don't prompt for inclusion of details of cord clamping practise, resulting in it not being specifically documented. Recommendations: Altering of NLP to include space for documenting DCC, strengthening the clarity and support of the document for midwives. The audit has caused an overhaul of NLP, and also a document advising on correct practise of syntometrine administration. The audit has changed the way POWH practises and added clarity on DCC.

LOWERING AND MONITORING SERUM URATE LEVELS IN GOUT

Ahmed M*
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Objective: Are gout patients, treated with Allopurinol at Furnace Green Surgery, having their serum uric acid (SUA) levels tested and treated to target according to latest guidelines?

Relevance: Long-term maintenance of low SUA concentrations prevents development of gout complications, with Allopurinol being first-line treatment. Standard: No definitive guideline relating to gout. BSR, BHPR recommend target SUA =360µmol/l. NICE CKS recommends gout patients on Allopurinol have SUA levels checked every 3 months in first year, annually thereafter.

Criteria: =80% have SUA =360µmol/l. =90% have had SUA checked within last year (3/12/12 – 3/12/13). If SUA not within target, a plan should be noted >90%. Inclusion: Age =18, male/female, past history of gout +/- acute gout flare up in past 12 months (3/12/12 – 3/12/13).

Exclusion: first gout presentations in past 12 months. Method: This is a retrospective study. Patient data was obtained using Crosscare system; following codes were used, X40PQ (Gout), NO23 (Gouty Arthritis), C340 (Gouty Arthropathy), X702U (Gouty Tophus), 1442 (H/O Gout). Search criteria included 'Allopurinol' in 'Repeated' drugs. Data was analysed in Microsoft Excel.

Results: Seven thousand patients registered, 187 (2.7%) had gout. Of these, 48 (25.7%) were prescribed Allopurinol from which 14 (29.2%) had SUA monitored within last year. 3 (21.4%) had SUA within target, 5 (35.7%) had flare up within last year and an action recorded. 15 patients (31.3%) currently prescribed Allopurinol had no record of SUA levels.

Discussion: The results fall below standard. Dosing Allopurinol appears to happen as a sole event and SUA is used diagnostically rather than measuring treatment efficacy. Recommendations include a copy of BSR guidelines placed in consultation rooms for guidance, a system highlighting Allopurinol review on software would be an excellent remainder to repeat SUA test and to re-audit in December 2014.

REVIEW OF PNEUMOCOCCAL VACCINATION STATUS IN PAEDIATRIC COCHLEAR IMPLANT RECIPIENTS.

Kang M*, Mathew R
St. George's Hospital, United Kingdom

Background and Aims: Children with cochlear implants (CI) are at higher risk of acquiring pneumococcal meningitis. It is important to ensure that that these children are appropriately vaccinated. National guidelines in relation to meninigitis vaccination are complex and changed in 2011. We therefore conducted an audit to determine whether children on our CI programme were optimally vaccinated by their General practitioners and also looked at ways of improving compliance. Results are compared to a previous audit.

Method: Paediatric patients who had their cochlear implants from July 2011 to October 2013 were selected for the audit. The data collected included whether the implants were inserted bilaterally or unilaterally, age at implantation, date and type of pneumocoocal vaccination.

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Results: Fifty-two percent of patients were optimally vaccinated at the time of cochlear implantation. Fifty-five percent of the patients were optimally vaccinated at the time of censorship. Optimal vaccination was achieved less commonly in children undergoing unilateral implants. The most common cause of sub optimal vaccination was failure to administer the 23-valent polysaccharide vaccination.

Conclusion: In comparison to the result of the previous audit, an increased proportion of patients were optimally vaccinated against streptococcus pneumoniae. However significant further improvement is still required. We present methods of improving vaccination compliance and intend to complete the audit cycle again following this.

COMPARISON OF END OUTCOME AS CALCULATED BY LOCAL MODIFIED EARLY WARNING SCORING SYSTEM (MEWS) AND NATIONAL EARLY WARNING SCORING SYSTEM (NEWS) IN A SCOTTISH DISTRICT GENERAL HOSPITAL.

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University Hospital Ayr, United Kingdom

Various Early Warning Scoring systems exists to efficiently identify and respond to patients who are acutely unwell. These systems calculate a "score" using a combination of physiological parameters such as respiratory rate, oxygen saturations, blood pressure, pulse rate and temperature that are monitored during patient observations by nursing staff ("obs"). Score is linked to a response whether this be re-check in 12 hours or immediate review by a senior member of the medical team. In England Royal college of physicians (RCP) has developed and recommended the use of single early warning system called National Early Warning Score (NEWS). RCP states that aside from the advantages of having a standardised system across all NHS trusts, NEWS score provides an enhanced level of surveillance and clinical review of patients who are at risk of clinical deterioration. In Scotland various trusts are using locally developed early warning systems. Currently NHS Ayrshire and Arran uses a system called Modified Early Warning Score (MEWS). We aim to compare the end outcomes of using our local MEWS system to NEWS system. 500 MEWS scores as calculated by nursing staff for medical inpatients were noted. Physiological parameters that combined to make these scores were then plotted on standardised NEWS scoring chart to obtain the equivalent NEWS score. This score was then used to postulate what the end outcome would be. This was intern compared to what the end outcome was when the MEWS score originally calculated by nursing staff. As far as we are aware this is the first time such a comparison has been carried out in a Scottish hospital. We discuss the differences in end outcome from the two scoring systems and the implications of using NEWS score in a Scottish district general such as ours.

COGNITIVE ASSESSMENT OF ELDERLY INPATIENTS: A CLINICAL AUDIT.

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Background: Previous research has shown that comprehensive geriatric assessment including cognitive assessment results in better outcomes and improved quality of life for elderly inpatients. The National Audit of Dementia revealed that too few patients were being assessed for cognitive function and were therefore failing to receive adequate care. Consequently, recommendations were made to improve implementation of cognitive assessment.

Methods: Retrospective clinical audit in a district general hospital. Data was collected via systematic sampling of clinical records of 50 inpatients on an elderly care ward. Descriptive analysis of results was then performed.

Results: Despite guidelines suggesting that cognitive assessment should be performed on admission, we found this was only documented in 22% of medical notes. However, 56% of patients received some form of cognitive assessment by discharge. Although these figures appear disappointing, in comparison with the

National Audit of Dementia (which found mental status was only assessed in 50% of patients by discharge) a small improvement is apparent. The most commonly used assessment tool was the Abbreviated Mental Test 10. Assessment completion was independent of gender or level of independence, but was only performed in patients over age 75. In those assessed, 75% were found to have some level of cognitive impairment and 36.8% received a new or suspected diagnosis of dementia.

Discussion: Our results demonstrate that despite the National Audit of Dementia highlighting the need to improve cognitive assessment rates, practice in this area is still poor and further emphasis on performing assessment is necessary. Our findings support the need for increased education regarding the importance and benefits of cognitive assessment, as well as how to complete and document the assessment correctly.

Conclusion: Cognitive assessment continues to be poorly performed. Since assessment leads to better outcomes in dementia, doctors should be encouraged to perform assessments to improve patient care.

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Poster Presentations

THE IMPACT OF GLAUCOMA VIRTUAL CLINICS ON OUTPATIENT SERVICES

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Background: Currently huge pressures exist on General ophthalmic clinics for the review of patients with a wide variety of conditions. Throughout the UK glaucoma virtual clinics are being established with the intention of reducing the strain on resources in outpatient ophthalmic departments.

Aim: This service evaluation aims to quantify the present consumption resources by stable glaucoma patients in outpatient clinics and thereby assess whether the future implementation of a glaucoma virtual service would have a significant impact in freeing resources.

Methods: Data was gathered retrospectively on 2206 patients presenting to general clinics run by all consultants at Blackpool Victoria Hospital, during July 2013. Data collected included the number of clinics, number of doctors, number of patients, number of patients' not attending clinics, number of visual fields undertaken, the number of suspect glaucoma, ocular hypertensive, and suspicious discs and number of 6, 9 and 12 month glaucoma follow-ups.

Results: For the entire month: 2,206 patient booked, 78 general clinics, 172 doctor sessions and 388 visual fields booked. 21% of all patients presented with glaucoma/ glaucoma related conditions. 11.4% of all patients were for 6-12 month glaucoma follow-ups. An average of 13 patients were booked per doctor session.

Conclusion: A significant percentage of patients reviewed in general clinics are stable glaucoma patients. A large amount of resources are dedicated to such patients. Transfer of such patients to virtual clinics can increase clinic capacity, decrease new patient waiting times and allow resources to be transferred to other pressurised clinics. Further work should be undertaken to review whether or not other stable conditions could be better managed in a similar fashion.

SPIGELIAN HERNIA: A CASE REPORT OF AN ABNORMAL ABDOMINAL SWELLING

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Spigelian hernia is a rare surgical presentation caused by a defect in the rectus sheath. The hernia commonly presents below the linea arcuata and requires a high index of suspicion due to its vague clinical presentation. This 75-year-old lady presented with severe, intermittent pain and tenderness over her right iliac fossa which was exacerbated by bending forward and carrying heavy items. The patient's high body mass index (BMI) hindered our ability to detect the protrusion on clinical examination. There was no cough impulse and bowel sounds were normal. The only clinical finding was the patient's report of occasional discomfort over the hernia site. Contrast enhanced computed tomography (CECT) revealed no strangulation. Management involved open surgical repair with mesh application to relieve pain and prevent strangulation. An open operative approach with mesh application between the oblique muscles and covering the lateral border of the rectus muscles was used in this case. While it has been shown that a laparoscopic approach results in fewer rates of infection, early resumption of daily activities, less postoperative pain, and avoids opening the external oblique aponeurosis, an open approach allows better visualisation of the weakness in the abdominal muscle1. The optimal surgical approach in the management of spigelian hernias is still evolving. The open approach with or without mesh is the procedure of choice in complicated cases and where laparoscopy is not available. Spigelian hernia remains an enticing entity because of its rarity, the concealed nature of its symptoms and the varied approach to its management.

References 1: Moreno-Egea A, Carrasco L, Girela E. Open vs. laparoscopic repair of spigelian hernia. Arch Surg. 2002;137:1266–8.

EXTERNAL LIGHT COVER DEFIBRILLATOR WITH GPS LOCATOR.

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Background: The sequence of actions that are needed to cope with sudden death are defined as the "Survival Chain". The effective implementation of the four rings (Early Access, Early CPR, Early Defibrillation and Early Advanced Care) allows for the best results in terms of patient survival. Each link in this chain is composed of several subrings and the improvement of each of these subrings leads to the improvement of the entire chain.

Description of Innovation: We have built an external light cover that is applied on top of an automated defibrillator and that is controlled by an Arduino processor. The cover has three main tasks: send SMS containing the geolocation, light up completely when the defibrillator is turned on and visually giving the correct rhythm (through an alternating sequence of switching on and off) during the execution of the CPR and always visually indicate feedback to ensure proper enforcement of CPR (via a third electrode that detects the right frequency, depth of chest compressions and chest recoil).

Discussion: In noisy or dark environments, or with hearing-impaired bystanders, the use of a light signal can help individuals to survey the scene and properly perform CPR. Furthermore, the application of a third electrode allows us to detect real-time performance of CPR and allows the operator to correct its errors through a visual signal. Finally, sending SMS containing the geolocation to the Emergency Medical Services when the defibrillator is taken from the box (placed in a public space) and also when it is turned on allows a rapid identification of the place of intervention.

Conclusion: The purpose of this device is threefold: to improve the quality of CPR, to improve the interaction between CPR and defibrillator and allow for the rapid geolocation of the patient.

AUDIT OF RATE OF VENOUS THROMBOEMBOLISM FOLLOWING LOWER LIMB ORTHOPAEDIC SURGERY OVER 1 YEAR IN A DISTRICT GENERAL HOSPITAL.

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Background: This study aimed to examine whether lower limb surgeries carried out in a district general hospital over the course of 1 year led to venous thromboembolism (VTE) events and whether patients had received appropriate thrombolytic prophylaxis if they developed VTE.

Methodology: All lower limb surgeries carried out between 01/01/2012 and 31/12/2012 were examined to discover whether they resulted in a VTE event up to 6 months post-operatively. Each patient record was reviewed with regards to post-operative notes, discharge summaries, follow-up clinic letters, A&E admissions and relevant investigations. If a patient was found to have had an event it was determined whether they had received appropriate VTE prophylaxis post-operatively as per NICE guidelines.

Results: 682 lower limb surgeries were carried out in this period. 1.03% of operations resulted in VTE event (n=7/682); 0 88% (n=6/682) DVT, 0 15% (n=1/682) PE. There were no (n=0/682) mortalities which resulted from these events. 4 of these patients had elective total knee replacement, 2 were admitted with fractured neck of femur and 1 patient underwent PIP fusion. 2 patients had previously had a VTE event. All patients had received appropriate VTE chemo-prophylaxis; however, none of these patients went home with TED stockings prescribed.

Discussion: In this study, patients who experienced a VTE event post-operatively had received appropriate chemoprophylaxis. Patients who had previously had a VTE event were at an increased risk of future events.

Conclusion: Patients who have previously had a VTE event are at increased risk of future events. Therefore, in patients undergoing orthopaedic lower limb procedures, this should be taken into account when considering VTE prophylaxis. As per NICE guidelines, all patients should be commenced on mechanical VTE prophylaxis at admission which should be continued until mobility is no longer reduced. In this study, chemoprophylaxis was prescribed appropriately; good practice should be maintained.

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ELECTRONIC PRESCRIBING - ARE WE KEEPING OUR DRUG CHARTS UP TO DATE?

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Introduction: Electronic prescribing is becoming increasingly common and has many benefits, both in terms of usability and safety. However, lack of physical drug charts at the end of patients' beds may reduce how regularly medications are reviewed, increasing the risk of medication errors. One example of this is expired medications being left on drug charts, which may lead to confusion on rounds and lead to patients receiving incorrect medications. This audit assessed whether expired medications were being left on drug charts on a surgical ward in a tertiary centre.

Methods: Data was collected prospectively from all patients over two audit periods three months apart. Total number of medications and number, and duration, of expired medications was recorded. Between periods a change in practice was made. An education programme was run for medical staff, educational posters were displayed and electronic drug chart settings were reconfigured to make expired medications more obvious and easier to cancel.

Results: 34 patient encounters, with 404 regular medications (mean 11.9 per patient), were reviewed in the first period. In the second period there were 46 patient encounters with 511 medications (mean=11.1). In the first cycle 15.1% (61) of medications had expired, falling to 5.1% (26) in the second ($p<0.01$). The mean duration of expiration fell by 32.8% between periods, from 6.7 days to 4.5 days ($p=0.01$). Before intervention 67.6% (23) of patients had an expired mediation still prescribed, falling to 28% (13) in the second period ($p<0.01$).

Conclusions: Despite its benefits electronic prescribing may reduce frequency of medication review, leading to errors. The simple intervention used in this project led to a change in practice, with more regular drug review, evidenced by a significant reduction in prevalence of expired medications left on drug charts.

ACCURACY OF GP REFERRALS FOR SOFT TISSUE KNEE INJURY: A REGIONAL RETROSPECTIVE AUDIT.

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General practitioner referrals for orthopaedic opinion are often deemed inappropriate or misdirected to the wrong specialist [1]. Orthopaedic service activity has risen by 12% in the last decade [2]. This audit aimed to determine the accuracy of orthopaedic referrals for soft tissue knee injury and identify how these could be improved. Retrospective analysis of 163 patients seen at Glasgow Royal Infirmary's knee clinic between November 2012 and December 2013 allowed analysis of the content of referrals by identifying key clinical features mentioned by general practitioners. Orthopaedic appointment outcomes and orthopaedic appointment outcomes based on quality of referral were assessed. Referrals containing three or less pieces of key clinical history features accounted for 92 of 163 referrals (56.4%). Suggested improvements included the development of electronic referral pro-forms and weekly allocated telephone time to consult with specialists. After orthopaedic opinion, 65 patients (39.9%) were referred for physiotherapy and 53 patients (32.5%) were discharged. This suggests more needs to be done to allow general practitioners to manage patients in a primary care setting. Interactive peer education to update general practioners knowledge base is an idea to enable effective patient management. Analysis of general practitioners referrals may be used to identify ways in which patient management could be improved. Interactive peer education and better communication between orthopaedic specialists and general practitioners might help improve appropriateness of referrals.

References [1] Speed C A, Crisp A J. Referrals to hospital-based rheumatology and orthopaedic services: seeking direction. Rheumatology. 2005; 44(4): 469-471. [2] Audit Scotland. Review of orthopaedic services. Edinburgh: Audit Scotland, 2010.

MALIGNANT MELANOMA OF THE ORAL MUCOSA.

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Background: Primary oral melanoma (POM) is a rare neoplasm typically of the palate or maxillary gingiva that originates due to the proliferation of melanocytes. POMs possess aggressive, anomalous behaviour and early haematogenous spread associated with a 5-year survival of 12.3-16.6%.

Case Report: A Caucasian female presented at 53 years of age complaining of a painless upper left sided ulcer and gum recession associated with a tingling sensation. Her background included breast cancer and osteopenia for which she received intravenous bisphosphonate treatment. Examination revealed an unpigmented, endophytic ulcer with exposed tooth roots. Biopsies of the gingival mucosa showed an amelanotic malignant melanoma. The patient was managed with a left hemi-maxillectomy and left selective neck dissection with reconstructive surgery. Significantly, bisphosphonate-related osteonecrosis of the jaw (BRONJ) was initially suspected as the aetiology of her ulcer. Three patients presenting with POM at Manchester Royal Infirmary teaching hospital between 2009 and 2014 are explored. Up to date follow up information will be provided for all three patients.

Discussion: Identification of only three cases over a 5 year period in a major head and neck cancer surgical centre highlights the rarity of POM. All three presented with late stage disease reflecting an insidious development in contrast to its cutaneous counterpart. Treatment is primarily surgical resection with the excised tumour tissue also allowing for molecular testing of a mutation, which if present, predicts response to a novel targeted therapy. The differential diagnosis of pigmented patches in the mouth will be discussed as will the entity BRONJ which in our case of amelanotic melanoma, confused the clinical picture.

Conclusion: Awareness of pigmented oral lesions and their possible causes is important among medical and dental professionals as diagnosis of POM at an early stage of disease provides the best hope of long term cure.

SEVERE REFRACTORY COELIAC DISEASE WITH RESPONSE ONLY TO PARENTERAL NUTRITION: A CASE REPORT.

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Background: Refractory coeliac's disease (RCD) is characterised by recurrent or persistent malabsorptive symptoms and villous atrophy, despite strict adherence to a gluten-free diet (GFD) for at least 6 months and where other causes of malabsorption including malignancy have been excluded. There is limited evidence and guidance on the effective management of these patients. We describe a case of severe RCD, with symptoms controlled effectively only by total parenteral nutrition (TPN).

Case Report: This 68 year old woman initially presented to clinic with persistent non-bloody diarrhoea and vomiting. A diagnosis of coeliac's disease was confirmed with a positive tissue transglutaminase assay and histology. A strict GFD was ineffective and thus she was commenced on oral steroids. However, she represented 6 months later with 13kg weight loss (16.7%), ongoing abdominal pain and diarrhoea, with bowels opening 16 times a day. She was oedematous, had an albumin of 12g/L and required hospital admission. She was treated for pancreatic insufficiency and treated presumptively for small bowel bacterial overgrowth with no resolution of symptoms. We ruled out infectious causes and investigated for small bowel malignancy; all results were negative. Small bowel enteroscopy showed ulcerative jejunitis. She was given 5 days of TPN, following which her symptoms improved and albumin normalised. This was sustained with symptom resolution and weight gain seen at follow up.

Discussion: In our case of severe RCD, symptoms persisted despite a strict GFD, treatment with steroids, antibiotics and pancreatic supplementation. There is limited guidance for management options in patients with RCD and only GFD has been shown to be effective. TPN enabled weight gain and total control of symptoms in our case.

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Conclusions: TPN successfully and rapidly induced remission in this case. A short period of TPN should be considered as a potential component of management in patients with severe RCD.

EVALUATING THE DIAGNOSTIC FEATURES OF THE PENTALOGY OF CANTRELL: A LITERATURE REVIEW

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The Pentalogy of Cantrell (POC) is an anatomopathological syndrome, with the full spectrum described by Cantrell in 1958. It is composed of five congenital defects: omphalocele, anterior diaphragmatic hernia, sternal cleft, ectopia cordis and intracardiac defects. This literature review aims to fill a gap by examining the incidence of the defects in the diagnosis of POC. A comprehensive literature search of 4 medical databases (PubMed, Cochrane, Embase and Google Scholar) was undertaken using the keywords Pentalogy of Cantrell with no language restriction. Parameter of evaluation was specific mention that a diagnosis of POC was made. All intracardiac defects were considered. Exclusion criteria were inability to access full text, and patients that exhibited defects other than the pentalogy. Mortality was not a criterion. 172 studies were reviewed, 21 met the search criteria and 68 patients were included in the study, highlighting the rarity of the disease. 49(72%) patients were reported to have intracardiac defects, 34(50%) had ectopia cordis, 35(51%) had omphalocele, 45(66%) had sternal cleft defect and 44(65%) had anterior diaphragmatic hernia. 10(15%) patients had two of the defects present, 33(49%) had three of defects, 22(32%) had four of the defects and only 3(4.4%) patients had all five defects present. The criteria for diagnosis of Pentalogy of Cantrell are not conclusive. Incidence between the abnormalities was minimal. There was no significant defining characteristic for POC, but patients exhibiting full pentalogy criteria were rare.

EVALUATION OF EFFECTIVENESS AND SAFETY OF OZURDEX IMPLANT FOR TREATMENT OF MACULAR OEDEMA SECONDARY TO RETINAL VEIN OCCLUSION AND DIABETIC RETINOPATHY.

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Introduction: Ozurdex is a long-acting intravitreal dexamethasone implant which is licensed for the treatment of macular oedema secondary to central/branch retinal vein occlusion (CRVO/BRVO) and posterior uveitis. Studies show that Ozurdex is a promising new treatment for diabetic macular oedema (DMO). The aim of this study is to evaluate the effectiveness and safety of Ozurdex for treatment of macular oedema secondary to CRVO, BRVO and DMO.

Method: A prospective study, collecting data from 27 Eyes of 25 patients with persistent macular oedema secondary to BRVO (22%), CRVO (22%) and diabetic retinopathy (56%) who had Ozurdex implanted from May 2012 to March 2013, was conducted.

Results: For BRVO, the mean change from baseline BCVA were 15±18 (p=0 32), 18±16 (p=0 34) and 10±17 (p=0 54) at week 1, month 2 and 6. For CRVO, the mean change from baseline BCVA were 4±8 (p=0 44), 10±12 (p=0 77) and 5±9 (p=0 57) at week 1, month 2 and 6. For DMO, the mean change from baseline BCVA were 4±4 (p=0 37), 5±7 (p= 0 23) and 1±5 (p=0 65) at week 1, month 2 and 6. Mean reductions in CRT at 2 months were 254±212µm (p=0 02) for BRVO, 191±201µm (p=0 08) for CRVO and 127±177µm (p=0 09) for DMO. Safety profile of Ozurdex is acceptable without significant complication.

Discussion: Relatively poor results in the diabetic group may be related to these being refractory cases with longstanding disease. Limitation of this study is in the small sample size. Based on this study and other relevant studies, Ozurdex can safely be used not only as a routine licensed treatment for macular oedema secondary to BRVO and CRVO, but also as unlicensed treatment for DMO.

Conclusion: Ozurdex is clinically effective in treatment of macular oedema secondary to BRVO, CRVO and DMO.

AN AUDIT OF PRE-OPERATIVE FASTING TIMES IN ELECTIVE SURGICAL PATIENTS: ARE WE MEETING STANDARDS?

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'Nil by mouth after midnight' has been rigidly adhered to by practitioners due to fear of aspiration of gastric contents and its life threatening consequences. Revised guidelines take into account different rates of gastric emptying of solids and clear liquid. New guidelines state that clear fluids can be safely consumed up to 2 hours prior to induction of anaesthesia in healthy adult patients undergoing elective surgery. Fifty patients scheduled for 'same day admission surgery' received a questionnaire in theatre recovery prior to going into the anaesthetic room that was filled out with assistance of the theatre staff. The questionnaire comprised of 6 questions covering areas including how the patient received information on fasting and their awareness of its importance in practice and when they had last consumed clear fluid. Only 32% of patients are currently adhering to guidance and drinking fluids up to 2 hours prior to anaesthesia. 35% of patients had clear fluids between 3 and 6 hours leaving 40% that are still not consuming clear fluids for over 6 hours prior to anaesthesia, significantly longer than recommendations. 80% of patients admitted to receiving verbal information at preoperative assessment and 72% to receiving a leaflet containing fasting information which is reflected by 70% of patients aware on the day of surgery of the 2 hour period they should not consume clear fluids. 60% of patients did not understand the reasons behind fasting and its importance. It is evident that at present patient adherence is significantly low and this could be due to lack of understanding of reasoning and importance of fasting.

DOES THE 2 WEEK REFERRAL PATHWAY FOR SUSPECTED COLORECTAL CANCER ALTER THE MANAGEMENT IN PATIENTS OVER THE AGE OF 80?

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Aims: The aim of this study was to investigate the diagnostic pick-up rate of colorectal cancer and outcomes in patients over 80 who presented to the colorectal cancer rapid access clinic, to see if this pathway altered their management. Introduction The low diagnostic yield of "red flag" referrals for suspected colorectal cancer is well documented with pick-up rates of 3 – 14%.It would be useful to find out the outcomes of octo and nongenerians which constitutes three million of our population and is projected to almost double by 2030.

Methods: From 1st March 2012 to 30th August 2012, data was collected on consecutive patients over 80 years old referred via the two-week referral pathway for suspected colorectal cancer. Data was collected on presenting symptoms, investigations and management.

Results: A total of 354 patients were included 256 patients (72%) were discharged after investigations revealed no pathology or a benign pathology 58 patients (16%) were discharged without any investigations (mainly not fit for investigation). None of these patients represented within the 1st year. 40 patients (11%) were diagnosed with colorectal cancer. 17 patients (43% of the malignancy cases , 5 % of all referrals) underwent resection, of which 4 patients died post operatively (mortality rate 24%). The remaining 23 patients had palliative treatment (57% of malignancy cases, 6% of all referrals).

Conclusion: High pick-up rate for colorectal cancer in this age group at 11%. Cancer resection rate was low at only 5% of all referrals and 43% of patients diagnosed with cancer. Mortality was high with a quarter of patients not surviving surgery. We recommend the design of a referral system which takes into account patients' fitness for bowel cancer surgery prior to urgent referral for exclusion of colorectal cancers.

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PROSTHETIC VALVE ENDOCARDITIS: A COMPLEX TREATMENT DECISION.

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A 71-year-old male with a bioprosthetic aortic valve replacement, pacemaker and bilateral knee replacements presents to A&E. He was mildly confused with slurred speech, muscle tremors, fever and joint pain on a background of being treated with amoxicillin by the GP. The history in conjunction with investigations indicated a diagnosis of acute kidney injury secondary to sepsis of unknown cause. However, on further investigation this looked to be due to infective endocarditis (IE) of both the aortic and mitral valves. No causative organism was found and the decision to continue with a medical management approach was made. IE and in particular prosthetic valve endocarditis (PVE) have a poor prognosis and management is very much down to clinical judgement. Therefore, this report discusses the merits of a combined medical and surgical approach as opposed to solely medical in the absence of definitive evidence based treatment guidelines. On admission, transoesophageal echocardiography showed no vegetations however two weeks later small vegetations were present on the aortic valve prosthesis and the mitral valve. The patient was treated using careful fluid resuscitation and started on a six week course of IV antibiotics. PVE presents difficulties in terms of diagnosis and management due to complications or extra cardiac manifestations. Very few multicenter, multinational and randomised control trials have been carried out on the treatment of PVE complicating a medical versus surgical treatment decision. A wider awareness of recommendations and implementation of protocols by NICE and individual hospital trusts needs to occur to aid clinical management of PVE. Whilst such protocols are no replacement for clinical judgement easier decision-making would be facilitated. Furthermore RCTs need to be conducted to create a larger and more reliable evidence base on which to base clinical decisions with the aim of reducing the high levels morbidity and mortality.

THE HOMELESS IN THE EMERGENCY DEPARTMENT - A CROSS SECTIONAL STUDY AT A LARGE METROPOLITAN NHS TRUST: THE EXTENT OF ALCOHOL DEPENDENCE AND PREVENTING MULTIPLE ADMISSIONS

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No recent studies exist on homeless patient presentations to emergency departments in the UK. The objective of this unique study is to identify common characteristics of regular attendees, in order to address wider health issues of the homeless. Patient records of 85 of the most recent attendees at Sandwell General Hospital and Birmingham City Hospital with “No Fixed Abode” were taken. Comparative data on the general population was extracted, for the same number of attendees in ED over the same time period. The mean age was 41 years, with 87% of homeless attendees being male and 13% female, in comparison to 53% male and 47% female in the general population. The most common presenting complaints were head injury (19%), intoxication (18%), psychiatric (9%) and seizures (9%). Only 2% attended for food or shelter; 61% directly involved alcohol and 10% drugs. The most common co-existing medical problems were alcohol dependence (21%), depression (7%) and epilepsy (5%). Regular alcohol use was recorded in 75% of patients and drug use in 16%, but only 5% were seen by a social worker. 50% presented more than once within a year, with 14% presenting over 10 times. 80% of repeat attendees had co-existing medical problems, with alcohol dependence being the most common. Alcohol use plays a major role in homeless attendance and readmission to the Emergency Department. Very few have contact with a social worker on attending ED, despite it being an ideal setting to address housing issues. To address the ‘revolving door’ nature of homeless attendees, an alcohol liaison service operating alongside social workers is a promising strategy that will be implemented to address alcohol use, referring homeless patients to community abstinence programmes to prevent the ‘revolving door’ nature of attendances.

AUDIT ON GROUP B STREPTOCOCCUS SCREENING UPTAKE AND SUBSEQUENT MANAGEMENT

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Background: Group B Streptococcus (GBS) - Streptococcus agalactiae is an asymptomatic gram positive colonizer of the vagina and rectum that can be transferred to the fetus intra-partum. It is a major cause of early neonatal sepsis especially in pre-term or prolonged labour. Transmission can be prevented by intra-partum intravenous antibiotic prophylaxis – benzylpenicillin/ampicillin. Patients are not routinely screened in Malta.

Aim: To determine the uptake of GBS screening in a cohort of pregnant women between the months of June till August 2013, their subsequent management and whether this had any significant effect on neonates following delivery.

Method: A retrospective study of partially prospective data was carried out at Mater Dei Hospital. A cohort of 90 pregnant women between June and August 2013 were analysed on whether they were offered GBS screening with a high vaginal swab at the obstetrics out-patients, during their antenatal visits. Those screened were then selected and stratified according to status and the positive group studied for antibiotic treatment and any maternal or fetal complications. All patients delivered vaginally and were under the same consultant. Results: Out of 90 patients, 54 (60% of total) were screened and 7 (13% of those screened) were positive for GBS. Out of 7 women, 6 received antibiotics orally close to term or intra-partum intra-venous. No neonatal complications were reported during the patient's hospital stay (2-3 days).

Discussion: GBS screening rate is still low in Malta. The role of intra-partum antibiotic prophylaxis is significant in preventing neonatal complications. However, this deserves to be compared with the rate of GBS neonatal sepsis in neonates of untreated/unscreened women.

Conclusion: This audit showed that GBS colonisation is worth screening for. However, one needs to audit the disadvantages of screening (cost, anxiety) and subsequent treatment with intra-partum antibiotics (anaphylaxis, bacterial resistance and making labour less natural).

IDENTIFYING AMYLOID ß AND HYDROXYAPATITE IN DRUSEN

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Age-related Macular Degeneration (AMD), the leading cause of irreversible vision impairment in the Western world, is characterised by the formation of drusen. Drusen are heterogeneous deposits that form in the Bruch's membrane. Amyloid ß, amongst other proteins and lipids, has been detected in drusen in AMD. Dr Lengyel's group recently discovered the presence of insoluble hydroxyapatite (HAP) in drusen. HAP has the capacity to bind to proteins, amongst them amyloidß. HAP has the potential to become the seeding point for protein and lipid deposition and initiate drusen formation. I will determine the distribution and relationship between HAP and amyloidß deposition in human cadaveric eyes. This will provide valuable information in defining the molecular steps leading to the pathogenesis of ageing in the retina leading to disease such as AMD. To prove that there is a relationship between amyloidß and HAP I performed immunohistochemistry labelling and staining techniques on drusen and correlated this to the fluorescent labelling of HAP observed in drusen on sections from human donor eyes. Sections were viewed using LSM 700 confocal microscopy. Labelling flat mount sections with HAP dye and antibody 6E10 showed co-localization of amyloid ß spherules with HAP seen at the core of some of these ß spherules in some drusen. To the best of my knowledge, there is no current published research on the co-localization of amyloid ß and HAP, therefore the results obtained are insightful in the structure of drusen and the implications this may have on drusen biogenesis. The results of this project not only confirm the presence of amyloid ß and HAP in drusen but also show there is co-localisation of these two molecules. HAP cores are found in some amyloidß spherules in drusen. Thus implying HAP deposition may preceding step and cause of amyloid ß immobilization and accumulation in drusen.

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COMPLIANCE OF REQUESTING STOOL CULTURES AND FAECAL CALPROTECTIN IN INFLAMMATORY BOWEL DISEASE PATIENTS PRESENTED WITH ACUTE DIARRHOEA.

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Background: Concomitant Clostridium Difficile (C.Diff) infection in patients with Inflammatory Bowel Disease (IBD) is associated with increased hospitalization, use of vancomycin, colectomies and mortality.

Methodology: With standard set to 100%, we retrospectively audited our compliance of requesting stool cultures for IBD in-patients admitted to gastroenterology with acute diarrhoea. Factors of interest to us were the established diagnosis of patients, antibiotic use prior to acute admission, C Diff/ Glutamate Dehydrogenase (GDH) status and the percentage use of faecal calprotectin.

Results: 94 patients were identified between September 2010 and August 2013. Out of the 27 acute admissions patients, case notes from 18 were available. The mean age (SD) was 53.1 (21.2) years and male-to -female ratio was 11:16. Among all with IBD, 3 were coded as having ulcerative colitis, 1 remained unspecified. Acute flare up of IBD was responsible for 7 cases of acute admissions. The remaining were due to GDH positive diarrhoea (n=1), diverticulitis (n=1), gastroenteritis (n=6) and three were discharged with no known cause identified. We note from systematic review of case notes that no patient received antibiotics prior to admission or were considered as failed discharge. The compliance of patients that had at least one stool culture sent was 59% (n=16). Only 4 patients had 3 sets of stool cultures sent to exclude C.Diff. No patient nevertheless had had faecal calprotectin requested during their hospitalization.

Discussion: Clinical guidance from NICE suggested a minimum of one stool culture should be sent for adult in-patients admitted with acute diarrhoea. Our compliance to that is suboptimal. We note outcomes from published evidence that fecal calprotectin could indicate flare up and efficacy of treatment for IBD.

Conclusion: Improved compliance of requesting stool cultures and faecal calprotectin could positively influence our care of patients with acute diarrhoea secondary to bacterial origin.

THE USE OF THE NATIONAL EARLY WARNING SCORE (NEWS) IN AN OLD AGE PSYCHIATRY UNIT.

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Background: The National Early Warning Score (NEWS) was introduced in 2012 by the Royal College of Physicians to standardize acute illness assessment in all inpatient settings. Focusing on six individual physical observation parameters, a total score is created which provides an indication of illness severity and prompts appropriate clinical action. Recommendations are for weekly monitoring. This audit aims to identify the nature of NEWS usage in an old age psychiatry unit, determining if practice meets the recommended guidelines and to implement change where appropriate.

Methodology: Standards were based on local psychiatric hospital guidelines. Data was collected retrospectively using the NEWS charts (n=32 patients). Scoring frequency and accuracy over six weeks was assessed. A subsequent educational program of two weeks duration was delivered to staff and a NEWS Trigger-Sticker outlining recommended total score responses was designed and placed on each chart. This also served as a reminder to calculate the NEWS. The charts were then re-audited (n=27 patients).

Results: 28% of patients had weekly NEWS calculations, of which only 14% were correctly scored. The greatest error amongst incorrect scores was in relation to the respiratory rate. Post quality improvement - 72% of patients had weekly NEWS calculations of which 70% were correctly scored.

Discussion: Many psychiatry wards are separate from acute hospitals and lack medically experienced staff, thus use of the NEWS to aid detection of physical deterioration is particularly important. This is especially relevant as people with mental illness are at an increased risk of comorbidity. The importance of the NEWS to old age psychiatry as a speciality is also clear, given the frequency of comorbidities in the elderly.

Conclusion: This audit identified suboptimal scoring, putting patients at risk. Following cost-effective intervention the NEWS Trigger-Sticker in addition to further education has greatly improved scoring quality, benefiting patient safety in psychiatry settings.

AUDIT: INVESTIGATING THE PRE-IMPLANTATION COUNSELLING GIVEN TO PATIENTS BEFORE IUS INSERTION.

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Aims/Objectives: To establish whether patients at a general practice in Manchester are receiving high quality pre-implantation counselling in accordance with NICE guidelines. Is there a link between patients opting for early removal of the IUS and the quality of counselling they received?

Background: The intra-uterine system (IUS) is licensed as a form of contraception, to manage idiopathic menorrhagia and to prevent endometrial hyperplasia in patients receiving hormone replacement therapy (HRT). Despite its differing uses, the counselling patients receive before IUS insertion should be the same. Guidelines state this must include information regarding its mode of action, duration and efficacy, as well as possible risks and side effects.

Materials and methods: Patients who had the IUS inserted in the last two years were identified using EMIS. These patients' electronic records were retrospectively examined to see what counselling these patients had been given. This was compared to current NICE guidelines on IUS counselling.

Results, Summary/Conclusions: In total 29 patients were identified. 22 of these patients (76%) had received counselling which adhered to NICE guidelines. Of these 29 patients, 7 had had the IUS removed within a year of insertion (24%). No relationship was found between the patients who had the IUS removed early, and the quality of counselling that these patients received.

Findings were presented to the surgery and amendments to practice were suggested. These included using a template for all IUS counselling consultations, increasing the duration of appointments for IUS insertion and reminding doctors of the need for through documentation of all consultations. A teaching session regarding the IUS was also suggested. A re audit should be carried out every year to ensure that patients are being adequately counselled.

SIALOLIPOMA OF THE PAROTID GLAND- CASE REPORT AND REVIEW OF THE LITERATURE

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Objectives: To increase awareness of the rare presentation, diagnostic difficulties and management of sialolipoma of the salivary glands.

Materials and Methods: A review of the English literature was performed using MedLine. The main search phrase used was sialolipoma. Both primary and secondary sources identified from the search criteria were also reviewed.

Case Report: A 70-year-old Caucasian male with multiple co-morbidities presented with a painless lump over the right parotid gland which was gradually increasing in size over the preceding 5-6 months. There

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were no systemic symptoms or facial weakness. Imaging indicated a benign tumour of the right parotid. Superficial parotidectomy was performed and the histology revealed a sialolipoma.

Conclusions: Sialolipomas are rare neoplasms of major and minor salivary glands and should form part of the differential diagnosis of a salivary gland swelling. Preoperative diagnosis can be difficult which makes surgical excision the gold standard as it provides tissue for histological analysis.

UNDERSTANDING FOOD ALLERGY AND FOOD INTOLERANCE: THE PATIENT'S PERSPECTIVE

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Aims: The purpose of this exploratory study is to compare food allergy and intolerance, identify the extent to which these adverse food reactions (AFRs) compromise quality of life in individuals and to expand on the limited literature available in this area.

Hypothesis: Patients with food allergy will have worse health and lower quality of life but fewer mental health problems than patients with food intolerance.

Background: Food allergy and intolerance are distinct AFRs, which are more prevalent in developed countries and in women. Typical food triggers include fruit and nuts. AFRs cause reactions, ranging from mild skin reactions to severe anaphylaxis. Individuals need to be vigilant with their diet to reduce risk, which impacts on the individual in other aspects of their life. Studies show that the vigilance required, amongst other things can affect health and quality of life, however, the existing literature regarding this particular topic is extremely limited.

Methods: 31 new referrals to allergy clinics in the Guy's and St. Thomas' NHS Foundation Trust completed the self-report food allergy questionnaire, consisting of 7 validated measures of factors relating to AFRs and quality of life.

Results: Statistically significant differences between the two groups were not identified. However, the food intolerance group had approximately double the proportion of participants who qualified as likely cases of anxiety and eating disorders. Qualitative responses from participants suggested that they would appreciate more knowledge about their symptoms and how to manage them.

Conclusion: The results suggest that health and quality of life is compromised more in food intolerance patients. The findings highlight the need to expand on this study with a larger sample size, achieving larger effect sizes. Qualitative responses indicate the need for investigation into the improvement of support for those with AFRs to ensure implementation of a holistic care approach.

AUDIT OF HEADACHE ADMISSIONS REQUIRING LUMBAR PUNCTURES 2013

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Background: Headaches are a common presentation in hospitals. Important causes of headaches include meningitis and subarachnoid hemorrhages (SAH), and lumbar punctures are often performed as part of the diagnostic work-up. At present, a Meningitis/SAH pathway exists to help with the acute management of headaches within the Stockport NHS Trust. This audit looks into the management of patients requiring lumbar punctures as per the Meningitis/SAH pathway, in relation to whether lumbar punctures were performed appropriately with adequate consent, information provision and clear documentation of each procedure, and whether adjunct investigations and treatment were provided, alongside lumbar punctures, within the appropriate time frame.

Methodology: Data was collected retrospectively, via case notes and electronic database systems, of patients above the age of 16, admitted with headaches requiring a lumbar puncture, between the 1/1/2013 to 30/6/13. Of the 116 patients identified, 55 case notes were selected randomly, of which 50 were eligible for further data collection and analysis.

Results: The audit identified poor outcomes from standards surrounding adjunct investigations and treatments performed, consent, information provision and documentation of procedures. There were inconsistencies surrounding initiation of antibiotics and/or antivirals, and on obtaining venous blood samples when indicated. There was a lack of awareness surrounding the need for written consent prior to performing a lumbar puncture, and a lack in standardized approach surrounding documentation of each lumbar puncture performed.

Discussion: Aside from education and creating awareness regarding adequate consenting, a lumbar puncture checklist was designed, post-audit, to help overcome problems surrounding documentation and illegible handwriting.

Conclusion: To rule out sinister causes of headaches, lumbar punctures can often proof essential in helping with diagnoses. However, it is without its own complications, and therefore obtaining formal consent and providing information to patients, as well as documenting them and the procedure itself is crucial.

MANAGEMENT OF HEAVY MENSTRUAL BLEEDING BY ENDOMETRIAL ABLATION TECHNIQUES. IS THERE SUCH A THING AS TOO MANY OPTIONS?

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Introduction: Heavy menstrual bleeding refers to significant menstrual blood loss over consecutive cycles affecting quality of life and is a common significant health problem in many pre-menopausal women. There are many identifiable causes but in up to 60% of patients no cause is identified.

Objective: To review and compare endometrial ablation techniques for the management of heavy menstrual bleeding. Design: Literature review.

Summary Points: Traditional first line therapy was medical treatment, however, this is frequently unsuccessful or of limited benefit. Until recently the only surgical option was hysterectomy which is effective but invasive, extreme, expensive and carries a greater risk of complications. Since the 1990s the number of hysterectomies has decreased due to increasing utilisation of alternative methods such as the Mirena intra-uterine system and endometrial ablation techniques. There are two main categories of endometrial ablation. First generation techniques require hysteroscopic visualization of the uterus and include: transcervical endometrial resection, rollerball endometrial ablation and hysteroscopic laser ablation. Whereas second generation techniques are non-hysteroscopic and include: thermal balloon technology, microwave endometrial ablation, hydrothermablation, monopolar and bipolar radiofrequency ablation, cryotherapy, diode lasers and photodynamic therapy.

Conclusion: Treatment of menorrhagia has improved over the last 20 years and continues to do so. Comparison of the literature reveals that first generation techniques take, on average, fifteen minutes longer to perform and second generation techniques were more often performed under local anaesthesia, carry less risk of uterine perforation, haematoma development, cervical lacerations or fluid overload. However, there is no significant difference between the techniques in terms of rates of amenorrhoea or patient satisfaction. However, this progress has led to an increase in the range of treatment options available with no clear indication regarding the most effective method. A more defined guideline of recommended endometrial ablation techniques would likely improve patient care and satisfaction.

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AN ATYPICAL PRESENTATION OF DIABETIC KETOACIDOSIS IN A TYPE 2 DIABETIC TRIGGERED BY CATASTROPHIC SMALL BOWEL INFARCTION.

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This case report describes an atypical presentation of diabetic ketoacidosis (DKA) in a type 2 diabetic, triggered by small bowel infarction. It emphasises that DKA is not a disease solely of type 1 diabetics, and highlights the necessity for a low threshold of suspicion for significant precipitants, as well as an appropriate investigative search. A 73-year-old male presented to A&E with confusion and general malaise for 2 days. Examination was largely unremarkable apart from a GCS of E1 V2 M5. Blood tests revealed glucose 53.1mmol/L, hyponatraemia, hyperkalaemia, acute kidney injury, bicarbonate 8mmol/L, pH <7.2, ketonaemia >3.0mmol/L and lactate 6.2mmol/L, meeting the diagnostic criteria for DKA but with a mixed ketotic and lactic acidosis. There was no clear trigger for DKA and he was treated for presumed sepsis. He was transferred to critical care for ongoing management. Blood ketones and glucose improved but the lactate level and GCS did not. 12 hours later his abdomen became acutely distended and guarded to palpation. An abdominal CT showed extensive small bowel infarction, likely secondary to superior mesenteric artery calcification and occlusion, with mesenteric and portal venous gas. Unfortunately this was deemed non-survivable and the patient died.

Summary: This is an important case highlighting the existence of DKA in type 2 diabeties. Here, a mixed ketotic and lactic acidosis was the first indication of significant and catastrophic visceral infarction. Clinicians require a low threshold of suspicion for significant pathology and an intensive search for the cause when is not immediately obvious.

PRE-PRANDIAL INSULIN ADMINISTRATION IN INPATIENTS WITH DIABETES

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Background: The National Patient Safety Agency recommends systems are in place to enable hospital inpatients to self- administer insulin where feasible and safe. All rapid and intermediate acting insulin's have a specific timeframe in which they should be taken prior to a meal to optimise glycaemic control in patients with diabetes. The individual timeframe is set by the manufacturers and stipulated in the summary of product characteristics.

Methodology: A sample size of 29 insulin dependant diabetic patients was obtained from 29 medical wards at the Norfolk and Norwich University Hospital between 12th and 19th November. Wards in which patients were admitted for 24 hours or longer were included. Each eligible patient recorded the exact time of their meal and when they received their insulin in a data collection questionnaire over a 24 hour period. Results 87 meals were analysed. Insulin was administered outside the manufacturers recommended time for 47 (56%) meals. 41% of patients had their Insulin administered by a nurse during their hospital stay, whilst 59% self-administered. The average delay in administration was 10 minutes, however by 30 minutes, all patients had received their Insulin. Nurses were accountable for 62% of meals administered outside the recommended time, and patients responsible for 53%.

Discussion: Findings show a poor compliance in administering Insulin within the manufacturers SPC recommend times. Self-administering patients showed greater adherence to meeting this standard, compared with nurse led Insulin administration. Results show a clear inclination towards self-medicating, however majority of patients were frustrated at being unable to freely access their insulin prior to meals.

Conclusion: Improved education in the timely administration of insulin is required amongst nurses. A strict selection criteria is necessary to allow nurses to carefully select in patients in whom self-administration would be a safe option, and thus reduce the likelihood of insulin related medication errors.

A CRITICAL REVIEW OF CURRENT PROPHYLACTIC USE OF ONDANSETRON AND CYCLIZINE FOR POSTOPERATIVE NAUSEA AND VOMITING (PONV) IN DAY-CASE GYNAECOLOGICAL SURGERY.

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Background: Postoperative nausea and vomiting (PONV) is a significant problem for both patients undergoing day-case surgery, and their clinicians, leading to distress, poor patient satisfaction and in some cases, delayed discharge or unplanned admission. PONV is more common in certain procedures such as gynaecological surgery, yet the optimal treatment strategy remains unclear. Many patients at Torbay Hospital receive prophylactic anti-emetics prior to surgery, potentially exposing 'low risk' patients to unnecessary medication side-effects and increasing hospital expenditure.

Methodology: 30 patients undergoing day surgery in Torbay completed a questionnaire just prior to their procedure, enabling an assessment of patient concerns.

Results: The results of the survey showed that the biggest concern for 52% of patients was PONV, with women worrying more about this than men. This suggests that for 48% of those undergoing surgery, PONV is of little concern and therefore the prophylactic treatment of low-risk patients may be unnecessary.

Discussion: Research suggests ondansetron and cyclizine work better in combination than alone. The routine use of the British Association of Day Surgery (BADS) PONV calculator as a screening tool would enable individual assessment of PONV risk and identification of low and high-risk patients prior to surgery. If low-risk, anti-emetics could be given on a 'need to treat' basis, focusing on non-pharmacological methods of reducing PONV. A randomized-control-trial based on this would prove beneficial; however the ethical implications of withholding prophylactic anti-emetics are an important consideration.

Conclusion: When considering prophylactic treatment of PONV, the BADS PONV calculator may assist in assessing individual patient risk and preference. A large-scale survey focusing on patient preference would be a useful tool to direct further research.

IMPACT OF EDUCATION ON LIFESTYLE, WORK CONDITIONS AND GENERAL HEALTH

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Background: It is assumed that better educated people should make smarter lifestyle decisions, have better work conditions and therefore have better health. The aim of the study is to determine: Are better educated peoples' lifestyle healthier? Do better educated people have better work conditions? Are better educated people healthier?

Material/ Methods: Cross-sectional study in corporate environment, 290 workers, 50% executives and 50% employees. Interview, measurements. SPSS - independent sample t-test and chi-square test.

Results: 88% executives and 65% employees have higher education. Better educated people smoke 2.22 pack years less ($p=0.048$), consume 0.64 drinks less ($p<0.0001$) and 23% of them eat healthier ($p<0.0001$) than workers with lower education. They work 1 hour less each workday ($p=0.005$), but their stress level is 15% higher ($p=0.001$), they sit 43 minutes longer each day ($p=0.045$) and 82% bring their work to home ($p<0.0001$) more frequently than workers with lower education. Better educated people evaluate their health as high, feel as healthy and have the same amount of complaints about their health as people with lower education.

Discussion: When searching PubMed database - education and employment is mostly connected with psychoemotional work conditions or specific medical conditions. This is the only scientific paper concerning education, employment and general health issues.

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Conclusion: Although better educated people live healthier lifestyle, they have more stressful work conditions and therefore are not healthier although equally healthy as people with lower education. This proves that stressful work conditions are exactly as bad as unhealthy lifestyle – smoking, consuming alcohol and unhealthy diet put together. If people live unhealthy lifestyle and have stressful work conditions a great deal of health damage can be caused regardless of their education.

SUDDEN ARRHYTHMIC DEATH SYNDROME (SADS): DIAGNOSTIC YIELD OF COMPREHENSIVE CLINICAL EVALUATION OF PAEDIATRIC FIRST-DEGREE RELATIVES.

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Background: Sudden arrhythmic death syndrome (SADS) describes the sudden death of a previously healthy individual, with no cause identified on post-mortem. A large proportion of SADS cases are thought to be attributable to inherited cardiac disease. Previous studies of adult populations, have identified evidence of a heritable cardiac condition in up to 53% of families. However, prevalence data within paediatrics is more limited. The aim of this study was to determine the yield of extensive clinical screening in children attending Great
Ormond Street Hospital, referred due to a history of SADS or aborted cardiac arrest (ACA) in a first-degree relative.

Methods: Retrospective evaluation of children attending family screening after sudden cardiac death or ACA in a family member was performed and strict inclusion criteria employed. Comprehensive assessment of patients included clinical examination, family history, electrocardiogram, echocardiogram, 24-hour tape and signal averaged electrocardiogram; older children also underwent exercise testing, cardiac MRI and ajmaline-provocation test.

Results: The study included 110 children in total from 63 families. In 10 children from 9 families, an inherited cardiac disease was diagnosed (14.3%). Specifically, 7 patients were diagnosed with Brugada Syndrome, 2 with Long QT Syndrome and 1 with catecholinergic Polymorphic Ventricular Tachycardia.

Conclusion: The results demonstrate a high prevalence of heritable cardiovascular disease after screening of children at risk due to a history of SADS in first-degree relatives. This emphasises the importance of ongoing screening in this population, to ensure early diagnosis, appropriate management and prevention of sudden cardiac death.

AN AUDIT TO ESTABLISH THE CURRENT MONITORING STANDARDS OF HYDROXYCHLOROQUINE IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Background: Hydroxychloroquine is considered a disease-modifying anti-rheumatic drug (DMARD) because it can decrease the pain and swelling of arthritis and it may prevent joint damage and reduce the risk of long-term disability. It often is used for mild rheumatoid arthritis or in combination with other drugs for more severe disease.

It is well acknowledged that there are rare but devastating visual complications associated with the medication and close monitoring of this is advised. Local guidelines advise the reduction of dose of hydroxychloroquine within three months of commencing the medication. Baseline renal and liver function blood tests and every 6 months thereafter are recommended along with an initial screening by an optician and every year subsequently.

Results: A total of 46 patients (33 male and 13 female) were included but 6 were excluded as they had been on hydroxychloroquine for less than 6 months. Only 10% of patients had their dose calculated according to their lean body weight and 13% had it reduced after 3 months. An ophthalmology history, performance of visual acuity and fundoscopy at commencement of hydroxychloroquine was poorly performed, 8%, 10% and 5% respectively. However 100% of patients who experienced visual symptoms after starting treatment were referred to an ophthalmologist and of those 67% stopped taking hydroxychloroquine immediately. Only 7% of patients receiving treatment for more than 5 years were referred to an ophthalmologist.

Conclusions: Despite recommendation from local guidelines the reduction of dose after 3 months of hydroxychloroquine is rarely performed. Visual assessment is not routinely performed and patients are overall aware of the complications that can occur and when they should stop taking their medication. The findings of the audit will be presented locally to the multi-disciplinary rheumatology team in order to improve care of these patients. There needs to be improved communication between the hospital staff, patient and their local optician at commencement of hydroxychloroquine and to ensure appropriate investigations and management are performed at initiation and whilst taking hydroxychloroquine. We aim to re-audit in a year's time.

A PROSPECTIVE AUDIT ASSESSING THE RATE OF POLYPHARMACY IN CARE HOME RESIDENTS

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Background: The presence of polypharmacy (5+ medications) is common among care home residents. Reducing the number of medications taken lowers the risk of adverse drug reactions.

Methodology: Participants from five residential/nursing homes (n=43) all registered with a single General Practice were assessed for polypharmacy using guidelines from NHS Scotland (topical treatments and supplements excluded). Possible medications to discontinue were identified and discussed with the participant/relative and their General Practitioner. A teaching session reviewing national guidelines with General Practitioners was undertaken. Medications were re-evaluated six months later and compared with medications of newly registered participants from the same care homes to determine if prescribing habits had changed.

Results: 74% of participants were identified with polypharmacy with an average of seven medications - one less than international data. After a review of prescribed medications, the rate dropped to 61%, and the average number of medications fell to six. The most common medications stopped were folic acid, aspirin and zopiclone. The re-audit rate of polypharmacy in existing participants was 59%; however, the rate for new participants (n=15) was 80%, which paralleled the initial medication audit (prior to intervention).

Discussion: The initial rate of polypharmacy was lower than international data, suggesting prescribing practices were reasonable. The further reduction in average medications suggests a focused review of prescriptions is effective. The re-audit showed new participants had a similar rate of polypharmacy to those in the initial audit, suggesting the teaching session did not alter prescribing practices.

Conclusion: Initial rates of polypharmacy were lower than described in international data, and the use of national guidelines allowed a further reduction. Although rates remained static on re-audit, new participants had similar rates of polypharmacy to the pre-audit cohort, suggesting further work needs to be undertaken when patients first register.

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ADHERENCE TO LEEDS TEACHING HOSPITALS URINARY TRACT INFECTIONS (UTI) GUIDELINES AUDIT

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Background: A standards-based clinical audit into the compliance of antimicrobial prescribing in patients in the medical admission unit at St James' University Hospital, where the diagnosis/reason for antimicrobial prescription was 'urinary tract infection' (UTI). The purpose was to investigate how many patients being treated for UTI had had signs and symptoms of UTI, how many had had a urine dip positive for nitrites/ leukocytes and how many had had samples sent for microscopy cultures and sensitivity (MC&S), in accordance with hospital guidelines.

Experimental design and/or methods used: A review of clerking notes and prescriptions for all (15) patients over 5 days in March 2013, where antibiotic treatment was given on the basis of 'UTI', on medical admissions ward.

Results: 80% patients had at least one sign or symptom of a UTI. 33% patients in the sample had no record of a urine dip being done. Only 60% of patients being treated for UTI had a urine dip positive for nitrites/ leukocytes. For all patients with a nitrite/leukocyte positive urine dip, MC&S samples had been requested. 20% of these samples were rejected due to inadequate labelling, one sample was not sent. Therefore only 47% patients on antimicrobials for UTI had had a urine sample sent for MC&S.

Conclusion: We often treat infection empirically if we are unable to obtain urine samples. However, we should be aiming to direct antimicrobial treatments as accurately as possible, for reasons of patient care, increasing microbial resistance and cost.

THE RELIABILITY OF 3DMD PHOTOGRAMMETRY AS A FORM OF INDIRECT ANTHROPOMETRY, WITHIN CRANIOFACIAL SURGERY

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Background: Planning of craniofacial procedures requires precise collation of volumetric cranial dimensions. Development of surface anthropometry is valued in the modern world of surgery, where manual use of calipers is commonly used. 3dMD photogrammetry allows radiation free and fast imaging. Advantages of 3D photogrammetry compared with direct traditional methods prove futile without evidence of the systems accuracy, precision and reliability to collate measurements. Limited studies compare 3dMD systems with direct anthropometry, a key motivation of our review. This review will draw emphasis to anthropometric studies, focusing on the reliability of 3D photogrammetry as a form of indirect anthropometry. A refined database search was conducted using Web of Knowledge/Web of Science. 24 articles were yielded with only 3 relevant to this review.

Discussion: The 3dMD Systems achieve 360-degree images of a subject, allowing accurate documentation cranial geometry. High-speed capture eliminates motion error, ideal for paediatric imaging. Patients remain in an upright position, eliminating soft tissue draping, often seen from supine computed tomography and cone beam systems. Results showed an average error linked with landmark positioning as sub- millimeter and statistically insignificant, concluding that 3dMDface system is highly accurate. Findings from one study recognized 17 out of the 18 direct measurements obtained related greatly to the digital values acquired (mean r = 0.88). The conclusion was that the digital measurement using 3dMD were reliable and as precise. .

Conclusion: 3dMDface system, establishes respectable covenant with the traditional methods of direct anthropometry. In most cases results of the 3dMDface system demonstrated a higher level of precision, with labeling errors being statistically insignificant. The outcomes on accuracy, reliability and precision provide reliable unbiased evidence to suggest that 3dMDface system, as a form of indirect anthropometry is reliable. The reliability of 3dMD systems could play a potentially key role in patient reported outcome measures.

DELIRIUM AND THE ENVIRONMENT IN AN ELDERLY HOSPITAL POPULATION

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Introduction: The burden of delirium among hospitalised patients is significant. Particularly among the elderly, who as a result have an increased morbidity and mortality. The National Institute of Clinical Excellence (NICE) recommends the provision of environmental cues to prevent or manage delirium. This audit assessed the adherence to these guidelines.

Methodology: Clinical audit assessing the environment of 60 inpatients in care of the elderly wards at University Hospial Llandough (18/03/2013 to 28/03/2013). Factors assessed included positioning of patient within ward (main versus side ward), mobile versus bed bound and number of bed moves. Patient's environment was assessed for the presence of a visible clock, date (whether this was correct) and adequate light provision. The presence of cognitive impairment or delirium was assessed.

Results: 23 (38%) patients had known dementia, 21 (35%) were admitted with delirium. 56 (93%) patients had a visible clock, 26 (43%) had the date visible which was correct in 20 (77%) cases. 56 (93%) patient's had adequate light provision The average number of bed moves among all patients was 1 23 moves. Of those with cognitive impairment 29 (85%) patients had a visible clock, 17 (50%) had the date visible of which 13 (76%) were correct. 31 (91%) patients had adequate light provision.

Discussion: The provision of certain environmental cues was inadequate, particularly for patients with known cognitive impairment. Orientating patients is a low cost approach to managing delirium. Particularly when comparing this with the cost of morbidity and mortality associated with delirium.

Conclusion: This audit recommends: 1) All patients with delirium should be well orientated with a visible clock and date which should be correct. 2) Additional effort needs to be made in reducing the number of bed moves in patients with delirium. 3) Adequate light provision should be provided for all patients.

Continued Medical Education

Test your knowledge

EXTENDED MATCHING QUESTION 1

OPTIONS:

A. Acute pancreatitis
B. Acute Cholecystitis
C. Urinary tract infection
D. Intestinal obstruction
E. Appendicular abscess
F. Acute appendicitis
G. Acute pyelonephritis
H. Dissection of the aorta
I. Right renal calculi

QUESTIONS:

1. A 75-year-old man is brought to Accident and Emergency department after he collapsed in the street. Now he complains of severe retro-sternal/upper abdominal pain with the pain radiating to his back, mainly between his shoulder blades. He is pale and anxious, and his pulse rate is 110/min and blood pressure is 90/70 mmHg.

2. A 25-year-old woman presents to the Accident and Emergency department with a severe pain in her right iliac fossa pain. She is pale and has fetor oris. Her pulse rate is 120/min and blood pressure is 120/80 mmHg. On examination, she has localised guarding over the right iliac fossa with rebound tenderness. Her periods are normal and her urine is clear.

3. A 65-year-old woman who is a known alcoholic presents to the Accident and Emergency department 12-hour history of severe epigastric pain associated with several episodes of vomiting. The pain is radiating to her back. She is pale, her pulse rate is 114/min and her serum amylase is elevated.

EXPLANATIONS:

1. Aortic dissection occurs when there is defect in the intima of the aorta resulting in blood tracking into the aortic tissues and creating a false lumen. The blood insinuates itself between the intima and overlying adventitia. The clinical presentation is often a tearing intra-scapular pain or pain in the retrosternal/epigastric regions. The dissection may extend distally down the aorta to involve the renal, spinal, iliac arteries causing renal failure, paraplegia and leg ischemia. The patient usually manifests all classical signs and symptoms of shock.

2. This is a classical presentation in a patient with acute appendicitis. In women, gynaecological causes such as ectopic pregnancy, menstrual disturbances and Mittelschmertz (mid-cyclical) pain should be ruled out. Other common differential diagnoses in both sexes include urinary tract infection and right-sided renal or ureteric calculi.

3. Acute pancreatitis is usually characterised by epigastric pain which radiates to the left and right of the epigastrium and through to the back. Nausea and vomiting are associated symptoms. Abdominal examination reveals localised guarding and tenderness. Bowel sounds may be absent. Inflammatory markers and serum amylase levels are usually elevated.

ANSWERS: 1-H; 2-F; 3-A

Continued Medical Education

Test your knowledge

EXTENDED MATCHING QUESTION 2

OPTIONS:

A. Chronic persistent hepatitis
B. Chronic active hepatitis
C. Autoimmune hepatitis
D. Primary sclerosing cholangitis
E. Primary biliary cirrhosis
F. Primary haemochromatosis
G. Wilson's disease
H. Hepatocellular carcinoma

QUESTIONS:

1. A 38-year-old woman, who is undergoing treatment for Ulcerative Colitis for many years, presents to the Accident and Emergency department with a five-day history of right upper quadrant pain, loss of appetite, vomiting and fever. She is icteric and says that she has generalized itch over the past few days.

2. A 47-year-old female presents to her General Practitioner with a six-week history of right upper quadrant discomfort, pruritis and loss of appetite. On examination, she has finger clubbing, xanthelasmata and mild jaundice. She is also observed to have increased skin pigmentation. Her liver is palpable 4-cm below the right coastal margin.

3. A 37-year-old man, who is known to drink heavily, presents to the surgical out-patient clinic with a two-month history of right upper quadrant pain and generalized joint pains. On examination, his skin is of grey complexion. His liver is palpable 6.5-cm below the right coastal margin and scrotal examination reveals right testicular atrophy.

EXPLANATIONS:

1. Primary sclerosing cholangitis is caused due to persistent inflammation and scarring of the bile ducts. As the scarring progresses, the ducts become blocked. The patient presents with right upper quadrant pain, jaundice, nausea and vomiting, fever and pruritis. This condition primarily affects middle aged women. Although the aetiology remains unclear, it is associated with inflammatory bowel disease such as Ulcerative Colitis.

2. Primary biliary cirrhosis is a slow, progressive, non-suppurative form of cholangio-hepatitis. It affects women more than men, and usually the middle-aged. In the initial stages, the patient presents with pruritis and fatigability. With progression of the disease, jaundice, hepato-splenomegaly and melanotic skin pigmentation may be observed. Other important recognized features include clubbing, xanthelasmata and arthralgia.

3. Primary haemochromatosis is a condition that is more common in men. It is caused due to abnormal amounts of iron being absorbed from the gut and deposited in various organs, particularly the liver and the pancreas. The iron absorption can be exacerbated by alcohol. The patient presents with right upper quadrant pain, slate-grey skin pigmentation, arthritis, hepatomegaly, impotence and testicular atrophy.

ANSWERS: 1-D, 2-E, 3-F

Continued Medical Education

Test your knowledge

MULTIPLE CHOICE QUESTION 1

Regarding Joints:

a) Primary cartilaginous joints unite the bones of the vault of the skull at the sutures
b) Fibrous joints are very mobile
c) The symphysis pubis is an example of a secondary cartilaginous joint
d) Synovial joints have a capsule enclosing the joint cavity
e) The cartilaginous epiphysis is a highly vascular structure

EXPLANATION:

All joints in the body could be broadly divided into three types: fibrous; cartilaginous (primary and secondary) and; synovial (typical and atypical). Primary cartilaginous joints are formed when bone joins cartilage. They are immobile and strong. The adjacent bone may fracture but the bone-cartilage interface seldom separates. All epiphyses and the ribs attaching to their costal cartilages are examples of primary cartilaginous joints. Fibrous joints unite the bones of the vault of the skull at the sutures. The bone ends are joined by fibrous tissue and movement is negligible. A secondary cartilaginous joint is a union between bones whose articular surfaces are covered with a thin lamina of hyaline cartilage, which in turn is frequently united by a fibrocartilage. All midline joints - symphysis pubis, sternal angle, xiphisternum and intervertebral discs - are examples of secondary cartilaginous joints.

In a synovial joint, the bone ends taking part are covered by hyaline cartilage and surrounded by a capsule enclosing a joint cavity. The capsule is lined internally by synovial membrane (containing synovial fluid) and the capsule is reinforced internally or externally, or both, by ligaments. The joint is capable of varying degrees of movement. All limb joints fall in this category. In atypical synovial joints, such as the sternoclavicular joint and the acromioclavicular joint, there is no hyaline cartilage in the joint. The cartilaginous epiphysis, like all hyaline cartilage, has no blood supply. The synovial membrane, joint mesenchyme and its derivatives are supplied from a vascular plexus that surrounds the epiphysis and sends branches to the joint structures. As ossification of the cartilaginous epiphysis begins, branches from this vascular circle penetrate the ossification centre.

ANSWERS: FFTTF

Continued Medical Education

Test your knowledge

MULTIPLE CHOICE QUESTION 2

Acute Extradural Haematoma:

a) Is due to rupture of the superior cerebral vein
b) Does not occur without an associated skull fracture
c) Is limited by suture lines
d) Is associated with lucid interval in more than 90% of patients
e) Causes contralateral hemiparesis

EXPLANATION:

Acute extradural haematomas (EDH) are due to damage to the anterior (frontal) branch of the middle meningeal artery. Rupture of the superior cerebral vein as it enters the superior sagittal sinus causes subdural haematoma. Trivial trauma could lead to the development of EDH. Often a blow to the temporal region, where the relatively thin skull overlies the meningeal artery, can precipitate a bleed. EDH occurring in the posterior fossa (damage to the posterior cerebral artery) are extremely rare, but should be suspected in patients with occipital fractures. Since the dura has strong attachments to the cranium along the suture lines, contrary to subdural haematomas, EDH are limited by suture lines. Due to this feature, they have a characteristic biconcave ('lens' shape) appearance on a CT scan.

After a trauma or a fall, patients may recover after a brief loss of consciousness. They then complain of increasing headache; vomiting and drowsiness follow. They fall asleep and are difficult to rouse. The well described 'lucid interval' of an EDH, however, is not commonly seen – the majority of patients progressively deteriorate from the time of injury. If left untreated, the resultant swelling causes pressure on the cerebral hemisphere in the region of the motor area, leading to contralateral hemiparesis, and the medial edge of the temporal lobe may be displaced over the free edge of the tentorium, compressing the oculomotor nerve and causing dilation of the pupil on the injured side. Finally there is coma with bilaterally fixed pupils, terminating in a respiratory arrest. In patients with occipital lobe injuries, changes in the respiratory and cardiovascular system may be witnessed before there is deterioration in the conscious levels.

ANSWERS: FFTFT

Continued Medical Education

Test your knowledge

MULTIPLE CHOICE QUESTION 3

The metabolic response to injury includes:

a) An increase in the visceral blood flow
b) A fall in plasma insulin concentration during the 'ebb' phase of injury
c) An increase in hepatic glycogenolysis and gluconeogenesis
d) Stimulation of aldosterone secretion leading to metabolic alkalosis
e) A rise in serum albumin

EXPLANATION:

The body responds to any form of injury (including surgery) with local and systemic responses that attempt to contain and heal the tissue damage, and also to protect the body whilst it is injured. The systemic response, produced by many different mediators (sympathetic nervous system, acute phase response, endocrine response and vascular endothelial cell system response), increases the metabolic rate, mobilizes carbohydrate, protein and fat stores, conserves salt and water, stimulates immunological and coagulation systems, and diverts blood preferentially to vital organs. Blood is redistributed from the viscera and skin to the heart, brain and skeletal muscles, and there is an increase in heart rate and contractility. In the 'ebb' phase after injury, plasma insulin concentration falls with resultant hyperglycaemia because catecholamines and cortisol make the β-islet cells of the pancreas less sensitive to glucose (insulin resistance). Glucagon also inhibits insulin release and cortisol reduces the peripheral action of insulin; less carbohydrate is transported into cells and blood sugar rises.

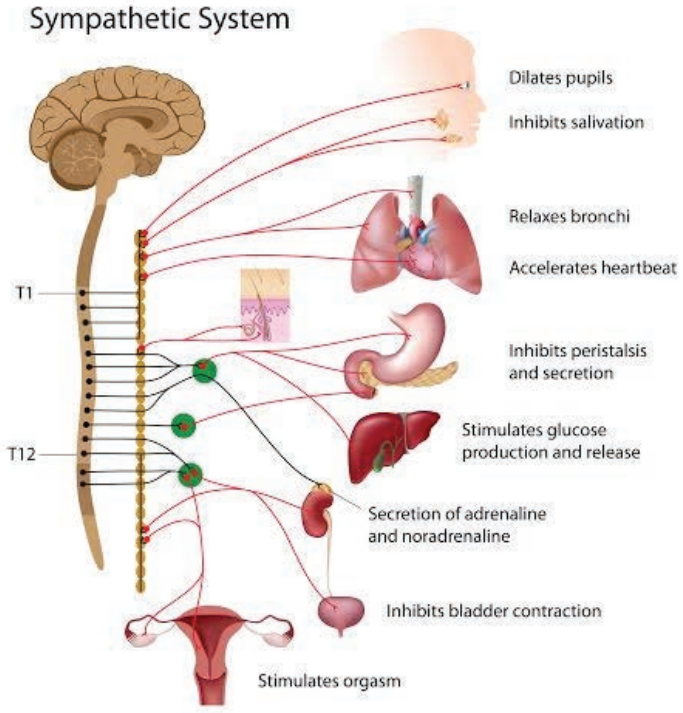
Arginine vasopressin (from posterior pituitary) acts on the distal tubules and collecting ducts in the kidney and leads to increased reabsorption of solute-free water; it causes peripheral vasoconstriction especially in the splanchnic bed, and it also stimulates hepatic glycogenolysis and gluconeogenesis. In addition, glucagon secretion increases after injury, further stimulating hepatic glycogenolysis and gluconeogenesis. ACTH stimulates aldosterone secretion (in addition to glucocorticoids) which causes increased reabsorption of sodium and secretion of potassium (and hydrogen ions) in the distal convoluted tubules and collecting ducts leading to metabolic alkalosis as well as a reduction in the urine volume. In more severe injuries, however, a metabolic acidosis is common due to poor tissue perfusion and anaerobic metabolism. Serum albumin falls after trauma because production by the liver decreases and loss into damaged tissue increases due to the action of cytokines and prostaglandins on vessel permeability. The accompanying fluid shift out of the intravascular compartment contributes to dysfunction in various organs.

ANSWERS: FTTTF

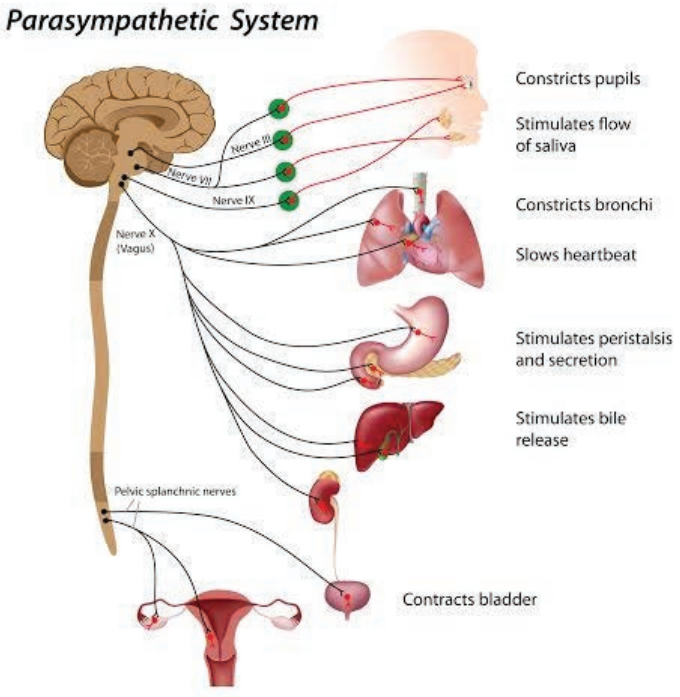
Continued Medical Education

AUTONOMOUS NERVOUS SYSTEM

Sympathetic Nervous System



Parasympathetic Nervous System



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