SUMMER SCHOLARSHIP SYMPOSIUM

—

School of Medicine, Medical Sciences & Nutrition
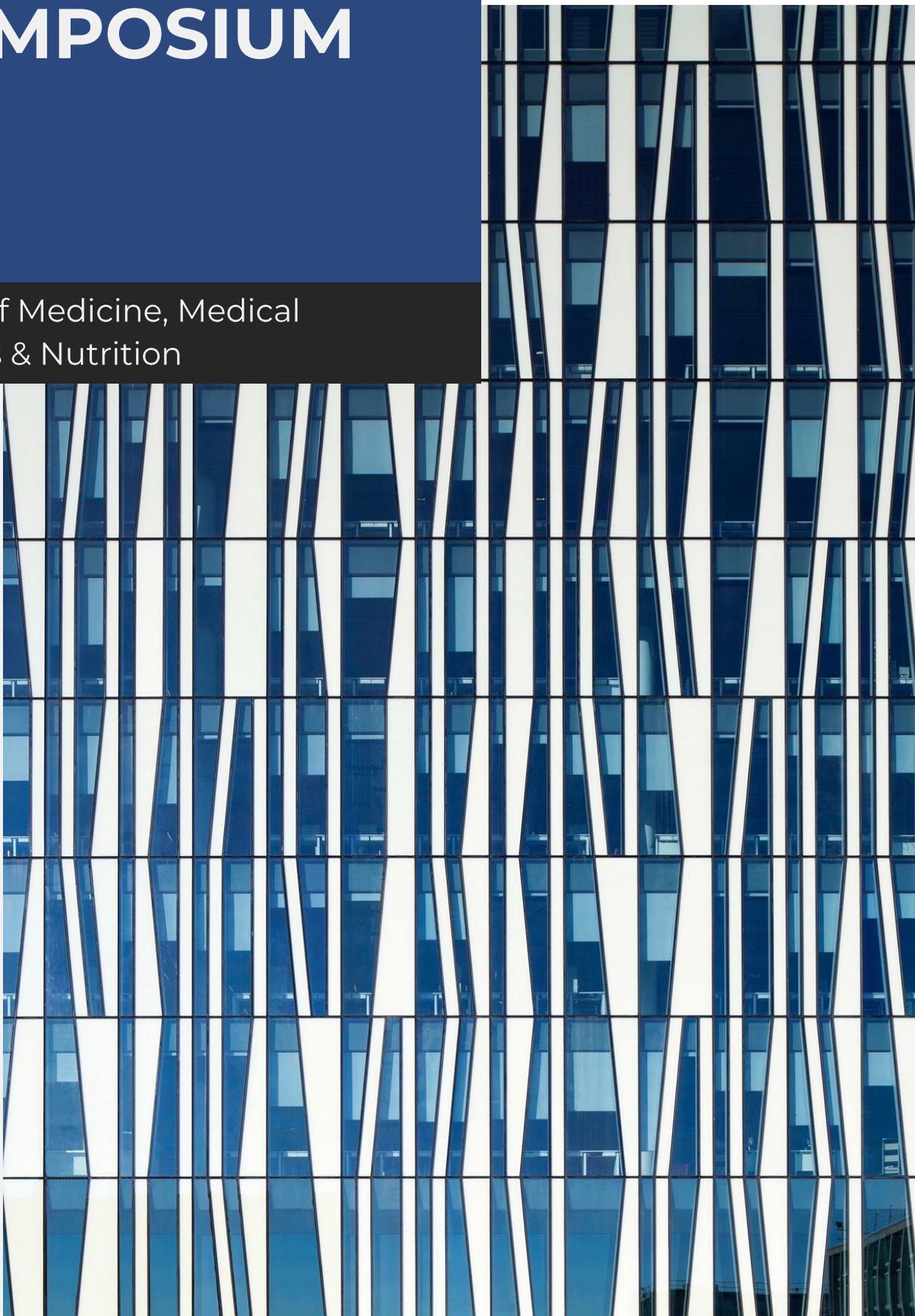
1 4 9 5

UNIVERSITY OF
ABERDEEN

2018

Contents

14TH OF NOVEMBER 2018

SUTTIE CENTRE
LECTURE THEATRE
15:00 – 19:30
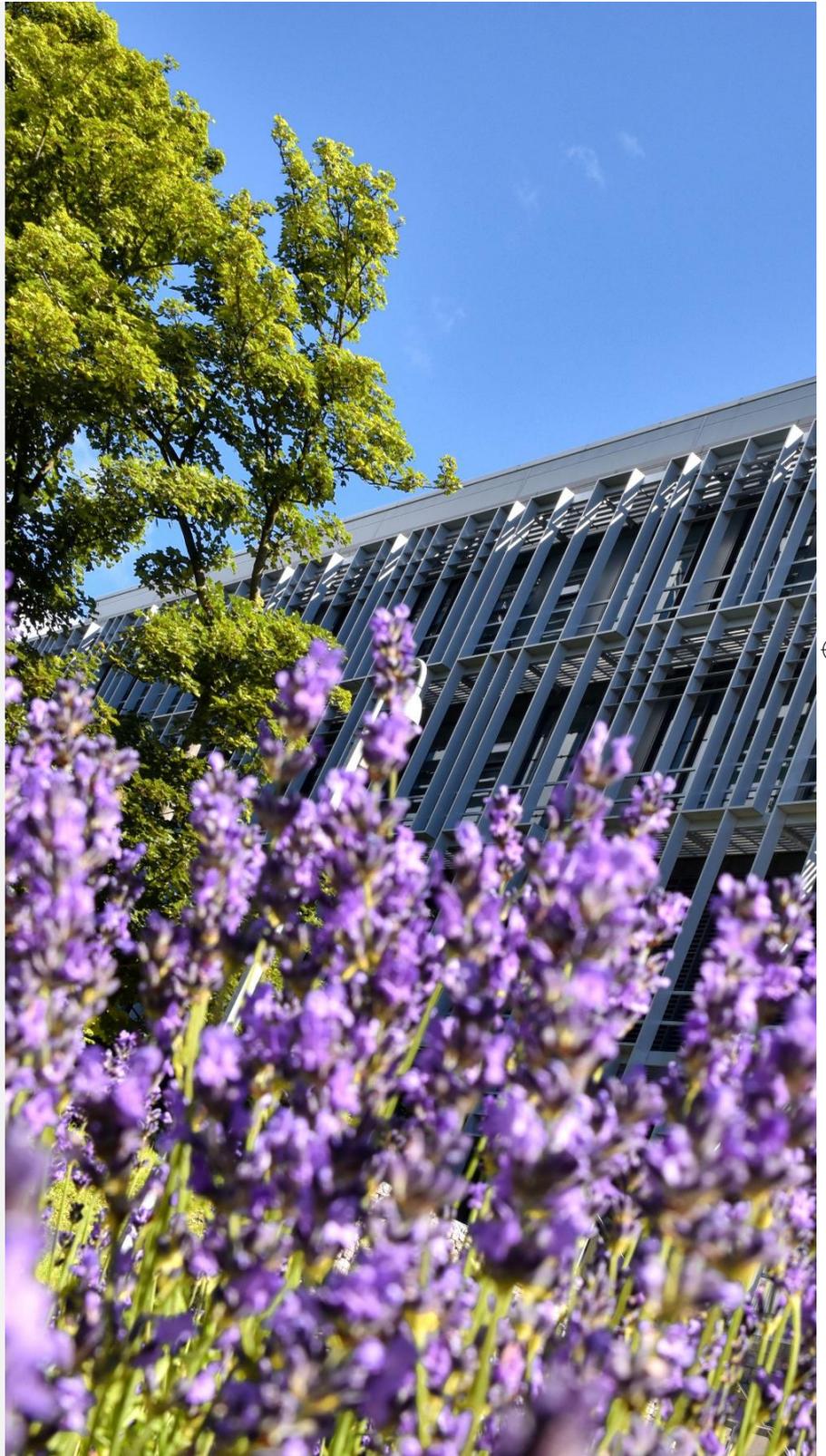
Internally Funded Scholarships 2018

ASRS Scheme

- 4 - School of Medicine, Medical Sciences & Nutrition
- 4 – Institute of Applied Health Sciences
- 2 – Dental Institute
- 6 – The Development Trust Funds
- 2 – Department of Medicine for the Elderly
- 2 – Department of Gastroenterology
- 3 – Department of Stroke
- 2 – Department of Vascular Surgery

HOTSTART & Endowed Scholarship Scheme

- 3 – The Development Trust Funds
- 6 – Innes Will Endowed Scholarships
- 1 – Flora Gow Murray Endowed Scholarship

UNIVERSITY OF ABERDEEN · 1495

NHS Grampian

Acknowledgement

I would like to thank students and supervisors contributing to this year symposium event.

We are indebted to Mrs. Janice Forsyth and Ms. Morag Mcconnell for their assistance with the running of the programme. I also would like to thank Jesus Perdomo, 4th year MBChB, who designed this year's abstract booklet and Dominika Boldovjakova, 3rd year MBChB, who has contributed to the editing of the abstract booklet. Special thanks to faculty members and students with an academic track record who volunteered to act as judges for this year ASRS prizes.

On behalf of the Summer Research Student Scholarship recipients, the Executive Board of Aberdeen Clinical Academic Training (ACAT) Scheme would like to thank the financial contributions from the funders of the various undergraduate research scholarship programmes.

Professor Phyo K. Myint

Director of Clinical Academic Training Development & Chair, ACAT Executive Board
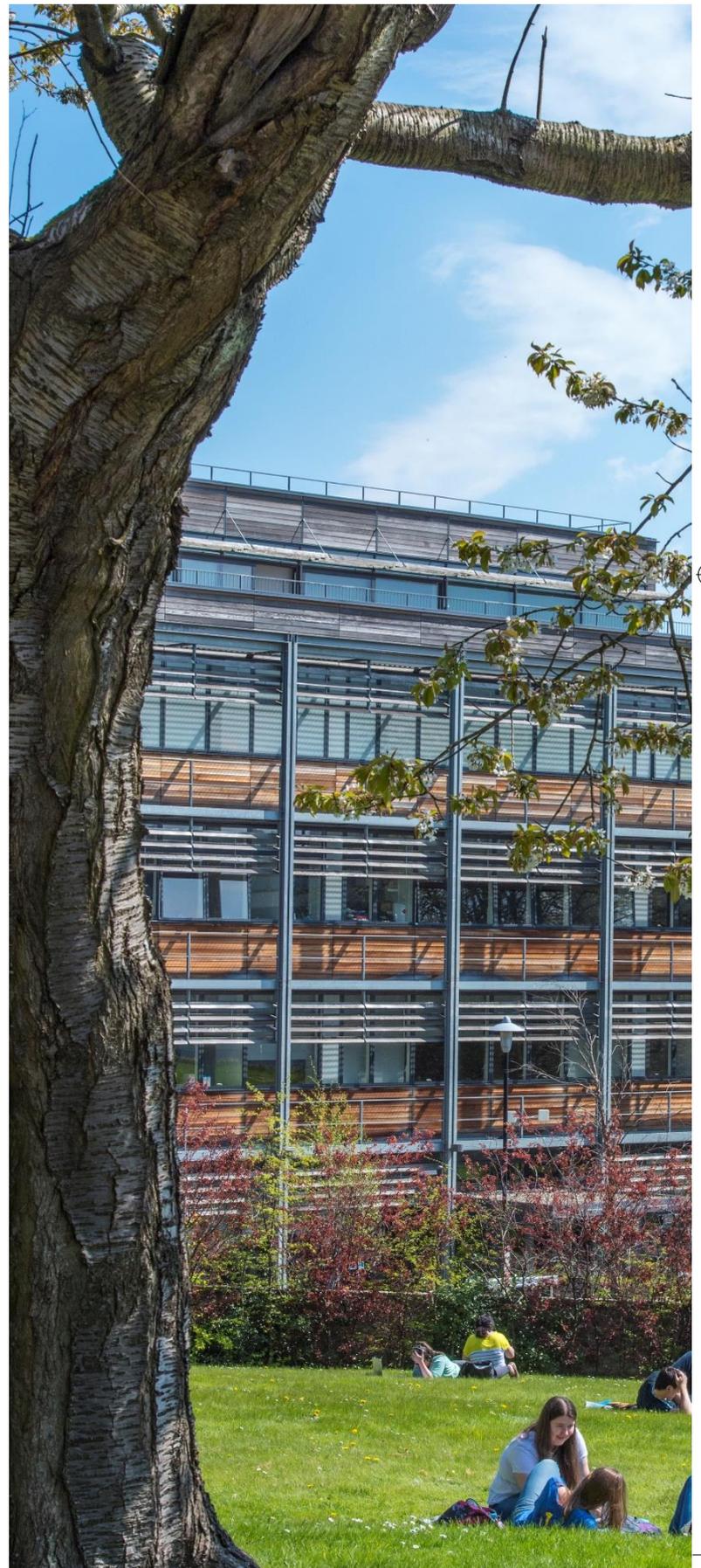
Schedule

—

Time	Speaker	Title
15:00 – 15:05	Prof. Rona Patey	Welcome and Introduction
15:05 – 15:20	Sofia A et al.	Invited Medical Education Presentation
15:20 – 15:30	Aminta C	Detecting differentiation of fibroblast-like synoviocytes to a myofibroblast-like phenotype in a mouse antigen-induced arthritis model: a pilot study
15:30 – 15:40	Catriona Y	Efficacy of corticosteroids in twin pregnancies at risk of preterm birth: systematic review and meta-analysis
15:40 – 15:50	Weronika S	Impact of Diabetes on Complications, Mortality and Recurrence in 608,890 Hospitalised Patients with Stroke
15:50 – 16:00	Edward S	Is hospital admission for bronchiolitis in infancy associated with risk for childhood asthma admission? A whole population study
16:00 – 17:30 Refreshments and poster viewing		
17:30 – 17:40	Craig F	Audit of Telemedicine Consultations and Clinician Perspectives in ARI Gastroenterology Out-Patient Services
17:40 – 17:50	Mhairi M, Sayed A	The Oral Health Status of Patients with Peripheral Vascular Disease and Patients Undergoing Vascular Surgery: A Systematic Review
17:50 – 18:00	Sean J	A systematic review of approaches to management pathways for Fibromyalgia, Irritable Bowel Syndrome and Chronic Fatigue Syndrome
18:00 – 18:10	Zahra P	Hypertensive disorders of pregnancy and the risk of common cancers; Evidence from the EPIC-Norfolk prospective population-based study
18:10 – 18:20		Judges discussion
18:20 – 18:30		ASRS Prizes and closing remarks
18:30 – 19:30		Refreshments and Drinks reception

Poster Presentations
—

ASRS

#	Presenter	Title
01	Abdel-Rahman A-F	Sex differences in age-adjusted mortality of 6.3 million hospitalised stroke patients: Analysis of Thailand Registry Data, systematic review and meta-analysis
02	Albana K	Achieving planned mode of delivery: a systematic review
03	Claire A	Rural Access to Out of Hours (OOH) Cancer Care in Grampian: Why does earlier diagnosis and treatment not equal better survival for patients living in rural areas?
04	Iliana G	Genetic modulation of the efficacy of B-vitamin intakes in pregnancy
05	Nikhil A	Detection of Osteoarthritis using Fast Field Cycling Nuclear Magnetic Resonance
06	Parivrudh S	Identification of Neuro-emboli in Knee Surgery (INKS)
07	Rafsan C	An Audit of Cerebrovascular Services Across GP Practices in NHS Grampian
08	Sarah P	Genetic Referrals: Characterising Young Onset Colorectal Cancer
09	Annes A	Gestational diabetes predicts low bone mineral density and hip fracture incidence in older age: EPIC-Norfolk population-based cohort study
10	Bernadette A	A systematic review on management of multizonal intraepithelial neoplasia of female lower genital tract
11	Katriona H	Mechanisms of weight loss in Parkinson's disease: A systematic review
12	Kelvin O	An audit investigating the referrals to a hospital based paediatric department
13	Philip C	Telemedicine: How do Grampian Gastroenterology outpatients want to be seen?
14	Phui Yuen W	Dietary vitamin B6 and folate intake predict higher bone mineral density in women but not in men: EPIC-Norfolk prospective cohort study
15	Suzanne R	Do waiting times for surgery have an impact on breast cancer tumour sizes?
16	Vlad-Costin I	The association between trigeminal neuralgia and multiple sclerosis - a review

Poster Presentations

—

HOTSTART & Endowed Scholarships

#	Presenter	Title
17	Alexandra H	Exploring the feasibility of integrating Walk With Ease (WWE) - a community-based walking programme for adults with arthritis and musculoskeletal (MSK) conditions - into an existing UK setting
18	Genevieve M-F	The Association Between Fatigue Measured By SF-36 Vitality and Stroke Risk In EPIC-Norfolk Cohort
19	Hwan H	Mental Health Stigma in Scottish Print Media from 2002 to 2012
20	Kar Yee L	Pre-operative urodynamics for management of urinary incontinence in women: A linked systematic review and meta-analysis
21	Rekha G	Effectiveness and safety of the current dosage guidelines for Posaconazole in paediatric patients: review
22	Shirleen H	The role of *Staphylococcus aureus* in the oral cavity
23	Owens I	A Digital Teaching Aid in Clinical Skills Training in Dentistry
24	Giovanni M	An Evoked Response Potential during facial action-perception match and mismatch reveals correlations with measures of empathy
25	Kaisa Y	Baseline anticholinergic burden from medications predicts poor health-related quality of life in the men and women of EPIC-Norfolk prospective population-based cohort study
26	Quiterie S d J	The effects of playing rugby on spinal bone health

Poster Presentations
—

Externally Funded Scholarships

#	Presenter	Title
27	Dominika B	Does interleukin-27 provoke anti-microbial peptide expression in the human-derived gastrointestinal organoids?
28	Dylan McC	The importance of arginase activity on the antimicrobial function of macrophages against *Cryptococcus neoformans*
29	Georgios K	General Practice coding of Huntington's disease Samuel
30	Samuel N	The association between body fat percentage and incidence of falls- and fracture-related hospitalisation in the EPIC-Norfolk cohort
31	Tiberiu P	What matters most for patient-related stroke outcomes: atrial fibrillation, heart failure or their combination? A prospective hospital register cohort study

Medical Education Scholarships

#	Presenter	Title
32	Claire R, Rosannah J	The History of the First Five Female Graduates from the University of Aberdeen Medical School: are the Issues They Encountered Still Relevant Today?
33	Dylan McC, Rachel H	Shaking up Immunology Teaching at the University of Aberdeen
34	Philip C, Rebecca W	Educational videos for the navigation of the BNF
35	Rachel C	Development of a 15-credit online pharmacokinetics module
36	Rachel B	Developing a Prescribing Handbook for Year 4/5 Medical Students
37	Rebecca H	Student responses to "paperless workshops"

ASRS

Aberdeen Summer Research Scholarship
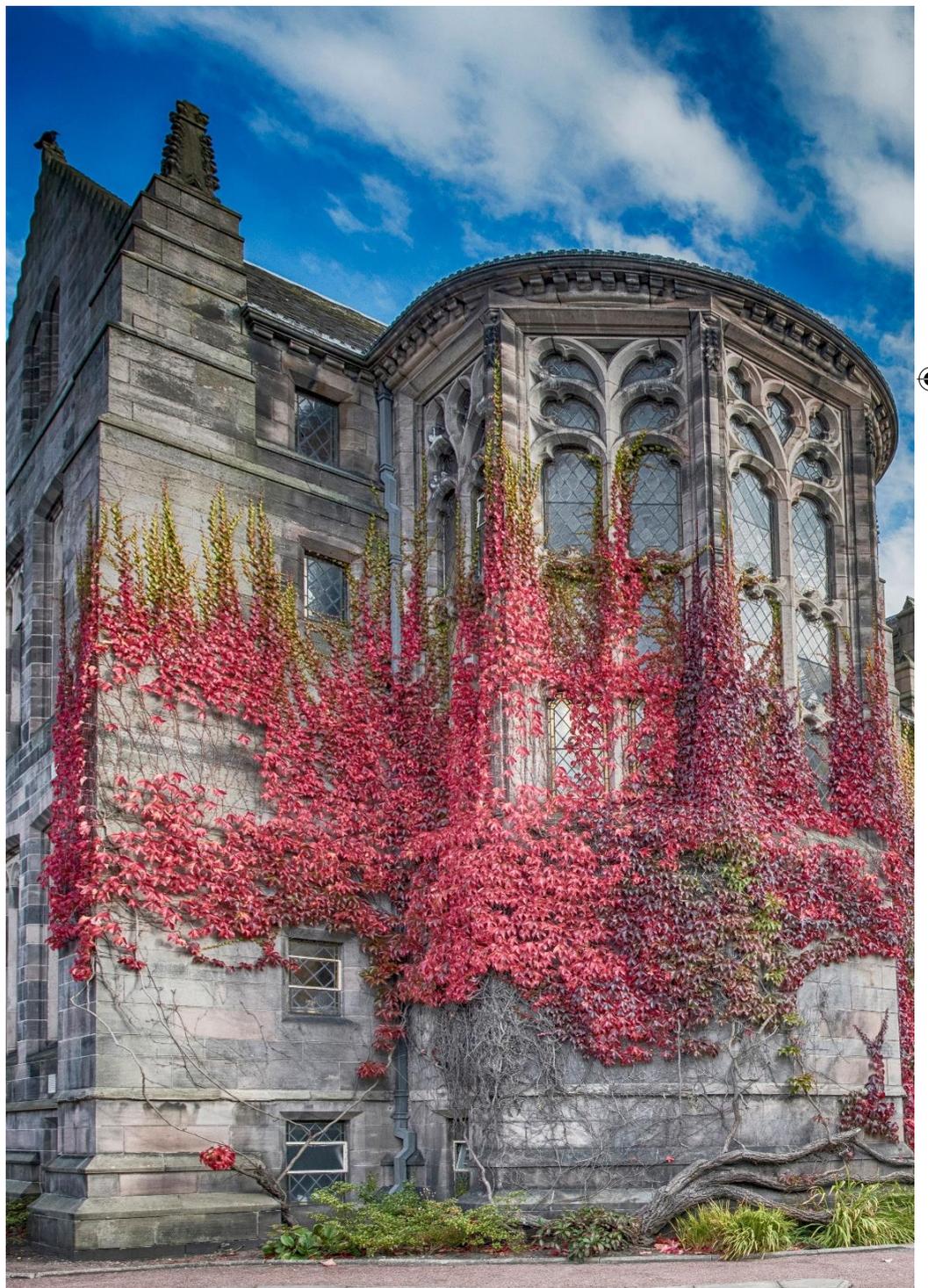
Sex differences in age-adjusted mortality of 6.3 million hospitalised stroke patients: Analysis of Thailand Registry Data, systematic review and meta-analysis

Abdel-Rahman Abdel-Fattah

Background

Stroke is a common cardiovascular disease responsible for approximately 6.2 million deaths worldwide. We aimed to systematically assess and quantify the evidence on sex differences in mortality of hospitalised stroke patients.

Methods

We analysed data from a cohort of 608,890 stroke patients (mean age 64.29±13.72 years, 44.9% women) admitted between October 2004 and September 2015 using an insurance database covering 80% of population in Thailand. The age-adjusted sex differences in stroke mortality was assessed using restricted cubic spline regression model. The odds of women dying after ischaemic (IS) or haemorrhagic (ICH) stroke compared to men were assessed at 1 month, 12 months and 5 years. We then conducted a systematic review using the Ovid Embase, Ovid Medline and Web of Science databases. Only prospective observational studies of hospitalised stroke cases in adults >18 years; published in English, were included. Meta-analysis was carried out including current study results.

Results

Thirty-three studies met the inclusion criteria. Studies included were conducted from all world regions. The review included 6,310,419 hospitalised strokes. In a meta-analysis of age-adjusted systematic review data, women were associated with higher mortality within 1 month post-IS in comparison to men (OR 1.08 95% CI 1.05-1.12), however, they had lower mortality within 12 months and 5 years (OR 0.98 95% CI 0.91-1.06, OR 0.97 95% 0.90-1.05). Post-ICH, women were associated with higher mortality within 1 month and 12 months in comparison to men (OR 1.02 95% CI 1.01-1.03; OR 1.01 95% CI 0.98-1.04) however there was no difference in mortality between the two sexes at 5 years (OR 1.00 95% 0.99-1.02).

Conclusion

There appear to be sex differences in stroke mortality outcome regardless of stroke subtype and it depends on duration post-stroke. Whilst the reasons for this is unclear, further exploration is required to better understand this difference.

Supervisor: Professor Phyo K Myint

Achieving planned mode of delivery: a systematic review

Albana Krasniqi

Background

Historically, the majority of birth outcomes have been reported by actual rather than planned mode of birth. This is unhelpful as women cannot be guaranteed which mode of birth they will experience. Women planning to give birth for the first time require information on outcomes according to planned mode of birth to make informed decisions about their plans. This systematic review aimed to analyse published literature on birth outcomes by planned mode of delivery in a population of low risk nulliparas.

Methods

Databases searched were Embase, Medline, Cinahl, Cochrane library and Web of Science. Of 3539 citations screened, 12 cohort studies were eligible – dating from 2008. The settings of these studies were; the UK, Ireland, US, Norway, Australia and China. The total number of primiparas planning vaginal birth (VB) was 630,287, whilst planned birth outcomes for only 58 people planning caesarean section (CS) were found.

Results

The main results of this review were that of those planning for VB, 81% were successful in achieving this. 79% of those planning a CS achieved this. Success for overall VB was inclusive of complicated VB, and in the case of planned CS success, included emergency CS. Adverse neonatal and maternal outcomes for planned VB varied by outcome measured; Neonatal Intensive Care Unit (NICU) admission and birth injury rates for planned VB were greater than for planned CS; at 5.1% vs 3.6%, respectively. Rate of maternal thromboembolism was higher for planned CD (0.5%) than for planned VD (0.1%) whilst maternal haemorrhage was greater in the CD group – values being 1.6% for planned VD vs 3.8% for planned CD.

Conclusion

Whilst a high proportion of women achieve their planned mode of birth when aiming for vaginal delivery, the rate of NICU admission and birth injury for these women was higher than for those planning CS.

Supervisor: Dr Mairead Black

Detecting differentiation of fibroblast-like synoviocytes to a myofibroblast-like phenotype in a mouse antigen-induced arthritis model: a pilot study

Aminta Chansiriwongs

Background

Rheumatoid arthritis (RA) is an autoimmune, chronic inflammatory disease that frequently manifests as cartilage and bone destruction, synovitis, and synovial hyperplasia in major body joints. In vitro studies have shown that in RA, fibroblast-like synoviocytes (FLS) convert to a myofibroblast-like phenotype (MLP), cells key in precipitating fibrosis that contributes to joint stiffness and pain.

Using a mouse knee model, this pilot experiment aimed to establish whether induction of a MLP in FLS can be detected by immunohistochemistry (IHC), using α-smooth muscle actin (α-SMA) as the marker. Results of this experiment are to be applied in a study of transgenic mice that analyses if a knockout of yes-associated protein (YAP) in FLS can counteract MLP differentiation in response to antigen-induced arthritis (AIA).

Methods

α-SMA positive cells were detected by the avidin-biotin complex IHC staining method with HRP-DAB detection on paraffin-embedded AIA knee sections harvested from adult female mice. Contralateral knee sections were used as control. Variations in antigen retrieval method, mediated by heat or porcine pepsin, and primary antibody applied, manufacturer and concentration were tested to determine condition providing optimal staining.

Results

Heat-mediated antigen retrieval with citrate-based buffer (pH 6) and a 1:100 dilution (5 μg/ml) of anti-α-SMA (Novus Biologicals, NB300-978) produced the highest quality stain, indicated by minimal background staining and distinctively positive cells observed in both AIA and controlled knee sections. However, as smooth muscle cells that surround blood vessels also stain positive for α-SMA and are difficult to distinguish from myofibroblast-like cells, whether or not the staining is due to MLP cannot be reliably quantified.

Conclusion

This experiment suggests an optimal IHC staining condition that can be used in the YAP investigation, despite unquantifiable results. Yet, further optimisation or alternative procedures should be considered to provide a clear difference between myofibroblasts and smooth muscle surrounding the blood vessels.

Supervisors: Professor Cosimo De Bari, Dr Anke Roelofs

Gestational diabetes predicts low bone mineral density and hip fracture incidence in older age: EPIC-Norfolk population-based cohort study

Annes Ahmeidat

Background

Gestational diabetes mellitus (GDM) is amongst the commonest pregnancy complications and its long-term maternal effect has not been fully researched. This study aims to investigate the association between GDM and bone mineral density (BMD), fractures, and falls in later life.

Methods

Data from the European Prospective Investigation into Cancer (EPIC) in Norfolk was utilised in this study. BMD was measured at second health check (1997-2000) using both broadband ultrasound attenuation (BUA) and velocity of sound (VOS) in 7,515 women. Fractures and falls were documented from hospital admissions via data linkage with ENCORE (East Norfolk health authority database) until 2017. Confounding factors adjusted were physical activity, self-reported stroke, use of diuretics for >3 months, smoking, dietary vitamin D, calcium and vitamin D supplement, social class and education, statin use and cholesterol levels, hormone therapy and menopausal status. BMD data were analysed using univariate and multivariate linear regression. Cox regression was used to estimate the hazard ratios (HR) for fractures and falls.

Results

Linear regression analysis of VOS was statistically significant in both unadjusted and fully adjusted models ($p < 0.05$) with unstandardized beta coefficients (standard error): -9.95 (3.84) and -7.81 (3.61) respectively. Association between GDM and BUA measurements was not statistically significant. After stratifying by BMI into three categories (<23, 23-26, >26), the highest BMI group was statistically significant in both BUA and VOS measurements -4.37 (2.19) and -14.40 (5.10).

VOS measurements stratified by age (<65, ≥65) yielded statistically significant results in the <65 group: -10.96 (4.13). GDM is associated with more than 2-fold increase in hip fracture risk HR 2.20 (95%CI:1.32-3.67); total person years = 430,611 years and SD = 8.4. No association was observed with the incidence of falls hospitalisations HR 1.44 (0.95-2.20).

Conclusion

GDM increases risk of future hip fracture and is a risk factor for decreased BMD in obese women.

Supervisors: Professor Phyo K Myint, Dr Sohinee Bhattacharya

A systematic review on management of multizonal intraepithelial neoplasia of female lower genital tract

Bernadette Agboola

Background

Patients with intraepithelial neoplasia at two or more sites or zones of the lower genital tract and anus are considered to have multizonal disease, which are precursors to squamous cell cancers. In addition, HPV is associated with the development of multizonal intraepithelial neoplasia (MZIN). The management of MZIN is challenging because of its anatomical complexity and its true prevalence in the lower genital tract is unknown. This is further complicated by limited published literature on the topic; prompting an extensive systematic literature search.

The aim of this review is to summarise and present the published evidence for the management of MZIN.

Methods

An electronic search of the Ovid MEDLINE (from 1946 to present) was performed with the following parameters: humans, females, English articles, publication dating 2008-2018. Publications selections were based on keyword selections addressing (1) MZIN: intra epithelial neoplasia, dysplasia, high grade squamous intraepithelial lesion, vagina, vulva, peri-anal, cervix and anal and (2) management: diagnosis, treatment, follow-up, therapy, surgery, investigation, surveillance and radiotherapy. A developed checklist was used to assess the risk of bias.

Results

The database search identified 127 papers and hand-searching of books of abstract from recent conferences on lower genital tract pathology yielded an additional 2. 93 of the 129 articles screened were excluded based on titles and abstract. The full-text of the remaining 36 were assessed, of which 3 were systematic reviews. 25 did not meet the selection criteria of multizonal disease, females and management. Nine publications remained: 5 cohort studies, 2 case controls and 2 case reports; encompassing a total of 261,788 patients.

Conclusion

Although the prevalence of MZIN is increasingly recognised in clinical practice, very few literatures sources report its management. The selected papers are currently being reviewed for risk of bias and data synthesis.

Supervisors: Professor Maggie Cruickshank, Dr Gurumurthy Mahalakshmi

Efficacy of corticosteroids in twin pregnancies at risk of preterm birth: systematic review and meta-analysis

Catriona Young

Background

Respiratory distress syndrome (RDS) is the commonest neonatal morbidity associated with preterm birth and is more likely to occur among twins. Yet the efficacy of corticosteroids to accelerate lung maturity and prevent RDS is not yet established in multi-fetal pregnancies. The practice of administering corticosteroids for twins, the same as singletons, is based on the assumption that it has the same effect without any changes to dose, interval or gestational age. This systematic review tests this assumption by assessing antenatal corticosteroids among twin pregnancies, at risk of preterm delivery, on neonatal morbidities and mortality.

Method

Medline, PubMed, Embase and Cochrane library were searched using the following terms: (corticosteroids OR adrenal cortex hormones) AND (twin pregnancy OR multiple pregnancy) without restrictions. Their references were also searched. Studies were eligible if they compared: corticosteroid versus no corticosteroid, twin versus singleton and administration-birth interval of < 7 days versus > 7 days looking at neonatal morbidities, especially RDS. Data was entered into RevMan and meta-analysed.

Results

Of the 4995 papers identified, 24 studies were selected. We were able to access data from 70,427 neonates. Compared to no corticosteroids or placebo there was reduced incidence of RDS (pooled RR 0.85 95% CI 0.76 to 0.96) with corticosteroid administration from the observational studies. However, the pooled risk ratio from randomised controlled trials did not show any significant difference in the incidence of RDS (RR 0.96 95% CI 0.79 to 1.15).

Conclusion

Although observational data does show a marginal effect, there does not appear to be same effect seen in RCTs. Based on this systematic review and meta-analysis, there does not appear to be any beneficial effect of corticosteroid administration in preterm twins at the current therapy regime.

Supervisor: Dr Sohinee Bhattacharya

Rural Access to Out of Hours (OOH) Cancer Care in Grampian: Why does earlier diagnosis and treatment not equal better survival for patients living in rural areas?

Claire Amanda Adkin

Background

All patients throughout Grampian deserve equal care when diagnosed with cancer, irrespective of where they live. In 2017 it was reported that patients living in rural areas around Aberdeen were diagnosed and treated for cancer faster than urban-dwellers, but they are more likely to die within a year. This is paradoxical, suggesting that earlier diagnosis does not translate into better survival for those living over an hour from Aberdeen Royal Infirmary. We hypothesized that this was due to how patients access care during and immediately after their cancer treatment; and created a questionnaire to evaluate this in the OOH setting.

Methods

We performed secondary analysis of data from an interview study conducted with patients with active cancer who had required OOH primary care. We used the data to produce a behavioral model, including practical and environmental factors, and patient level determinants which might influence a patient's decision to access OOH care. We then used this model and four focused research questions to develop our questionnaire. The questionnaire will collect demographic data from participants, and will ask about barriers such as travel burden, transport infrastructure and previous experiences of OOH care.

Results

The questionnaire has been piloted around the academic GP team in Aberdeen, with positive feedback. We are in the process of writing the protocol to apply for funding, with the aim to publish the questionnaire and have it distributed around Grampian.

Conclusions

We hope to make this questionnaire available to all patients diagnosed with cancer in Grampian, and to gather data on opinions and expectations of OOH care. We expect that this preliminary data will lay the foundations for a larger study to investigate the rural cancer survival paradox and inform interventions to improve cancer survival in rural patients.

Supervisors: Dr Rosalind Adam, Dr Peter Murchie

Audit of Telemedicine Consultations and Clinician Perspectives in ARI Gastroenterology Out-Patient Services

Craig Fraser

Background

Evaluation of the ARI Gastroenterology Out-Patient Service in June 2017 revealed Telemedicine has a role to play in the provision of Gastroenterology services. The Gastroenterology Department now routinely offer Telemedicine consultations to IBD patients. However, it is unknown how many consultations could be conducted using Telemedicine and whether clinician perception of suitability for Telemedicine corresponds to current practice.

Methods

A cross-sectional survey was designed to evaluate clinician perceptions regarding suitability of telemedicine consultations, evaluate the demographics and determine the number of telemedicine consultations carried out within Gastroenterology Out-Patient Services in ARI. Clinicians were offered a questionnaire prior to clinic in the Gastroenterology Out-Patient Department in ARI between 1/8/18 and 28/8/18. Patients attending General Gastroenterology and sub-specialties including Liver, Coeliac and IBD were included. Other appointment types were excluded.

Results

Of the 168 clinics, 131 questionnaires were returned (79% response rate). From the 131 questionnaires returned, full data was available for 852 of 886 consultations and analysed using Excel Software. 297/852 (35%) of consultations were perceived to be amenable to telemedicine. IBD clinicians and IBD dieticians identified 119/233 (51%) and 24/24 (100%) of their patients were suitable for telemedicine respectively. The majority of patient consultations within Gastroenterology, Liver and mixed Gastroenterology/IBD clinics were deemed not suitable for a telemedicine consultation. Of all the consultations analysed, 42/886 (5%) were provided by telephone consultation and 26/886 (3%) were provided by video consultation.

Conclusions

The difference between clinician's recorded perceptions of suitability for telemedicine and current practice is striking with 35% deemed suitable but in reality, only 8% are telemedicine consultations. There are also differences between sub-specialty groups and individual clinician's perception of suitability. Further studies will evaluate the factors contributing to the gap between perception of telemedicine suitability and the reality.

Supervisors: Dr John Thomson

Is hospital admission for bronchiolitis in infancy associated with risk for childhood asthma admission? A whole population study

Edward Soulsby

Background

Previous studies associate a diagnosis of bronchiolitis in infancy with an increased risk of subsequent asthma. The aim of this whole population study is to establish the absolute risk of an asthma admission following a bronchiolitis admission in infancy and investigate the number of admissions, severity of bronchiolitis and respiratory syncytial virus (RSV) positivity.

Methods

An initial literature review was performed to establish previous research and current knowledge linking bronchiolitis in infancy with the development of asthma. Details of all admissions to Scottish hospitals for children aged <16 years were obtained between 1st January 2000 and 31st December 2013. Admissions with bronchiolitis in infants were linked to admissions coded with an asthma diagnosis after ages two or five years. The number of bronchiolitis admissions, admission with RSV or to high dependency/intensive care unit (HDU/ITU) were also checked against later asthma admissions.

Results

There were 3,220,131 individuals with ≥ 1 admissions including 25,808 infants with bronchiolitis. There were 14,734 individuals ≥2yrs admitted with asthma and 9,080 ≥5 years admitted with asthma. 2.4% of the infants admitted with bronchiolitis had an asthma admission after 2yrs and 0.7% with an asthma admission after 5years. For infants admitted with bronchiolitis the odds ratio for an asthma admission after age 2 was 0.7, and 0.48 after age 5 years. For bronchiolitis admissions requiring HDU/ICU only 2.9% had a subsequent asthma admission- none of these occurred after age 5.

Conclusion

This whole population study demonstrated no evidence that infants admitted with bronchiolitis have an increased risk for a later asthma admission, even among those with ITU/HDU admissions. The reduced risk for asthma admissions after an earlier bronchiolitis admission is unexpected and not consistent with previous studies.

Supervisor: Professor Steve Turner

Genetic modulation of the efficacy of B-vitamin intakes in pregnancy

Iliana Georganta

Background

B vitamins are important in pregnancy and there is a special recommendation for increased intake to reduce the risk of neural tube defects and the general health of the mother and baby. The study set out to determine the modulating effect of methylene tetrahydrofolate reductase (MTHFR C677T) genotype and BMI on the effect of intake (from diet and supplements) on B vitamin status in mothers and babies and on homocysteine concentration in the blood.

Method

Data on B vitamin intake from the diet and supplements, concentrations of folate, B12 and homocysteine in mothers at around 19th week of gestation, cord blood, and MTHFR C677T genotype, were analysed in 1427 pregnancies in Aberdeen Maternity Hospital, recruited between 2000-2006. Homocysteine concentration has recently been used as a measure of B vitamin adequacy. Data was analysed by multiple linear and logistic regression.

Results

Dietary folate was strongly positively correlated ($p < 0.001$) with folate and B12 serum levels in mothers and babies. Dietary vitamin B12 was linked to significantly higher levels of B12 serum in the mother and the baby; supplementation of B12 after conception was strongly correlated with maternal and fetal folate serum levels. As the findings suggested, the strongest predictors for blood homocysteine are dietary intakes of folate, vitamin B12 and BMI (negative correlation). Genotype for MTHFR C677T reflected an additive fashion, with homozygous commonly associated with higher levels of vitamins and lower levels of homocysteine in the blood.

Conclusion

MTHFR C677T genotype modified the effect of intake form diet and supplements of folate and B12 on blood vitamin and homocysteine concentrations in maternal and cord blood in pregnancy. Other factors such as BMI were also linked with higher B vitamin levels. Further research is needed on whether this genotype alters the dietary requirement of mothers for folate in particular.

Supervisor: Professor Paul Haggarty

Mechanisms of weight loss in Parkinson's disease: A systematic review

Katriona Hutchison

Background

Weight loss in Parkinson's disease (PD) is associated with poorer patient outcomes: higher rates of dependency, dementia and earlier death. Therefore, targeting weight loss early in PD may improve outcomes. However, current literature on mechanisms of weight loss in parkinsonism is not clear and needs to be elucidated to inform future research on nutritional interventions. This systematic review aims to describe research into mechanisms of weight loss in PD.

Methods

Electronic searches of MEDLINE and EMBASE found studies related to weight loss or nutrition in PD or parkinsonism. After initial title/abstract screening, relevant abstracts were examined by two independent reviewers to ensure reliability in the evaluation process. Full-text analysis of the studies identified was performed using a data extraction form.

Exclusion criteria include: studies not written in English, animal studies, prevalence studies, studies investigating specific treatments, and studies only comparing PD patients to healthy controls.

Results

The electronic search identified 7,347 articles, 70 of which met the inclusion criteria. It is widely accepted that weight loss in PD is due to decreased energy intake and/or increased energy expenditure. Possible contributing factors influencing these variables include: loss of appetite, dysphagia, rigidity and tremor, dyskinesia, levodopa, gastrointestinal changes, changes in olfaction, hormonal changes and depression/anxiety. Study quality was limited: only 18.2% of studies had both longitudinal design and moderate sample size (>50). Consequently, it is questionable whether we can draw any reliable conclusions from these studies or whether they are generalisable to the wider PD population.

Conclusion

The current literature has revealed several factors which may influence weight loss in PD. However, this systematic review has illustrated weaknesses in the literature and suggests that future research is needed using a longitudinal approach, adequate sample sizes, and representative patient groups to provide more conclusive results.

Supervisors: Dr Angus Macleod, Professor Phyo K Myint, Dr Carl Counsell

An audit investigating the referrals to a hospital based paediatric department

Kelvin Onyinah

Background

Aberdeen Dental Institute receives considerable paediatric referrals from within the Grampian and the surrounding areas. The audit was undertaken to assess the appropriateness of the paediatric referrals received by the hospital service against the proposed national referral criteria by Scottish Dental Needs assessment programme (SDNAP).

Methods

A retrospective design was used. All referrals to the paediatric clinic at Aberdeen Dental Hospital were examined between June 2017 and June 2018. Data analysed were: the age of patients referred, medical history, reason for referral, treatment required, referring clinician, outcome of the referral and the Scottish Index of Multiple Deprivation (SIMD). All data was analysed using SPSS.

Results

254 referrals were received during a 12-month period. 137 (53.9%) males were referred compared to 117 (46.1%) female patients and the mean age was 14.1 years. The most common reasons for referral were seeking opinion (47.6%) and anxiety/phobia (26.3%). The most common treatment provided was for the management of abnormalities of tooth morphology, number and structure (33%), and the management of early/active caries (32.2%). 172 (67.7%) referrals complied to the SDNAP criteria for referrals, which highlights that 82 (32.2%) referrals could have been dealt with in the primary or secondary care setting. The SIMD showed that more patients from a more affluent areas were referred to the hospital compared to those living in a more deprived area.

Conclusion

These results show that clear paediatric referral criteria are needed in order reduce the high number of inappropriate hospital referrals. This will ensure that the patients are seen by the appropriate clinician, reducing the need for unnecessary multiple visits.

Supervisors: Dr Ekta Gupta, Dr Malcom Stewart

The Oral Health Status of Patients with Peripheral Vascular Disease and Patients Undergoing Vascular Surgery: A Systematic Review

Mhairi McGowan and Sayed Almoosawy

Background

Current evidence indicates an association between periodontitis and peripheral vascular disease (PVD), which may be mediated by shared risk factors, bacteremia caused by periodontal bacteria and exacerbation of chronic inflammation. As the oral health status of PVD patients remains poorly understood, we conducted a systematic review of the literature to evaluate the current evidence in this area.

Methods

A systematic review of 5 electronic databases was conducted using Medical Subject Headings/Index and Emtree terms up to July 2018. Identified texts were screened for studies reporting on oral health status in adult PVD patients. The Newcastle-Ottawa scale was used to appraise the quality of the studies.

Results

Excluding duplicates, 4876 studies were identified. Following application of the inclusion/exclusion criteria, 21 studies remained eligible for inclusion. Although three studies found that PVD patients were significantly more likely to have periodontitis than controls, two studies found that gingivitis was more common in controls. Four studies reported that periodontal pocket probing depths were significantly deeper in PVD patients compared to controls (p<0.05), whilst two reported a statistically higher percentage of sites with clinical attachment loss over 4mm in patients(p<0.05). PVD patients had more missing teeth, less residual teeth and were more likely to be edentate than controls in 4 studies (p<0.05). No difference was found in the caries status of PVD patients and controls.

Conclusion

The periodontal health of PVD patients is suboptimal and there is an increased rate of missing teeth and edentulism in these patients. Due to the limitation of studies in this area, further investigations, are required to understand the possible correlation between poor oral health status, periodontal bacteria and PVD. Formal assessment and management of oral health issues may be of therapeutic benefit for the management of PVD.

Supervisors: Mr Paul Bachoo, Dr George Cherukara, Professor Rona Patey, Dr Karolyn Hijazi

Detection of Osteoarthritis using Fast Field Cycling Nuclear Magnetic Resonance

Nikhil Agarwal

Background

In early stages of osteoarthritis, concentration of proteoglycans decreases in articular cartilage. Previous in-vitro work using a novel MRI technique, Fast Field Cycling (FFCMRI), suggested that the signal produced in FFCMRI (quadrupolar peaks) was significantly different between normal and osteoarthritic cartilage. However further development work is required to use it in detection of early osteoarthritis.

Methods

The objective was to refine and test the in-vitro pulse sequence required for FFCMRI to differentiate the proteoglycan content between normal and osteoarthritic cartilage samples. 4mm diameter cartilage cores of 1mm thickness were available for analysis. Fresh samples harvested from human femoral heads were used to develop the new sequence. Further analysis was planned, using normal and osteoarthritic frozen samples stored from a previous study, which in future will be compared to histology and chemical content of the samples. All the measurements were performed at $37\pm0.1^{\circ}C$ using a SMARtracer relaxometer. The cores were placed in NMR tubes with fluorinert to avoid evaporation during FFCNMR analyses and a pulse sequence was tested.

Results

Considerable refinement of the sequence was required on a refurbished and improved NMR benchtop device. Multiple samples from normal femoral heads were tested and a new protocol fully developed and tested. Upon data collection from the relaxometer, dispersion graphs were created and analysed using MatLab software. Results from the data analysis have shown that quadrupolar peaks are taller in normal cartilage samples than in osteoarthritic samples. This further supports previous results and hypotheses obtained by the MRI team.

Conclusion

Since there is a distinct difference between the quadrupolar peaks of osteoarthritic cartilage and normal cartilage, we can conclude that FFCMRI can detect differences between normal and osteoarthritic articular cartilage which we believe is directly related to proteoglycan concentration. We now hope to develop in vivo testing on a whole body FFCMRI scanner developed in Aberdeen.

Supervisors: Mr George P Ashcroft, Mr Lionel Broche

Identification of Neuro-emboli in Knee Surgery (INKS)

Parivrudh Sharma

Background

During a standard total knee replacement (TKR), fat emboli are known to affect the brain and can cause subsequent neuro-degeneration. The objective of this study is to assess the frequency, timing and number of emboli to the middle cerebral arteries (MCA) in participants undergoing standard TKR. The main aims is to establish a baseline number of neuro-embolic events during standard TKR, and then in future studies, the results can be used for comparison between different techniques of knee replacements.

Methods

Patients will be identified during their pre-operative assessment. Before patients are anaesthetised, the operator will apply the transcranial doppler headpiece to the patient, ensuring that the probes are fixed in place and are identifying the MCA. The tracing of MCA blood flow will then be recorded until the final staples have been applied, tourniquet removed, and the participant is about to be moved off the operating table. After twenty recordings are achieved, they will be analysed to look for the number of patients which have usable traces, the number of patients which have neuro-embolic events, the total number of neuro-embolic events in each patient, and to identify whether or not there is a peri-operative pattern for these events.

Progress to date

A literature review revealed that there are no studies comparing peri-operative neuro-embolic events with different types of knee surgeries. Final version of this study's protocol has been established and currently appropriate ethical permission is awaited, with plans to continue the study over the academic year.

Expected outcome

We expect that during certain parts of a TKR there will be more neuro-emboli detected. We will consolidate previous research which suggests that emboli occur after bone marrow disturbance during the procedure, and that this is more pronounced if a tourniquet is used.

Supervisors: Dr Mary Macleod, Mr GP Ashcroft

Telemedicine: How do Grampian Gastroenterology outpatients want to be seen?

Philip Cannon

Background

NHS Scotland has significantly invested in Attend Anywhere as a means of carrying out video-call based outpatient consultations, a form of telemedicine. In 2017 the Gastroenterology department in Aberdeen Royal Infirmary piloted Attend Anywhere as a means of enabling telemedicine outpatient consultations but not before a questionnaire-based study was done to capture patient perceptions. In 2018, they are the biggest adaptors of Attend Anywhere nationally and so, another questionnaire was created to determine if there were any subsequent changes in patients' perceptions.

Methods

A questionnaire was created to determine both patient perspectives towards telemedicine and any factors which were felt that could have influenced patient perspectives. The questionnaire was distributed over 4 weeks (31/7/18- 27/8/18) by the reception staff of the Gastroenterology outpatient department to every patient that attended during this timeframe.

Results

741 questionnaires were completed from the 807 distributed questionnaires (92%). The majority (74%) travelled by car with an average round trip of 39 miles, the patients estimated the direct costs to attend clinic at an average of £11, 32% had to take leave to attend and 86% found the clinic accessible. Patients indicated they preferred face to face consultations (89%) in 2018 with 23% also stating that they found video-call based consultations acceptable, increasing from 7% in 2017. Equipment based concerns (29%) were identified as the greatest obstacle to video-consultation.

Conclusion

Despite significant travel and perceived inconvenience most patients indicated they prefer face to face consultations in 2018 but with increasing perception that telemedicine would be a suitable alternative. With better definition of patients' concerns, these can now be addressed to increase the acceptability of video-calls as a consultation option. Further research will ascertain how this can be achieved.

Supervisor: Dr John Thomson

Dietary vitamin B6 and folate intake predict higher bone mineral density in women but not in men: EPIC-Norfolk prospective cohort study

Phui Yuen Wong

Background

Limited research with contradicting results has shown associations between vitamins B2, B6, B12, folates and bone mineral density. These associations may also be related to methylenetetrahydrofolate reductase (MTHFR) polymorphism. This study aims to investigate the relationship between dietary B vitamins and bone mineral density (BMD), accounting for MTHFR polymorphism in the general population.

Methods

5791 men and 7091 women, aged 40-79 years at study baseline (1993-1997), from the Norfolk arm of the European Prospective Investigation of Cancer (EPIC-Norfolk) were included. Nutritional data was derived from 7-day food diaries. BMD was measured using calcaneal ultrasound (broadband ultrasound attenuation (BUA) and velocity of sound (VOS)). We investigated the relationship between energy adjusted dietary B vitamins and calcaneal ultrasound measurements by linear regression, adjusting for confounders (age, body mass index, physical activity, education, social class, Townsend area deprivation index, smoking, alcohol, dietary nutrients, supplements, steroids, hormone, menopausal status, comorbidities), and after considering MTHFR polymorphism once missing MTHFR data (303 men; 759 women) is excluded. For the latter, B vitamins were analysed as both continuous variables and quintiles.

Results

Lower dietary vitamin B12 intake significantly predicted VOS in men (β = -0.029, P = 0.032 after adjustments). In the subset of TT homozygotic men, we observed a significant and inverse relationship between VOS and vitamin B2, B6, and folate respectively after adjustments. In women, vitamin B6 (β = 0.022, P = 0.045) and folate (β = 0.022, P = 0.042) were positively associated with BUA in the adjusted model. However, for TT homozygotic women, negative relationships were observed for adjusted models of BUA with vitamin B2 (β= -0.081, P= 0.025) and vitamin B12 (β = -0.065, P = 0.022).

Conclusion

There is potential in vitamin B6 and folate rich diet for improving BMD in women. However, further research is required for confirmation.

Supervisors: Mr Samuel R Neal, Professor Phyo K Myint

An Audit of Cerebrovascular Services Across GP Practices in NHS Grampian

Rafsan Chowdhury

Background

Cerebrovascular conditions such as Stroke, Transient Ischaemic Attacks, Retinal Artery Occlusion and Transient Monocular Blindness are serious as they may recur causing permanent neurological damage, impacting quality of life. Early referral can reduce risk of recurrence within 90 days from 10% to 2%. However, the huge demand and perceived low threshold for referral cause services to struggle. The aim of this study was to examine referral patterns from local GP practices to a large Stroke/TIA clinic in Grampian.

Methods

Anonymised clinic data from 7808 NHS Grampian patients referred with suspected cerebrovascular events between 2010-2017 was retrospectively reviewed and time to reviewal was analysed. The distance of GP practices from Aberdeen Royal Infirmary was calculated. Patients from GP practices further than 50 miles from ARI were excluded to represent the ARI catchment area. The 2016 QOF report was used to evaluate practice prevalence of stroke/TIA.

Results

3695(47.3%) patients had confirmed cerebrovascular diagnosis. 4113(52.7%) patients were diagnosed as non-cerebrovascular/unknown. 65 practices were included.

Conclusion

No relationship is found between the average time between referral and reviewal and GP practice distance from ARI, which illustrates that there is equity of service to both rural and urban patients. Additionally, average time between referral and reviewal is lower in patients with cerebrovascular diagnoses. There is also huge variability between GP practices in the percentage of the GP practice population with a confirmed cerebrovascular diagnosis. A weak correlation exists between the percentage of practice patient population clinically reviewed and practice prevalence, suggesting some practices may refer more non-cerebrovascular patients than cerebrovascular patients when making a cerebrovascular diagnosis. This confirms that there is a low threshold for referring patients to clinic and that it is necessary to improve accuracy of referrals given the need for urgent review of definite TIA/stroke patients.

Genetic Referrals: Characterising Young Onset Colorectal Cancer

Sarah Perrott

Background

Colorectal cancer (CRC) in the under 55s constitutes approximately 10% of cases. These patients represent a high-risk subgroup with a poorer prognosis, often associated with underlying genetic factors. Less than 5% are associated with high penetrance inherited cancer syndromes, with another 20-30% of cases being caused by low-penetrance single gene alterations. Due to the early onset of these inherited forms of CRC, it is imperative to characterise the genetic results of young CRC patients to allow for targeted therapy and family prevention.

The aim of this study was to audit referrals to genetics services in under 55s based on SIGN guidelines and to evaluate the survival of young onset CRC.

Methods

A retrospective audit was conducted for patients diagnosed between 2010-2015 in the North East of Scotland. Relevant data was obtained from patient notes and crosschecked with genetic database INVU. SIGN 2003 guidelines were used to categorise patients requiring genetic referral. Analysis was performed using SPSS to produce descriptive statistics, markers predictive for referral and Kaplan Meier survival estimates. The statistical significance of the observed differences in survival was tested using the log-rank test.

Results

199 patients (age range 25-54 years) were analysed, 13% had a positive first-degree family history of CRC. 63 patients (59%) requiring referral were referred to genetics services. A total of 9 patients (15%) were identified to have a high penetrance cancer syndrome. The one, five and overall survival was 90%, 56% and 42%, slightly lower than the overall 5 year reported survival of CRC of 59%.

Conclusion

Feedback to staff regarding genetics referral criteria could improve awareness and consequently the suboptimal referral rate. This study also suggests that survival in the young may be worse than those with later onset CRC.

Supervisors: Dr Kirsten Laws, Dr Leslie Samuel

A systematic review of approaches to management pathways for Fibromyalgia, Irritable Bowel Syndrome and Chronic Fatigue Syndrome

Sean Jackson

Background

Fibromyalgia, Irritable Bowel Syndrome (IBS) and Chronic Fatigue Syndrome (CFS) are three common examples of functional syndromes that often slip through the cracks of the medical system. Lack of clear guidance for such patients can lead to a 'revolving door' where patients visit secondary care specialists only to be sent back to primary care. This systematic review aims to identify current clinical pathways being adopted for these patients.

Methods

Using predefined inclusion and exclusion criteria, MEDLINE/PubMed was systematically searched. Keywords used to initiate the search included: fibromyalgia, chronic fatigue syndrome, irritable bowel syndrome, clinical pathway, primary healthcare and secondary healthcare. The search yielded 868 results and 21 studies were used for the final review.

Results

Approximately 36% of studies were specific to fibromyalgia, 14% to IBS and 14% to CFS, with a third of studies outlining strategies for non-specific somatic symptoms. 4 case studies described fully established UK-based clinics in operation. While 5 studies outlined clinical pathways for both IBS and fibromyalgia, no such studies were found for CFS. Important themes identified amongst the data was a call for an inclusive primary care diagnosis and multidisciplinary management strategy, including 5 interventional studies reporting positive improvements from an interdisciplinary approach in outcomes such as quality of life and reduced healthcare cost.

Conclusion

Findings of this review shine light on two factors in particular. Firstly, the use of an individualised syndrome-specific diagnostic algorithm based on up-to-date evidence would allow for timely positive diagnoses of fibromyalgia, IBS and CFS to be made within primary care and reduce referral rates, unnecessary investigations and healthcare costs. Secondly, an interdisciplinary centre, akin to the pain clinic model, where the complex biopsychosocial needs of patients can be individually met could provide an avenue for patients to follow and lead to improvements in continuity of care.

Supervisor: Mr George Ramsay

Do waiting times for surgery have an impact on breast cancer tumour sizes?

Suzanne Robat

Background

Breast cancer is an ever-growing health issue and places continuous burdens on Breast Units as needs for their services increases. As the number of patients requiring surgery for breast cancer increases, waiting times could potentially be extended further. Currently the National Health Service use a 31 day interval from decision to treat to surgery, however this does not take into account the time from detection of cancer to decision to treat. This study evaluated whether tumours grew during waiting times for surgery.

Methods

62 patients with unifocal breast cancer who underwent wire guided wide local excision of their breast cancer were identified at Aberdeen Royal Infirmary (ARI) in 2017. Tumour diameters were measured by two independent radiologists in mammograms taken at initial detection and in mammograms on the day of surgery. Tumour volumes were calculated as well as the difference between tumour volume at surgery and on detection.

Results

The two radiologists had an Intraclass Correlation Coefficient of 0.812, showing that their measurements were in good agreement. Waiting times averaged 70 days. Paired t-test showed there was no significant difference ($p = 0.76$) between tumour volumes on mammograms taken at initial detection and on mammograms take on the day of surgery. Waiting times from initial detection to surgery did not affect tumour volume significantly either ($p = 0.92$).

Conclusions

Although patients may wait more than two months for surgery, there was no significant increase in tumour size. This indicates that the Breast Unit in ARI are treating cancer before it has grown enough that more radical surgery is required. Although tumour growth was not significant during waiting times, further research could be done to evaluate survival rates of this cohort of patients to see whether waiting times and tumour growth affected their survival.

Supervisor: Mr Yazan Massanat

The association between trigeminal neuralgia and multiple sclerosis - a review

Vlad-Costin Iliescu

Background

Trigeminal neuralgia (TN) is a chronic pain disorder with a severe and sudden onset, usually unilateral, lasting for a short time, around the territory of distribution of one or more branches of the trigeminal nerve. Multiple sclerosis (MS) is a chronic degenerative disease and the consequent demyelinating condition affects mainly the central nervous system. Several studies have reported the association between MS and TN.

Methods

To look into the reported literature about the aforementioned association, a review was conducted utilizing the electronic databases: Pubmed, Primo and Scopus. Key words utilized were: "trigeminal neuralgia, tic doloreux, facial neuralgia, multiple sclerosis". To explore the possibility of common neuronal abnormalities between TN and MS, CT scans of two patients with MS and TN admitted at Department of Neurosurgery in Aberdeen were assessed.

Results

The review of 36 papers showed that 93% of the patients with TN and MS suffered from sudden attacks of facial pain described as intense, stabbing or electrical-shock like and 37% of the cases have experienced recurrence after a few weeks, mostly following the pharmacological treatment. Reported data showed that cases of right and left trigeminal neuralgia were equally common. Three patients presenting with bilateral TN have also developed MS. Several studies proposed that the onset of TN in early years is a symptom of MS.

The scans of the two patients showed neither space occupying lesion through the course of the trigeminal nerve or nuclei nor any acute/subacute ischemic change. However, in one of the patients the trigeminal nerve was not clearly delineated in the pre-pontine region which corresponds with previous studies in MS patients.

Conclusion

Although there is an established association between MS and TN, the exact mechanism and the causal nature of this relationship are not fully understood. Further research is needed to dissect the link between these two conditions.

Supervisors: Professor Jaya Jayasinghe

Impact of Diabetes on Complications, Mortality and Recurrence in 608,890 Hospitalised Patients with Stroke

Weronika Szlachetka

Background

Diabetes mellitus (DM) is a well-established risk factor for stroke. However, research on the association between DM and stroke outcomes is currently unknown. We aimed to examine the influence of insulin-dependent (IDDM) and non-insulin dependent DM (NIDDM) on outcomes after ischaemic and haemorrhagic strokes.

Methods

For the in-hospital outcomes, we extracted 608,890 stroke patients consecutively hospitalised between 2004-2015 from the Thailand Universal Coverage Insurance Scheme covering 80% of the population. Binominal logistic regressions were used to examine in-patient complications and short-term mortality for patients with both types of DM stratified by stroke sub-type.

For long-term outcomes analysis, we included 398,663 individuals (total person years of follow up for: mortality = 1,243,044; recurrence = 1,160,550), after excluding those with undetermined stroke, those who died during first stroke admission, had in-hospital recurrent stroke or history of previous stroke. Flexible parametric survival regression models (Royston-Parmar) were used.

Results

The mean age (SD) was 64.3 (13.7) years (prevalent diabetes 17.1% with 411 (0.1%) patients who had IDDM), 44.9% women. IDDM was associated with higher long-term death HR(99%CI) 1.89 (1.54,2.31) and 1.84(1.21,2.80), for ischaemic and haemorrhagic strokes, respectively. For both stroke types, NIDDM was positively associated with increased long-term mortality and recurrence (p-values < 0.01).

The odds (and 99%CI) of pneumonia, sepsis, acute kidney injury and cardiovascular events were significantly higher in NIDDM group (ORs ranging from 1.11-1.78) compared to patients without DM after both stroke subtypes. No significant associations with complications were observed for IDDM.

Conclusion

Our results highlight the importance of adapting specific strategies to meet the needs of patients with DM in order to prevent recurrent strokes and reduce long-term mortality and development of in-hospital complications. This study also provides front-line clinicians with prognostic information that can be used in daily clinical practice.

Supervisors: Mr Tiberiu Pana, Professor Phyo K Myint

Hypertensive disorders of pregnancy and the risk of common cancers; Evidence from the EPIC-Norfolk prospective population-based study

Zahra Pasdar

Background

Hypertensive disorders of pregnancy are a leading cause of maternal morbidity and mortality globally and there is also emerging evidence of its association with cardiovascular disease in later life. However, its association with cancer has shown conflicting evidence to date. We therefore aimed to determine the above association on four most common cancers in women in a UK population-based longitudinal study.

Method

Data were drawn from the EPIC-Norfolk cohort. Participants completed questionnaires and attended baseline assessments between 1993-1997. Information regarding participant's health and lifestyle factors were gathered and participants reported whether or not they ever had hypertension during pregnancy (HDP). Incident cancer cases were identified through NHS record linkage until March 2016. Univariate and multivariate logistic regression analyses were employed to determine the association between HDP and the odds of cancer. The multivariate regression models adjusted for sociodemographic, lifestyle and reproductive factors as well as prevalent illnesses to account for potential confounders.

Results

In total, 15,625 female participants were included after excluding 1,115 with prevalent cancer. Of them, 2952 (18.9%) reported HDP during mean follow up of ~19 years. Mean age (SD) for incident cancer was 60.5 (±9.04), from which 325 (19.9%) had HDP and 1312 (80.1%) had no HDP. In multivariate analyses, HDP had an odds ratio of 1.10; 95% CI 0.96-1.26 for incident cancer and the corresponding ORs (95% CIs) for site specific cancers were 1.08 (0.89-1.30), 1.20 (0.95-1.51), 0.91 (0.64-1.30) and 1.33 (0.95-1.88), for breast, colorectal, lung and ovarian respectively.

Conclusion

Whilst our study found no association between HDP and future cancer risk, further studies are required to take into consideration any underlying genetic factors involved in pregnancy related exposures and cancer risk. A greater insight into the complex hormonal mechanisms involved in these conditions may also help better understand the implications of these disorders.

Supervisors: Dr David T Gamble, Dr Sohinee Bhattacharya, Professor Phyo K Myint

HOTSTART

The Development Trust Funds
Innes Will Endowment Scholarships
Flora Gow Murray Endowment Scholarship
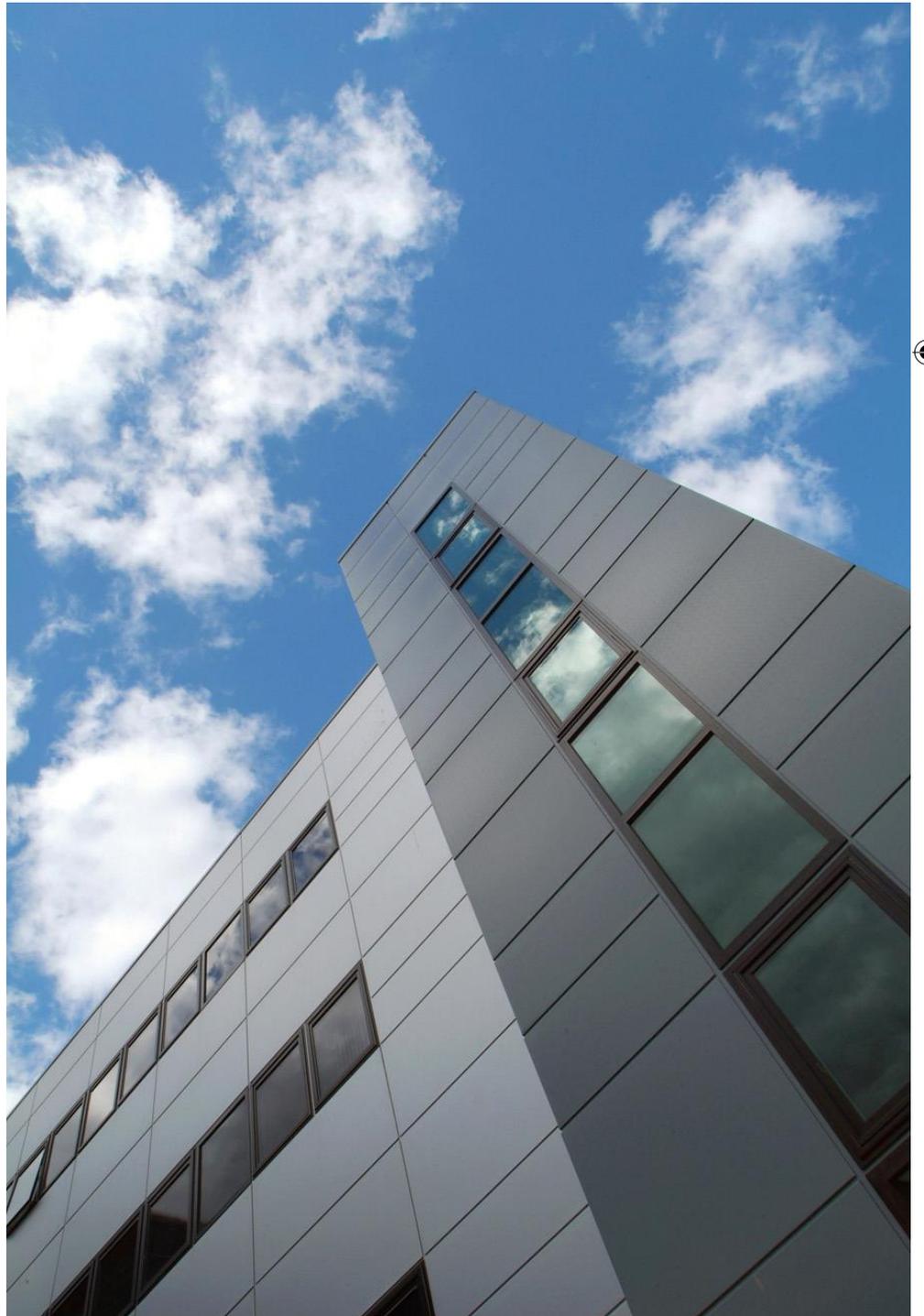
——

Exploring the feasibility of integrating Walk With Ease (WWE) - a community-based walking programme for adults with arthritis and musculoskeletal (MSK) conditions - into an existing UK setting

Alexandra Hunter

Background

The Arthritis Foundation's evidence-based WWE is a 6-week community walking programme specifically for people with arthritis and MSK conditions. Approximately a third of the Scottish population live with arthritis, and with low intensity physical activity (e.g. walking) proven to limit pain and prevent disability within this patient group, there is a need for greater opportunities to manage the condition in the community.

Methods

Representatives from community organisations (n=104) were recruited from a web search of health and well-being organisations based on the location of large cities. An online questionnaire to explore what PA programmes current UK health and wellbeing organisations offer and their perceptions on walking programmes and WWE were piloted and conducted using SNAP survey software. Data was analysed as frequency and percentages; free text was explored for emerging themes contextually reflecting respondent voices.

Results

Twenty-six organisations representing 25 different UK local authorities completed the survey. Of these, 76% currently offer walking programmes and most (68%) reported to already cater for population groups with arthritis and MSK conditions via route or pace alterations and/or increased support. Of those not offering walking programmes (24%), reasons included issues with staffing, location and lack of demand. Identified needs for walking programmes included greater training/education, marketing, funding and development of exercise referral schemes. The concept of WWE was positively received (86%), with these groups willing to either adapt their walks or offer a walking programme specifically designed for those with arthritis/MSK conditions. Concerns were raised around sustainability and staff capacity.

Conclusion

WWE was positively received by most groups, suggesting the demand for an evidence-based programme for this patient group. By addressing identified barriers and concerns, it appears WWE could be integrated in support of the current strategy to reduce NHS pressures via social prescribing schemes, by driving arthritis/MSK care into the community.

Supervisor: Dr Kathryn Martin

The Association Between Fatigue Measured By SF-36 Vitality and Stroke Risk In EPIC-Norfolk Cohort

Genevieve Marsh-Feiley

Background

Several studies have highlighted the importance of non-traditional risk factors for stroke including depression and metabolic syndrome. However, the role of fatigue is unclear. Fatigue is a common symptom experienced by patients following a stroke, but it is also prevalent among general population. There are several mechanisms through which it may mediate stroke risk, including acting as an indicator of underlying pathophysiological processes. The aim of this study was to examine the association between fatigue and stroke.

Methods

The sample population was drawn from the EPIC-Norfolk cohort. This study population consisted of 18,101 men and women aged 40-79 years. Fatigue was assessed at baseline (1993-97) and followed until September 2017 using the SF-36 Vitality questionnaire. Cox proportional hazard models were used to describe the relationship between baseline fatigue and incident stroke. The final model adjusted for: age, sex, systolic blood pressure, cholesterol, diabetes mellitus, body mass index (BMI) lifestyle habits and socioeconomic status.

Results

Through 249,248 person years of follow up 1509 strokes occurred. Participants in the most fatigued quartile were more likely to be women, more likely to be multimorbid and to perceive their health as fair or poor according to the SF-36. Following adjustment for confounders, the hazard ratio (HR) for stroke in the most fatigued quartile was 1.49 (95% CI 1.29-1.71) compared to the least fatigued quartile. When analysis was confined to ischaemic stroke the effect size increased to 1.59 (95% CI 1.35-1.86). This finding was not attenuated by analysis stratified by the potential mediators anaemia, chronic bronchitis and depression.

Conclusion

Fatigue is significantly associated with incident stroke at the general population level and therefore may be useful in the assessment of stroke risk. Further research is required to elucidate the mechanisms behind this relationship and to identify appropriate strategies for ameliorating this risk.

Supervisor: Mr Samuel R Neal, Professor Phyo K Myint

Mental Health Stigma in Scottish Print Media from 2002 to 2012

Hwan Heo

Background

Previous studies have reported on the effects of social stigma on patients with mental illness and the role of media reports on normalising and reflecting social attitudes towards mental illness. The aim of this study was to examine changes in social stigma surrounding mental illness reflected in Scottish print media between 2002 and 2012 and whether changes are related to the forensic content of the article.

Methods

Newspaper articles, containing mental health related terms, published between 2002 and 2012 were obtained through the Lexis-Nexis library and sorted as forensic or non-forensic depending on the focus of the article. The articles were then further sub-categorised as stigmatizing, anti-stigmatizing or neutral depending on the tone and content of the articles. Duplicates and unrelated articles were excluded.

Results

1730 articles were obtained in total. The number of articles printed annually was similar with a trend towards a neutral tone overall. However, forensic articles were more likely to be stigmatizing than non-forensic articles (55.6% vs 1.7%, p<0.001). Forensic articles were also less likely to be anti-stigmatizing compared to non-forensic articles (1.0% vs 12.9%, p<0.001).

Conclusion

Articles on mental health topics tended to become more neutral over time. This was not observed for forensic articles which tended to be more stigmatising. This may be an area for future stigma work.

Supervisor: Dr Daniel Bennett

Pre-operative urodynamics for management of urinary incontinence in women: A linked systematic review and meta-analysis

Kar Yee Lor

Background

Urinary incontinence (UI) is a common and distressing condition that has a negative impact on a woman's physical and psychosocial wellbeing. Stress Urinary Incontinence (SUI) affects 35% of women, while Overactive Bladder (OAB) comes second in UI prevalence, affecting 21% of women. Conservative treatment (including pharmacological treatment) is first line in managing UI, followed by surgical treatment. Urodynamics is an invasive test used clinically to evaluate the neuromuscular function of the urinary tract. However, there is a lack of evidence showing improved patients' outcomes following treatment based on urodynamics compared to clinical evaluation alone. The aim of this linked systematic review is to assess the clinical and cost-effectiveness of urodynamics versus clinical evaluation only in treatment outcomes for women with SUI and OAB.

Methods

Three separate literature searches were performed using Medline, Embase, Google-Scholar and Cochrane-Library databases. We included randomised controlled trials (RCTs) comparing urodynamics versus clinical evaluation alone before conservative and surgical management for SUI and OAB. Primary outcomes were patient-reported and objective success and secondary outcomes included adverse events, quality of life, sexual function and health economic measures. Authors of included studies were contacted for missing data. Analyses were performed using REVMAN software.

Results

Four RCTs were identified for conservative management of UI. There was no significant difference in the patient-reported and objective success (P=0.520, RR:1.09,95%CI,0.83-1.44; P=0.470, RR:1.15;95%CI,0.78-1.70 respectively) between two arms. Seven RCTs were included in the surgical management of SUI with no significant difference in patient-reported success (P=0.870, RR:1.00,95%CI,0.94-1.06) and objective cure (P=0.530, RR:1.02, RR:1.02,95%CI,0.97-1.07) between two arms. No RCTs were identified for surgical management of OAB.

Conclusion

There is no evidence that urodynamics before conservative or surgical management of SUI improve outcomes compared to clinical evaluation alone. No evidence was found regarding urodynamics effect on surgical management of OAB. More high-quality RCTs are needed to reach a firm conclusion.

Supervisors: Dr Alyaa Mostafa, Professor Mohamed Abdel-Fattah

Effectiveness and safety of the current dosage guidelines for Posaconazole in paediatric patients: review

Rekha Gurung

Background

Posaconazole (PSZ) is a broad-spectrum triazole antifungal agent commonly used in clinical practice for the prevention and treatment of invasive fungal infections (IFI). There is limited paediatric specific data on current dose guidance for the use of triazole antifungals to treat such infections. Our aim is to summarise the findings of these studies and assess whether the available pharmacokinetic and TDM data supports the current dosing recommendations in children, and also look at attainment of target concentrations.

Methods

Studies were identified using keyword searches of Medline and Embase databases (2000-2018) and results reviewed by two independent investigators. Trough plasma concentration (deemed adequate for prophylaxis and treatment) were derived from TDM (EFISG) guidelines. The following information was collected from: date and country when the study was carried out, study population and diagnosis, dosing regime and cut off serum levels and the assay used for measurements. Clinical outcomes were categorised as adequate exposure of drug in the plasma and any adverse effect noted.

Results

12 articles were selected for inclusion, providing data on 447 study participants globally. The most common dosing regimens that we encountered were 12mg/kg and 4mg/kg TID. Most of the studies used PSZ in a suspension form rather than as a tablet. Given the wide range of dosing regimen, variable trough concentration was noted when using a standardised PSZ dose based on body weight or body surface area which conforms to the previous literatures. For all these studies, no invasive fungal infections or adverse events were encountered during treatment and if side effect occurred, they were of low grade.

Conclusion

Given the variable factors that play in PSZ efficacy, and the lack of studies investigating this, it is difficult to ascertain the most effective PSZ regime from the review of the current literature however it is a well-tolerated drug in paediatric population.

Supervisor: Professor Adilia Warris

A Digital Teaching Aid in Clinical Skills Training in Dentistry

Owens Iguodala

Background

The conventional assessment of students' restorative tooth preparation skills relies on visual inspection. Despite the teacher's experience, research confirm considerable uncertainty due to the errors of visual perception. Therefore, the feedback the student received is inconsistent between teachers. Digital technology-based systems, claim objective evaluation of tooth preparations either by comparing it to the original state or to a standard model.

The aim of this study was to evaluate the effectiveness of digital tooth preparation analysis system on students' competence achievement.

Methods

Full crown preparations on plastic teeth performed in the dental simulation teaching laboratory by Year 3 BDS students in 2014, 2015 and 2016 were analysed using the digital tool in this study. The 2016 cohort of students (n=19) were taught using the digital tooth preparation analysis system while the previous two years cohorts (n=38) were taught using conventional visual assessment only. The two-sample t-test and Mann-Whiteney U tests were used to compare the quality of tooth preparations achieved by the two groups of students.

Results

The various measurement parameters of preparation provided by the digital system were reproducible and comparable to those reported in the dental literature. Although some aspects of the preparations were superior in the 2016 cohort, who were taught using the digital system, compared to their senior cohorts, these were not statistically significant ($p > 0.05$).

Conclusion

The results confirm that the digital system can reliably assess tooth preparation for teaching purpose. As students were only given a print-out (2D) of the analysis report, instead of access to the systems 3D manipulation capability, the systems potential to help students achieve competence could not be assessed. A Type 2 error is also suspected.

Supervisor: Dr George Cherukara

The role of *Staphylococcus aureus* in the oral cavity

Shirleen Hallang

Background

Staphylococcus aureus is an oral commensal microbe that may be a source of serious cross-infection to other body sites and reservoir of multidrug resistance. This review aims to update readers of the findings from the past 17 years, with emphasis on *S. aureus* colonisation of oral cavities of different populations including healthy individuals and those medically compromised.

Methods

Using PubMed, Web of Science, OVID Medline and Embase databases an updated literature review was carried out. Keywords used for search included "*Staphylococcus*", "oral" and "mouth". Articles were then screened by abstracts and full text. The inclusion criteria required articles to be published in English between February 2001 and September 2018, specify the location of oral cavity samples obtained and refer to *S. aureus* subspecies.

Results

After duplicate exclusion, 587 papers were identified. From 168 full text screenings, 102 articles were included. A wide variety of population groups were reviewed showing isolation rates of *S. aureus* in the oral cavity ranging from <1% to 84% and <1% to 78% for methicillin-resistant *S. aureus* (MRSA). The changes in oral microbiota of individuals with altered immune systems including during pregnancy, childhood, elderly and those who are immunocompromised due to infectious diseases, cancer therapy or recipients of transplants have been discussed. Studies looking at *S. aureus* in orofacial conditions such as cleft lip and palate and masticatory disorders have also been reviewed.

Conclusion

The review shows that even more is now known about the prevalence and role of *S. aureus* in different populations. Despite increasing antimicrobial resistance, the role of oral MRSA in infections is poorly understood. The findings identified the need for further studies regarding the relationship between oral MRSA and hospital-acquired infections.

An Evoked Response Potential during facial action-perception match and mismatch reveals correlations with measures of empathy

Giovanni Manfredi

Background

Understanding the neuronal mechanisms behind empathy and imitation can improve our knowledge and the diagnostic criteria of people with autism spectrum disorder (ASD). Previous studies showed that facial imitation accuracy correlates with activity in the anterior cingulate cortex (ACC), the brain area that might be responsible for monitoring ability and for social-motor tasks. This study aims to examine the association between social traits and brain areas involved in social-motor tasks such as sensorimotor regions using an EEG cap to record brain activity during an imitation task.

Methods

Brain activity was measured with electroencephalogram (EEG) recording. Data was collected from 10 electrodes, the impedance was reduced to approximately 10 kΩ and no more than 20 kΩ. Participants completed three questionnaires: empathy quotient (EQ), action and feeling questionnaire (AFQ) and the Broader Autism Phenotype Questionnaire (BAPQ). Participants were performing facial expression based on instruction while facial stimuli appearing on the screen, instruction could match or mismatch the stimuli on the screen. Participants were asked to perform four expressions: smile, kiss, tongue protrusion and pursed lips.

Results

The EEG data showed a first peak of activity in matches at 500-600ms, which was followed by a delay of mismatches. Causing the difference between the two stimuli to be maximal at about 880 ms. Data suggests a different brain activity in matches and mismatches, with the highest statistical difference in the electrode Cz (central) and Pz (parietal lobe). The association between self-reported social traits and evoked potential is statistically different only during matched conditions.

Conclusion

Data suggests a different brain activity in matches and mismatches, with the highest statistical difference in the frontal and parietal lobes (electrodes Cz and Pz). The data is consistent with the hypothesis that sensorimotor cortex is responsible for social motor tasks.

The association between self-reported social traits and evoked potential is statistically different only during matched conditions. This study may represent a promising tool to evaluate brain activity related to empathy and imitation. Further studies should focus on improving the accuracy of the EEG cap.

Supervisor: Dr Justin Williams

Baseline anticholinergic burden from medications predicts poor health-related quality of life in the men and women of EPIC-Norfolk prospective population-based cohort study

Kaisa Yrjana

Background

Previous studies investigating the association between anticholinergic burden (ACB) and health-related quality of life (HRQoL) showed conflicting results and focused on older age and specific patient groups only. The aim of this study was to examine the association between ACB from medications and HRQoL in a UK population-based study European Prospective Investigation into Cancer (EPIC)-Norfolk.

Methods

The sample was drawn from EPIC-Norfolk cohort. Baseline assessments were carried out during 1993-97 and participants attended several health checks. Participants were divided into three groups according to their ACB from medications at baseline: categories 1, 2 and 3 representing ACB score of 0, 1 and ≥2. Outcomes of interest were the physical and mental component summary scores (PCS and MCS) of the Short Form-36, collected at baseline and again at 3HC (2004-2011). After exclusion, linear regression and logistic regression for cross-sectional and longitudinal association were constructed. Regression models adjusted for potential confounders including sociodemographic and lifestyle factors and prevalent illnesses.

Results

A total of 16 675 participants, mean age 58.9±9.1 (55.6% female) and 7133 participants, mean age at baseline 55.8±8.0 (56.8% female), were included in the cross-sectional and longitudinal analysis, respectively. In cross-sectional analysis baseline ACB=1 and ACB ≥ 2 were significantly likely to be in bottom quartiles of PCS and MCS: OR1.85 (1.64, 2.09) and 2.19 (1.85, 2.58) respectively for PCS and OR1.47 (1.30, 1.66) and 1.68 (1.42, 1.98) respectively for MCS compared to ACB=0 category. In the longitudinal analysis ACB=1 and ACB ≥ 2 were associated with ORs of 1.56 (1.24, 1.95) and 1.48 (1.07, 2.03) for being in the bottom quartiles of PCS at 3HC. No significant longitudinal association was found for MCS.

Conclusion

The use of anticholinergic medications is linked to a poor health related quality of life in an ageing general population.

Supervisors: Mr Samuel R Neal, Professor Phyo K Myint

The effects of playing rugby on spinal bone health

Quiterie Sarton du Jonchay

Background

Sport is known to have many beneficial effects, however, the long-term effects of playing rugby are not yet well understood. The UK Rugby Health Project aims to increase the understanding and acknowledge these effects to appropriately care for players. Rugby league (RL) and rugby union (RU) are full contact sports that place the spine under great stress. Statistical Shape Modelling (SSM) quantifies variations in shape and has previously been used to investigate the role of spine shape in musculoskeletal conditions. This project aimed to discover if active rugby players vary in the shape of their spines compared to controls and whether there are differences between RL and RU.

Methods

A 176-point spine template was created on DXA scan images using 'Shape' - an SSM software developed by the UoA. Control (n=23), RL (n=50) and RU (n=37) images were marked up. All rugby players were professionals. One-way ANOVAs were used to test the relationships between mode scores (M1 to M10), rugby code and controls.

Results

RU and RL players had significantly higher M3 scores compared to control (0.509, 0.084 and −0.478, respectively). Higher M3 scores represent wider vertebrae and less pronounced thoracic kyphosis and lumbar lordosis compared to the lower scores. RL showed significantly lower M6 scores than controls; RU M7 scores were significantly lower than both control and RL, however, these differences were more subtle and limited to a few vertebrae.

Conclusion

Active rugby players had wider vertebrae with slightly less pronounced thoracic kyphosis and lumbar lordosis than the control group. Being a cross-sectional study, no conclusion can be made regarding cause and effect, however, a planned follow-up study examining retired rugby players could give valuable insight into the long-term effects of playing rugby and would be an important addition to the UK Rugby Health database.

Supervisors: Dr Jenny Gregory, Dr Karen Hind

EXTERNAL
Externally Funded Scholarships
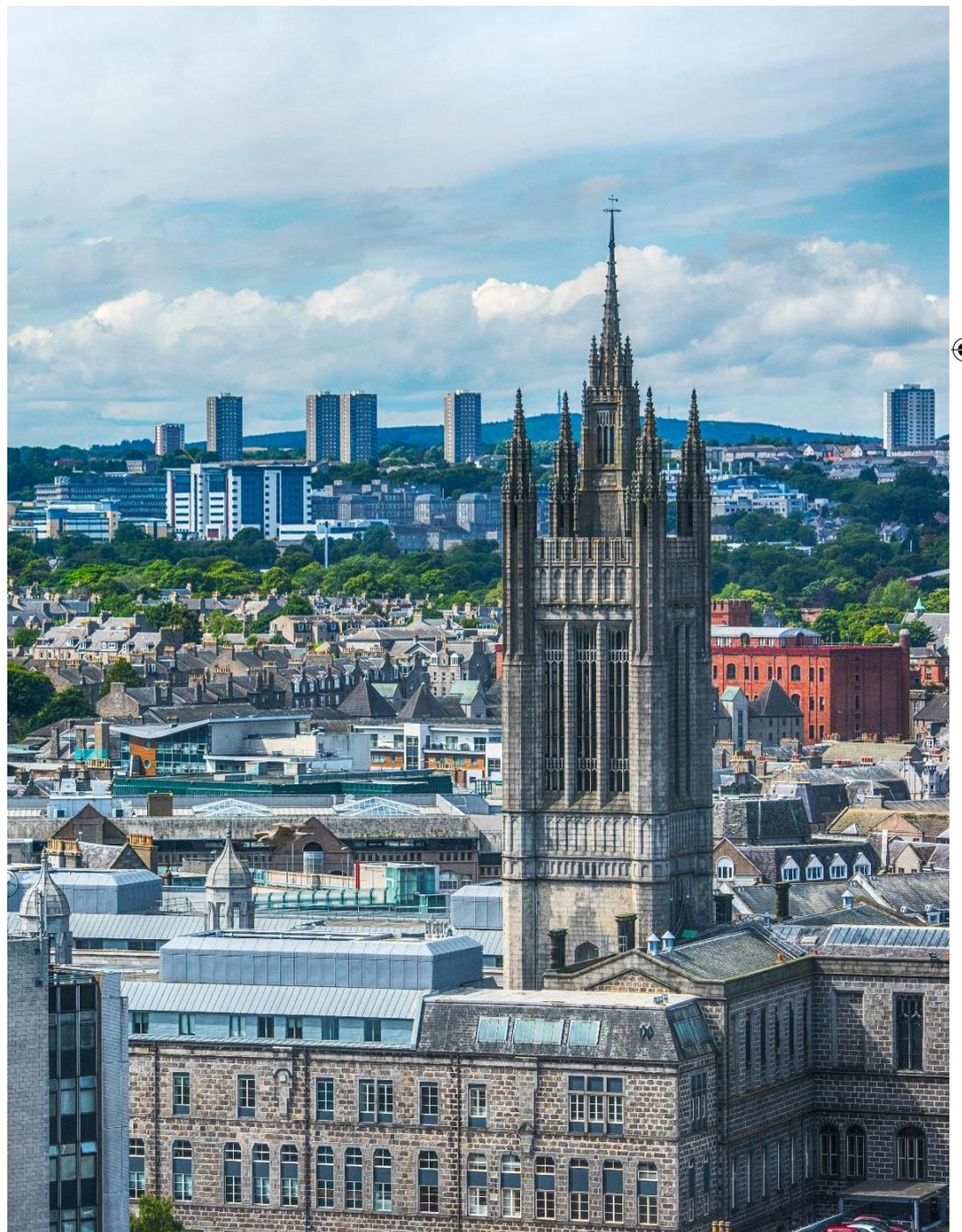
Does interleukin-27 provoke anti-microbial peptide expression in the human-derived gastrointestinal organoids?

Dominika Boldovjakova

Background

Inflammatory bowel disease (IBD) is a global disease with the rising incidence that affects thousands of patients worldwide. It results in chronic relapsing, remitting inflammation in the gastrointestinal tract. Currently there is no cure available. Despite several treatment options being available to control the inflammation, not all patients respond. Therefore, there is clinical need to newer and safer treatments for IBD.

Treatment with the immunoregulatory cytokine IL-27 in mouse model of IBD demonstrated suppression of both innate and adaptive immune responses and effective control of gastrointestinal inflammation. In order to elucidate mechanism of action expression of antimicrobial peptide and mucus barrier proteins involved in the innate immune responses was analysed.

Methods

Human derived colon organoids (specialized 3-D cultures of cells that line the gut) stimulated with IL-27 +/- TNF +/- LPS were used for gene expression analysis. Real time PCR analysis for 2 antimicrobial peptides genes (human defensin 1 and cathelicidin), mucus barrier proteins genes (MUC 1 and 2) alongside 2 housekeeping genes (B2M and GAPDH) was performed.

Results

IL-27 was shown to differentially downregulate expression of human defensin 1 gene and MUC1. In addition, the cytokine was shown to override upregulating effect of TNF on human defensin 1 gene expression. The results were obtained from 2 patients and there was a wide inter-individual variation in expression.

Conclusions

The genetic studies show promising results, but further work is required to expand the number of patient samples before any definitive conclusions can be made. Furthermore, if the expression analysis remains true, a scrutiny at a cell level is required to determine the biological consequence.

The importance of arginase activity on the antimicrobial function of macrophages against *Cryptococcus neoformans*

Dylan McClurg

Background

Cryptococcus neoformans (*C. neoformans*) is a fungal pathogen with worldwide distribution. Cryptococcal disease affects up to 1 million people each year and is a leading cause of mortality in immunocompromised individuals. The relationship between *C. neoformans* and the host immune system remains a high priority research goal for improving cryptococcal disease outcomes.

Fungi deploy numerous strategies to minimise damage by the host immune system. Amongst these, it has recently been shown that a distant relative of *C. neoformans, Candida albicans*, can induce host arginase enzymes within macrophages. As a result, L-arginine is diverted away from the inducible nitrogen oxide synthase (iNOS) system that is required to produce antimicrobial nitric oxide (NO). As macrophages play a crucial role in the pathogenesis of cryptococcal infection, we investigated if *C. neoformans* deploys an analogous mechanism to neutralise host macrophages.

Methods

Extracellular vesicles (EVs) were isolated and bone marrow derived macrophages (BMDMs) were isolated from mice. BMDMs were infected with wild type (WT) and mutant variants *of C. neoformans* at MOIs of 1 and 3, at 3 or 24H. BMDMs were untreated (UT) or activated with IFN-y/LPS prior to infection. Arginase and NO activity were determined using activity assay kits following the manufacturer's instructions. Statistical differences were determined using GraphPad Prism 5.

Results

WT and mutants of *C. neoformans* produced no detectable arginase in EVs. 3H infections at MOIs of 1 or 3 of UT and activated BMDMs with WT and mutant *C. neoformans* did not alter arginase activity. 24H infections of *C. neoformans* significantly increased production of arginase in UT but not activated BMDMs. WT infected BMDMs (MOI 1) resulted in decreased levels of NO at all time points.

Conclusions

Preliminary results suggest that *C. neoformans* may induce host arginase after 24H and suppress NO production in BMDMs at 3 and 24H.

General Practice coding of Huntington's disease

Georgios Kounidas

Background

Huntington's disease (HD) is a rare inherited neurodegenerative disorder. It is important to know how common it is, to plan services. Available clinic-based surveys done before the gene test for HD was available are likely to underestimate disease burden. We observed a number of cases in which unaffected family members have been coded as if affected. To inform service planning in the Grampian region, we sought to assess the level of miscoding of the diagnosis of HD in general practice (GP) records.

Methods

A retrospective case note review of North of Scotland genetic clinic records and Trakcare, the NHS Grampian electronic healthcare record was performed. Records were used to identify: (1) the proportion of pre-symptomatic HD gene carriers whose GP records were coded "Huntington's Disease"; and (2) the proportion of individuals symptomatic of HD whose GP records were coded "Huntington's Disease".

Results

One hundred Grampian individuals with HD were identified from the North of Scotland register. Diagnostic codes for 56 symptomatic HD patients and 21 pre-symptomatic HD gene carriers were included in the study. Of these, 80.4% individuals were coded as "Huntington's Chorea", 3.6% were coded as "Dementia in Huntington's disease" and 16% were not coded. Diagnostic GP coding of pre-symptomatic HD gene carriers was as follows: 42.9% were coded as "Huntington's Chorea", 14.3% were coded as "Genetic Disorder Carrier", 4.7% were coded as "Family History of Huntington's Chorea" and 38.1% were not coded.

Conclusions

43% of asymptomatic individuals were coded as if affected, suggesting that prevalence studies based upon GP codes are likely to over-estimate HD prevalence. This is in part counteracted by failure to code a similar number of individuals as affected. There is a need for a more consistent and accurate coding system for HD patients and previous estimates of prevalence should be interpreted with caution.

The association between body fat percentage and incidence of falls- and fracture-related hospitalisation in the EPIC-Norfolk cohort

Samuel R. Neal

Background

Falls are the leading cause of injury and death in those aged ≥ 65 years. Recent studies have suggested that excess adipose tissue may increase fracture risk. We aimed to investigate the impact of body fat percentage (BF%) on fracture- and falls-related hospitalisation, bone mineral density and bone mass.

Methods

EPIC-Norfolk study participants with BF% recorded at the second health check were followed up for a median of 16.7 years (total person-years of 235,286 years). Primary outcomes were fracture-related and hip-fracture-related hospitalisation. Secondary outcomes were falls-related hospitalisation, bone mineral density by calcaneal ultrasound and bone mass by dual energy X-ray absorptiometry (DEXA). Cox regressions were employed for each outcome, where the non-linear relationship between BF% and outcome variables was modelled using restricted cubic splines. Results were stratified by sex and waist-hip ratio (WHR) above and below the median (0.9 and 0.8 for males and females, respectively). All models were adjusted for baseline patient demographics and prevalent comorbidities.

Results

We included 14,796 participants (56.3% women) with a median (IQR) age of 62 (55-69) years. In men, there was no association between BF% and any outcome. In women, increasing BF% was associated with: lower risk of fracture-related hospitalisation for those with a low WHR and BF% below 40%; lower risk of hip-fracture-related hospitalisation; lower risk of falls-related hospitalisation for those with a low WHR and BF% between 20-40%; and higher BMD in both low and high WHR groups (significant for BF% above 25% and 35% for low and high WHR, respectively). There was no association between BF% and bone mass.

Conclusion

In women with BF% below 40%, increasing BF% may reduce the risk of falls and fractures. A balance needs to be achieved between fracture prevention and the negative effects of high body fat such as cardiovascular disease.

What matters most for patient-related stroke outcomes: atrial fibrillation, heart failure or their combination? A prospective hospital register cohort study

Tiberiu Pana

Background

The individual and combined impact of AF (atrial fibrillation) and HF (heart failure) on the mortality and recurrence of acute ischaemic strokes (AIS) remains unclear. We aimed to examine these relationships on the following outcomes: in-hospital mortality, length-of-stay and post-stroke disability, stroke recurrence and long-term mortality.

Methods

We included 10,816 consecutively admitted AIS patients to a UK centre with catchment population of ~750,000 between 2004 and 2016. All patients were followed until June 2017. The exposure groups were: patients with AF but without HF, those with HF but without AF, and those with both AF & HF. They were compared with those with neither condition for above outcomes using logistic regressions and Cox regressions for in-hospital outcomes and long-term outcomes, respectively. Multiple imputation was used to handle missing data.

Results

The mean age±SD was 77.9±12.1 years and 48% were male. Exposure groups were associated with increased odds of in-hospital mortality (OR (95% CI)) (AF 1.22 (1.06-1.41); HF 1.40 (1.10-1.79); and their combination 2.21 (1.81-2.68)). All three exposure groups were associated with increased length-of-stay, whilst only AF predicted increased disability (1.32 (1.09-1.60)). Patients were followed for a median of 995 and 1062 days for long-term mortality and recurrence, respectively. Long-term mortality was associated with HR (95%CI) AF (1.36 (1.24-1.50)), HF (2.11 (1.85-2.43)) and their combination (2.08 (1.85-2.34)). Recurrent events were associated with AF (1.57 (1.36-1.82)) and AF with HF (1.69(1.37-2.08)).

Conclusion

Patients with both AF and HF are at a higher risk of in-patient mortality compared to individual conditions alone in stroke. The excess risk of recurrence associated with AF appears to be independent of co-morbid HF and HF in isolation is not associated with stroke recurrence. Anti-coagulation strategies in patients with HF without AF after their incident stroke may require further evaluation in a clinical trial setting.

Supervisors: Dr David McLernon, Professor Phyo K Myint

MEDICAL EDUCATION
Medical Education Scholarships
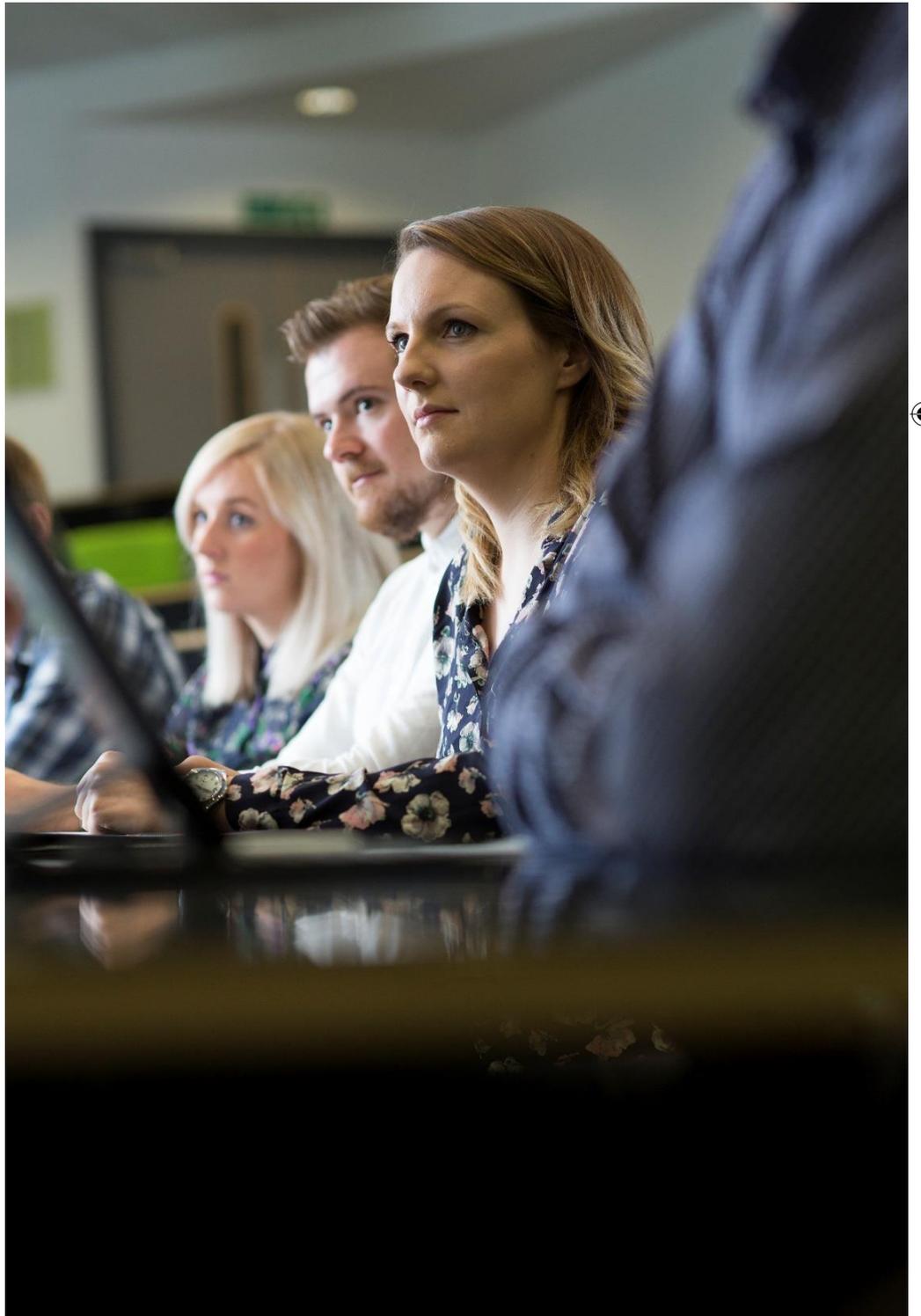
———

The History of the First Five Female Graduates from the University of Aberdeen Medical School: are the Issues They Encountered Still Relevant Today?

Claire Repper and Rosannah Jackson

Background

In 1900 the first female doctor graduated from the University of Aberdeen. In 2017 fifty-eight percent of UK graduates in medicine were female. The first five female medical graduates from the University of Aberdeen were Myra Mackenzie, Jeannie MacLeod, Margaret Duncan, Isabella Gunn and Isabel Copland Smith. Their time at university coincided with great social and political change in the United Kingdom. The aim of the project was to uncover the stories of these five women and discover if the issues they encountered remain pertinent today. Furthermore, the project looked at whether the increase in the percentage of female medical graduates has resulted in improved career progression for women today and the inclusivity of medicine overall.

Methods

Collation of information via Aberdeen University Library Special Collections, RCPSG, SOAS Library (University of London), National Records of Scotland, Medico-Chirurgical Society of University of Aberdeen, Ancestry.co.uk and British National Archives. Information was received from Dr Marion White, Dr Bob Clarke and Marilyn Lacey regarding three of the graduates.

Results

The lives of these graduates proved to be varied regarding both their careers and personal experiences. Many different themes were identified in their lives, for example: mental health, maternal mortality, career choices available to women doctors and their portrayal of qualities valued by modern doctors today.

Conclusion

It was concluded that these issues still present challenges today particularly mental health. The battle for gender equality has resulted in a higher proportion of female medical students however women are still underrepresented in the workforce. This has also brought to light the need to fairly represent all of society in medicine, especially those from non-traditional backgrounds.

Supervisors: Professor Rona Patey, Dr Leeanne Bodkin, Dr Marion White

Shaking up Immunology Teaching at the University of Aberdeen

Dylan McClurg and Rachel Hughes

Background

A thorough understanding of the immune system in medical education is critical, however, it often poses a challenge to medical students. At the University of Aberdeen (UoA), MBChB immunology is taught within nine, one-hour lectures between 1st- 3rd year supplemented by written handouts. Previous students have found that the pace of delivery in these lectures overwhelming.

A new approach known as 'blended-learning' has gained momentum within medical education. The most widespread form, 'the flipped classroom' supplies learners with core knowledge for self-study prior to face-to-face contact. Face-to-face sessions then facilitate deeper engagement and application of learned material. We aimed to enrich immunology teaching and learning at the UoA by creating a blended learning approach for the 3rd year immunology curriculum.

Methods

Multi-modal E-learning modules were produced collaboratively with MediCAL. Modules build on prior knowledge and introduce new learning at a student-led pace, finishing with a quiz to test understanding. Additionally, clinical problem-solving cases were developed to allow application of knowledge. Students will be directed to complete relevant modules and cases in advance of face-to-face lectures. The focus of lectures will be to clarify difficult concepts and help students apply their knowledge clinically. Learning guides and senior immunology teaching staff were consulted throughout development. A feedback questionnaire was devised to measure the usability and educational impact of the new learning materials.

Results

Modules were developed within six areas; an overview of the immune system, the innate immune system, the adaptive immune system, hypersensitivity, autoimmunity, and transplantation. Results from student feedback are awaited once the new 3rd year immunology course begins in 2019.

Conclusion

'E-learning' cannot replace expert teaching however when harnessed appropriately, quality E-learning has great potential to augment learning. As with any change in curriculum delivery, evaluation of implementation is important to see whether the intended aims have been achieved.

Supervisor: Dr Stephanie Stone

Student responses to "paperless workshops"

Paula Rebecca Hippen

Background

Many universities worldwide are trialling the use of online software to create a "paperless lab" to increase efficiency and reduce paper use. Students generally respond positively to the digitalisation of their labs and their grades improve. The University of Aberdeen School of Medicine, Medical Sciences and Nutrition mostly uses paper lab manuals in teaching laboratories, practicals and workshops. The aim of this project was to test the use of an online teaching software for medical sciences practical classes.

Methods

Two workshops from SM2001 (Foundation Skills for Medical Sciences) were adapted to online versions with Lt from ADInstruments, a cloud-based software for online medical sciences classes and labs. Students who had previously completed SM2001 were emailed about participating in the project. The volunteers were asked to complete the two workshops online from home and fill out a feedback form.

Results

Seven volunteers completed the workshops and feedback form. Most students agreed that they accessed the workshops easily and that they were well-presented. Five students agreed that they were very satisfied or satisfied with the online workshops. Three students preferred the online workshops, two preferred the paper version, and two had no preference. Most students thought the software would be useful for case studies and revision. Two students stated they thought the software would be useful for labs. Most volunteers left additional comments.

Conclusion

The online workshops were well-perceived among the volunteers. Due to geographical restrictions, no online labs could be trialled in this project. To properly assess the usefulness of Lt for the undergraduate laboratory, other trials need to take place. Some volunteers stated they preferred doing the workshops around demonstrators. It is important not to neglect the face-to-face component of learning in implementing online methods of teaching. Due to its flexibility, the software could be used for more than just practical classes.

Supervisors: Dr John Barrow, Dr Derek Scott

Educational videos for the navigation of the BNF

Philip Cannon and Rebecca Watson

Background

Currently there is no signposted teaching for medical students on how to navigate the British National Formulary (BNF) effectively at the University of Aberdeen despite it being the key resource required to pass the Prescribing Safety Assessment. The aim of this project was to identify a way to address this unmet need.

Method

An internet search to look for pre-existing resources that could meet this need was performed. A literature search was done using PubMed, Medline and Google Scholar. In addition to this, common extra-curricular learning websites such as YouTube and Geeky Medics were also consulted.

Subsequent educational videos were created with iMovie software using a mixture of images, newly created footage and narration.

Results

Almost no relevant results were obtained from the search, the exception being several old YouTube videos that dealt with the BNF book in its pre BNF 70 format. Due to a lack of appropriate pre-existing resources, four new educational videos were created; an introduction video, a structure video, an interactions video and a video signposting some of the many useful resources present in the BNF. They varied from 3:01 minutes to 7:08 minutes in length. They encompassed the BNF in its post BNF 70 book format, its recently developed mobile phone app format and its MedicinesComplete online format.

Conclusion

Four videos have been created with the aim of improving medical students' abilities to navigate the BNF in its most common forms. The next step will be to pilot the videos with medical students at the University of Aberdeen and establish if they are effective educational tools. This will be achieved by making the videos available to the medical students and then assessing their impact utilising a questionnaire.

Supervisor: Dr Jonathan Whitfield

Development of a 15-credit online pharmacokinetics module

Rachel Copland

Background

Pharmacokinetics (PK) is a fundamental component of pharmacology. It is the study of what happens to a drug once it is taken into the body, with a focus on absorption, distribution, metabolism, and excretion (ADME). The online course covers a breadth of topics in the field, including understanding the core principles of ADME and covering some of the more complex aspects of PK, such as mathematical modelling and their wider applications throughout pharmacology.

Methods

A detailed lecture plan was agreed upon between supervisor and student with clear learning criteria set out from the beginning. A comprehensive literature review using a variety of journal articles, textbooks, and online resources was carried out throughout the course of the project, which created the bulk of lecture material. Regular feedback between student and supervisor ensured project was within the aim of assisting in the creation of a course that provides theoretical, applied, and practical knowledge in PK.

Results

15 lectures covering a range of topics in PK were produced, each detailing supplementary and further readings for students to further consolidate their knowledge-base. A combination of journal articles, textbook entries, online videos, and other online resources provided a comprehensive and extensive platform for self-study. Online course set to be trialed later in the academic year with regular communications between supervisor and student still underway.

Conclusion

Student participation in development of an online course provides student with a wealth of experience in academic research, educational research and development, and a wider understanding of academic education. Student can provide fresh perspective on student engagement and modern-day learning, combining old and new educational techniques to create detailed and thought-provoking online resources.

Supervisor: Dr Steven Tucker

Developing a Prescribing Handbook for Year 4/5 Medical Students

Rachel Ball

Background

Prescribing is one of the main tasks performed by foundation doctors - indeed, the majority of NHS prescriptions are written by junior doctors. However, around 10 % of written prescription orders contain an error, whether this be a drug being prescribed to the wrong patient, the prescription of an incorrect drug or mistakes being made in relation to the formulation, route, dose, strength or frequency of a drug. Furthermore, students themselves continue to have concerns about their levels of knowledge and understanding in relation to prescribing.

Methods

We created a prescribing handbook for senior medical students, in order to enhance their clinical learning opportunities in terms of prescribing and address their aforementioned concerns. Additionally, two surveys were created and distributed: one for students who were about to enter Year 5, the other for students who had just graduated. These surveys gathered data about how confident student's felt about prescribing and the resources they'd used to develop their knowledge in this area.

Results

A handbook aimed at senior medical students was designed and developed; and has subsequently been made available to students via the MyMBChB portal. All of Aberdeen University's prescribing related learning outcomes were collated and mapped against the latest GMC 'Outcomes for Graduates'. Students were signposted as to where and how best to achieve these outcomes. The survey results showed that students' self-reported confidence in prescribing developed throughout their final year – only 24% of students at the start of Year 5 reported feeling 'somewhat' or 'highly' confident about prescribing, compared to 66% of recent graduates.

Follow-up

Evaluate the handbook's success by re-distributing the above surveys in Summer 2019 – in particular to see if students report using the handbook, and to compare self-reported confidence levels both between students starting and finishing Year 5, and between students who graduated in 2018 and 2019 (i.e. before and after the handbook was introduced).

Supervisor: Dr Jonny Whitfield

Creating Photorealistic Models of Cadaveric Specimens for Anatomy Teaching

Sofia Aliotta, Sara Cordoni, Ronja Struck

Background

Textbooks cannot match the value of cadaveric specimens when it comes to studying and teaching human anatomy. However, the identification of structures in prosected materials can be challenging and specimens are confined to licensed facilities due to Home Office regulations, thus limiting students' access to cadaveric material. To overcome these limitations and to enhance students' learning, we have used photogrammetry to produce high-resolution 3D reconstructions of anatomical specimens.

Methods

Prosected human specimens were placed on a turntable with reference system before being photographed from multiple angles with a single-lens reflex camera. After preprocessing of the images with Adobe Photoshop, Agisoft Photoscan Professional software was used to develop a point cloud, a 3D mesh and ultimately a textured model. Video animations were then created with Autodesk 3ds Max based on tailored storyboards. Text labels were subsequently added with Adobe After Effects before converting the final product into a more portable size.

Results

The finished models include a Circle of Willis in situ, the musculature of an anterior forearm, the structures within the palm of a hand, the plantar anatomy of a foot, a liver and associated gallbladder and a spleen with attached pancreas. The latter two models have already been used for second year medical teaching.

Conclusion

Our 3D models and animations have enriched the library of digital anatomy learning resources at the University of Aberdeen and will enhance the teaching and learning of anatomy. Interactive 3D PDFs and video animations will be made available to students via virtual learning environments to support their studying outside of classes. Additional models of the head and neck, lungs, brachial plexus, kidneys and bladder with prostate are currently in development. Future studies should evaluate the effects of these new learning resources on the student experience and performance through cross sectional surveys.

Author Index

Further your academic interest

Below is a selection of useful organisations and websites to help further your interest in academic medicine as a student.

Aberdeen Student Society for Academic Medicine (ASSAM)

"The Aberdeen Student Society for Academic Medicine (ASSAM) was established in 2012 with the hope to encourage undergraduate interest in medical research. Even though their primary aim is to inspire medical students to pursue a career in academia, they also try to highlight the importance of basic research skills and critical appraisal in normal clinical practice. "

www.assam.nsamr.org | assam@nsamr.ac.uk | AberdeenASSAM

Aberdeen Clinical Academic Training (ACAT)

Training programmes and support for postgraduate clinicians in Aberdeen.

www.abdn.ac.uk/smmsn/acat

National Student Association of Medical Research (NSAMR)

"National Student Association of Medical Research (NSAMR) is a non-profit, non-governmental and non-partisan student-led organisation representing an association of medical research societies nationally"

www.nsamr.org

1495
UNIVERSITY OF
ABERDEEN

Join the new Society for Medical Statistics

Words from the society's president

"The University of Aberdeen Society for Medical Statistics was created in response to the increasing need of the undergraduate student body for support and guidance in the field of medical statistics, which is not comprehensively covered in the medical or dental curriculum. The society aims to not only enhance the understanding of the statistical methods underpinning medical research, but also to promote good practice amongst future academics in the usage of statistics and the interpretation of resulting evidence."

Tiberiu Pana – 4th Year MBChB

For more information, please join the Society for Medical Statistics Facebook group.

Aberdeen Society for Medical Statistics

SOCIETY FOR **MEDICAL STATISTICS**

We are looking for Year Representatives!

The Society for Medical Statistics is looking for enthusiastic members to join the team as Year Representatives. If you are interested in this opportunity, join the Facebook group above and get in touch!