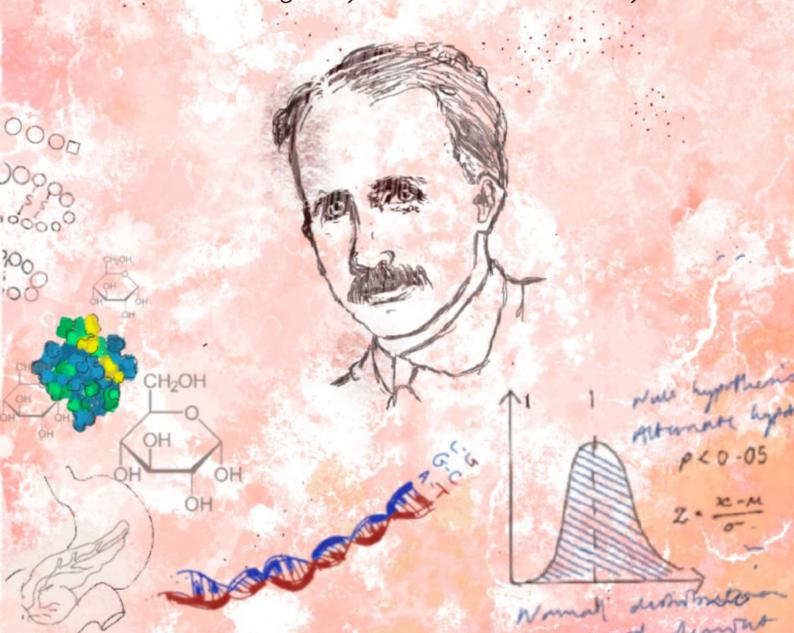




2021 SUMMER RESEARCH SCHOLARSHIPS SYMPOSIUM

Celebrating 100 years of insulin discovery





FOREWORD

First and foremost, I would like to thank the Academy of Medical Sciences, INSPIRE Scheme which provided funding for INSPIRE national and inter-disciplinary scholarships, plus NHSG clinical departments, the Institute of Applied Health Sciences and individual supervisors who raised funding to support summer research scholarships.

I am delighted to see high quality scientific investigations in a wide range of research areas carried out by medical & dental students at the University of Aberdeen. On behalf of the Aberdeen Clinical Academic Training (ACAT) Executive, I would like to thank all of the supervisors for their supervision and guidance to students and hope future collaborations will continue between them.

I would like to thank Mrs Janice Forsyth who provided administrative support for all of our scholarship programmes, Mr Craig Lee from Media Services - Medical Illustration for his help in designing the abstract booklet, Mrs Toni Gibson for her assistance in running this year symposium and the Vice-President of Aberdeen Student Society for Academic Medicine, Miss Zahra Pasdar, for her cover art design inspired by the Insulin Discovery by Professor John Macleod, who studied medicine at Aberdeen University Medical School.

As usual, my special thanks go to all students who have worked hard over the summer and submitted their work to share with the wider student community. We have witnessed our former scholarship students doing exceptionally well in their clinical academic careers and I am confident that this year's scholarship students will also have a very promising clinical academic career should they wish to choose clinical academia.



(Z. Ziz

Professor Phyo Kyaw Myint

INSPIRE Lead & Director of Clinical Academic Training and Development School of Medicine, Medical Sciences & Nutrition



PROGRAMME

13.00 - 13.05

OPENING SPEECH CHAIR: PROFESSOR COLIN LUMSDEN

13.05 - 13.15

PAST, PRESENT AND FUTURE - INSULIN DISCOVERY TO FUTURE OF RESEARCH INTO DIABETES

PROFESSOR MIRELA DELIBEGOVIC

(8 MINUTES + 2 MINUTES Q&A)

13.15 - 14.20

PRESENTATIONS: SECTION 1 INSPIRE NATIONAL SCHOLARSHIPS

DUTHSTRA SCHOLARSHIP & INVITED TALKS

BREAK **14.20 - 14.30** BREAK

14.30 - 15.35

PRESENTATIONS: SECTION 2AASRS SCHOLARSHIPS

8 PRESENTATIONS (6 MINUTES + 2 MINUTES Q&A EACH)

PRESENTATIONS: SECTION 2B ASRS SCHOLARSHIPS: INSPIRE PROGRAMME

8 PRESENTATIONS (6 MINUTES + 2 MINUTES Q&A EACH)

PRESENTATIONS: SECTION 2C ENDOWED SCHOLARSHIPS:

INNES WILL & FLORA GOW MURRAY

8 PRESENTATIONS (6 MINUTES + 2 MINUTES Q&A EACH)

BREAK **15.35 - 15.50** BREAK

15.50 - 16.30

PRESENTATIONS: 2A CONT. ASRS SCHOLARSHIPS

5/6 PRESENTATIONS (6 MINUTES + 2 MINUTES Q&A EACH)

PRESENTATIONS: 2B CONT. ASRS SCHOLARSHIPS: INSPIRE PROGRAMME

5/6 PRESENTATIONS (6 MINUTES + 2 MINUTES Q&A EACH)

PRESENTATIONS: 2C CONT. ENDOWED SCHOLARSHIPS:

INNES WILL & FLORA GOW MURRAY

5/6 PRESENTATIONS (6 MINUTES + 2 MINUTES Q&A EACH)

16.30 - 16.40

JUDGES/ASSESSORS DELIBERATION

16.40 - 16.45

ANNOUNCEMENT OF PRIZE WINNERS & CLOSING REMARKS

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LOUISE HENDERSON

Exploring the impact of changes in maternity services on the perinatal experience of women in Scotland during the Covid-19 pandemic

Background

The classification of pregnant women as a vulnerable group alongside national guidelines on social distancing resulted in changes to normal maternity services. This altered the experiences of those accessing maternity care during the pandemic. Perinatal care became increasingly remote, restrictions on the presence of partners were in place and rapidly changing guidance varied across health boards.

Methods

Initially, a scoping review of published and pre-published articles was performed. Thematic analysis identified common themes from these articles. This review contributed to an ongoing national study. Qualitative data from the national study, in the form of free-text survey responses, will then be used to explore the experiences of specific groups; low-income, under twenty and ethnic minority women.

Results

From the review and thematic analysis, four themes were identified. These included the anxiety felt by those accessing services alone, the feeling that care received was impersonal, the uncertainty of changing guidance and lastly, the benefits of a socially distanced maternity service. At the time of submission, the exploration of specific groups is in progress.

Conclusions

While navigating the uncertainty of changing guidance, one of the most prominent impacts on patient

experience was the increase in anxiety that these changes caused. This related to several aspects e.g. having to attend appointments and scans alone or questioning the safety of remote consultations. In addition, patients felt that the care received was impersonal, a result of a busy and stretched staff. Exploring the experiences of low-income, under 20 and ethnic minority women may reveal further challenges that women faced. Research in this area can inform the management of maternity services in future pandemics and guide the transition back to post-covid care.

Supervisors: Dr Mairead Black



MONA JAFFAR-KARBALLAI

Exploring Digital Health and its Potential to Improve Rare Disease Care in the United Kingdom – a Review

Background

Despite 1 in 17 people in the UK being affected by a rare disease, they remain deprived of adequate healthcare. The UK Government released 'The UK Rare Disease Framework' in January 2021 to help change that. The four key priorities that were identified in the framework include: (1)helping patients receive a faster diagnosis, (2)increasing rare disease awareness among healthcare professionals, (3)improving care coordination and (4)improving access to specialist care and treatments. The integration of digital health could help the nations achieve these milestones.

Methods

Using mixed methods analysis and search terms such as, "digital health" and "rare disease", this review analysed a range of online data including, published scientific literature, government documents, stakeholder interviews, and media. Under each framework priority, this paper critically appraised exemplar digital health applications in rare disease care.

Results

Mendelian and the Global Commission have developed digital algorithms to help healthcare providers bring an end to the rare disease diagnostic odyssey. Digital storytelling could help raise rare disease awareness among healthcare professionals by facilitating better rapport and person-centred care. The European Reference Network on Rare Multisystemic Vascular Diseases developed a mobile app that helps patients find expert centres and patient organisations to coordinate care. As it stands, there is a profound shortage of digital tools for priority 4, but England's national congenital anomaly and rare disease registration service could potentially solve this.

Conclusions

Digital tools remain in their infancy stages with a small number of recorded rare diseases. Ethical concerns in relation to privacy, data ownership and informed consent were identified as major challenges in digital health. Digital exclusion of rare disease patient and carers, due to lack of digital literacy and financial inequity, also play a role in the slow adoption of digital health on a societal level. Whilst these challenges are significant, they could be overcome through stakeholder collaboration, education, and empowerment of the patient voice.

Supervisor: Dr Heather May Morgan Funded by: INSPIRE National Scholarship



KYI LAE SHUNE KYAW

The individual and combined impacts of diabetes and dementia on ischaemic stroke outcomes

Background

Diabetes and dementia have been associated with poorer outcomes after stroke. Nevertheless, these two conditions have only been studied separately. We aimed to investigate the individual and combined impacts of pre-existing diabetes and dementia on acute ischaemic stroke outcomes.

Methods

10,812 consecutive patients with incident acute ischaemic stroke admitted to the Norfolk and Norwich University Hospitals (catchment population ~900,000) were divided into four exposure groups based on pre-stroke comorbid status: neither diabetes nor dementia (reference), only diabetes, only dementia, both diabetes and dementia. In-hospital mortality, length of hospital stay (LoS), and disability outcomes were analysed using multinomial and binomial logistic regressions as appropriate. Cox models assessed cause-specific hazard ratios for post-discharge mortality and recurrence. All models were adjusted for age, sex, Oxfordshire Community Stroke Project classification, comorbidities, admission biochemical/haematological measures, and antithrombotic medications. Median follow-up was 5.5 and 3.8 years for mortality and recurrence, respectively.

Results

There were no significant differences in in-hospital mortality and post-stroke disability between the exposure groups. Patients with dementia were more likely to have a longer LoS (OR 2.25 [95% CI: 1.34-3.76] and OR 1.31 [1.02-1.68] with and without diabetes respectively). Having only diabetes and only dementia increased the long- term mortality risk: HR 1.20 [1.08-1.32] and 1.71 [1.47-2.00], respectively. The HR increased to 1.76 [1.32-2.34] in patients with both conditions. For recurrence, patients with only diabetes had a HR of 1.25 [1.05-1.49] and those with only dementia had a HR of 1.59 [1.15-2.20] while having both conditions was associated with a two-fold increase in risk of stroke recurrence (HR 2.06 [1.13-3.77]).

Conclusion

While diabetes does not substantially increase the impact of dementia on stroke mortality, the co-existence of these two conditions doubles the risk of long-term stroke recurrence. Therefore, we recommend more intensive secondary prevention in patients with co-existing dementia and diabetes.

Supervisors: Dr Tiberiu A Pana and Professor Phyo Myint



NANDITA J NAIR

Uncovering novel G protein-coupled targets for pulmonary arterial hypertension

Background

Pulmonary arterial hypertension (PAH, mean pulmonary artery pressure >25 mmHg) is associated with increased proliferation of pulmonary artery smooth muscle cells (PASMC) and remodeling of the pulmonary artery, which leads to right ventricular failure. PAH can be idiopathic (IPAH) or secondary (SPAH): female sex, hypoxia and obesity are risk factors for PAH. G protein-coupled receptors are attractive targets in disease due to their tissue- and disease-selective expression. Our aim was to uncover novel GPCRs in PAH-PASMC that could be risk factors or drug targets for PAH.

Methods

Data TaqMan® GPCR arrays were analysed from female-, male-, IPAH-, SPAH-PASMC (n=4). GPCRs ≥1.5-fold expressed in females-, IPAH and SPAH-PASMCs. An extensive literature search (PubMed) was then performed to validate novel GPCR targets uncovered from the arrays.

Results

Our analysis identified 40 GPCRs were upregulated in IPAH- and SPAH-compared to control-PASMC, 6 of which were higher expressed in female- compared to male-PASMC: SSTR1, HTR7, LANCL2, GPR30, PTGER1 and GPR146. Review of the literature provided evidence that GPR146 (increased 4.5-fold IPAH, 1.12-fold SPAH and 2-fold in females) could be a novel target for PAH. GPR146 is also upregulated by both hypoxia and obesity, which are additional risk factors for PAH. Since GPR146 is known increases pERK and Ca2+-mobilisation in other cell types, it could contribute to constriction and proliferation in PASMCs. Importantly, GPR146 antagonists are currently being investigated for diabetes. We propose experiments are needed to determine PASMC-specific signalling and regulation of GPR146 and its expression and function in experimental models of PAH.

Conclusions

Profiling GPCR expression in PASMC can identify novel targets for PAH. GPR146, which shows female-bias, is upregulated with PAH and thus inhibiting GPR146 function could be a new strategy to treat PAH.

Supervisor: Dr. Fiona Murray



MELVIS USIDEME

Investigation of embolus thrombin concentrations by Fast Field Cycling MRI

Background

Current diagnostics for deep vein thrombosis (DVT) are not without their difficulties. These are mainly duplex ultrasonography and venography (typically with x-rays but increasingly with MRI). These current modalities can lead to false negatives – which increases the risk of embolism, and false positives – which subjects the patient to unnecessary medications.

FFC-MRI is a novel imaging technique for the investigation and characterisation of tissues, with potential to provide quantifiable and detailed clinical data in a simultaneously non-invasive manner.

This project will explore the application of FFC methods in detecting differences in clot composition, such as thrombin and fibrinogen concentration, in order to characterise these clots non-invasively using FFC-MRI.

Methods

Clots were composed of nine concentrations of fibrinogen plus control and two concentrations of thrombin (0.05IU/ml and 2IU/ml). Physical data was recorded from these samples and analysed using modelling applications. These results were plotted and curve-fitting tools were applied. Statistical significance of results were determined by ANOVA1 test. This was done for 3 different sample sets. Making the total number of sets analysed three for each concentration of thrombin (six in total).

Results

The parameters used were derived from the '2 Segment Power Law' model in MatLab. The level of significance was set at p=0.001. All p values were less than 0.001.

All samples at both thrombin concentrations presented consistent result trends; however, the earliest sample varied the most from the latter two. This is likely why the ANOVA test showed no similarity between samples, even though there is a similarity between the latter two.

Conclusions

The current analysis was unable to recognise similarities in clot characteristics composed of the same concentrations of thrombin and fibrinogen. This could be due to errors in the data processing stage or possibly experimental factors that were not controlled adequately.

Supervisors: Dr Lionel Broche, Dr Claire Whyte and Dr Nicola Mutch Acknowledgements: Mrs Ausra Lionikiene for supplying the experimental data.





INAS ALSUHAIBANI

The expression of CB1 and CB2 receptors and their potential role as therapeutic targets across cancer types

Background

Interaction of cannabinoid ligands with CB1 and CB2 receptors have received considerable attention, due to their promising anticancer therapeutic potential, through modulation of tumorigenesis. However, it is unclear how receptor expression level correlates with tumour type. Therefore, this research aims to investigate whether there is an association between level of CB1 and CB2 expression and overall survival and how they are dependent on tumour type/stage.

Methods

Kaplan—Meier Plotter database was used to assess the prognostic value of CB1 expression in different cancer types. Using mRNA data sets, patient cohorts were split by median expression values yielding high and low expression cohorts. KM plots were generated obtaining overall survival (OS) in months and P values. No data was available for colorectal cancer (CRC). Therefore, quantitative image analysis by scoring the intensity of immunostained (anti-CBIR) tissue microarrays (TMAs) from the NHS Grampian biorepository, corresponding to different stages (Dukes A, B and C) was performed.

Results

Database analysis revealed that high CB1-receptor expression level in lung cancer (P=4.5e-6), breast cancer (P=0.0448) and Head-neck squamous cell carcinoma (P=0.0169) and low CB1-receptor expression in gastric cancer (P=1.3e-5) were significantly associated with better prognosis. Scoring (0=None, 1=Weak, 2=Moderate, or 3=Strong) of normal CRC TMAs revealed score=3 in colorectal epithelium with no significant changes in any stage (Dukes A, B, and C) (95% vs 92%, 85%, and 89% of cases respectively). however, a clear reduction was seen in stroma (score=1 in 43%, 44% and 55% of cases respectively) in comparison to normal samples (score=3 in 83% of cases).

Conclusions

OS varied with CB1-receptor expression levels across different cancer types and similar expression levels was observed across CRC stages suggesting it is not likely responsible for tumour progression. However, high levels remained across stages suggesting its potential as a therapeutic target. CB2-receptor analysis is still ongoing.

Supervisors: Dr James Hislop and Professor Valerie Speirs Funded by: Cyril & Margaret Gates Endowment Funds



SHWETHA ANANDAN

Examining the relationship between reproductive health and dementia in women

Background

Globally, the incidence of dementia is higher in women than in men. Research suggests that young women may have less risk of dementia due to the protective effects of oestrogen towards the mitochondria which older women have lost. Characteristics of reproductive health are therefore potentially important risk factors for dementia. We aimed to conduct a scoping review to determine the extent and nature of research about aspects of reproductive health (namely the oral contraceptive pill, hormone replacement therapy/ menopause hormone therapy, gynaecology procedures, pregnancy, and the reproductive period) associated with dementia in adult women.

Methods

The PRISMA-ScR Checklist was used as the framework for this scoping review. The search strategy was developed in conjunction with a medical librarian using an inclusive and exclusive list of keyword combinations regarding dementia and reproductive health in women. MeSH terms were also used to widen the scope of the results. The databases searched were Medline, Embase and Psycinfo with no date restriction. Titles and abstracts were screened in Refworks using pre-specified inclusion and exclusion criteria. Data were extracted from full papers and evidence tables constructed were grouped by aspect of reproductive health examined.

Progress To Date

Database searches resulted in 5901 titles; following title and abstract screening, 140 titles remain. The full text screening is ongoing. The evidence table for reproductive periods (n=3) is complete and suggests that longer reproductive periods do not reduce dementia risk; however, shorter reproductive periods may increase risk.

Expected Outcome

To date, the scoping review has shown there has been limited research about the duration of the reproductive period and dementia. It is noteworthy that many abstracts of studies still to be full text screened concern hormone replacement therapy. The extent of the evidence for other aspects of reproductive health will be determined once data extraction is completed.

Supervisors: Dr Lisa Iversen

Funded by: Institute of Applied Health Sciences



ANAGHA CHINMAYEE

Management and clinical outcome of triple negative breast cancer in NHS Grampian from 2012-2019

Background

Breast cancer is the most common cancer in women. Triple Negative Breast Cancer (TNBC) accounts for 10-20%, characterised by the lack of oestrogen, progesterone, and human epidermal growth factor 2 receptor expression and classed as high risk. This study aimed to analyse the management and clinical outcome of consecutive TNBC patients over a time period of 8 years within NHS Grampian.

Methods

Caldicott approval was obtained to collect clinical information on all TNBC patients diagnosed between 2012- 2019 from the Cancer Audit Network registry and TRAKCARE system. A database including clinic-pathological details, treatments, and clinical outcomes was created. Statistical analysis was carried out using SPSSv27.

Results

Overall, 393 patients were analysed. 279 women were age >50 years (70.9%). The majority of tumours were invasive ductal carcinoma (82.7%) and grade 3 (81.4%). The median size was 20mm (IQR 11-31mm). Histopathology revealed basal phenotype in 158 patients (40.2%). At the time of diagnosis, 121 patients were axillary lymph node positive (30.8%) and, 24 patients had synchronous metastases on staging (6.1%). 165 patients underwent genetic testing (42%); subsequently 29 patients were found to carry a BRCA1 or BRCA2 gene mutation.

Surgical treatment comprised breast conserving surgery (n=209 patients, 53.2%), mastectomy (n=158, 40.2%), sentinel lymph node biopsy (n=235, 59.8%) and axillary node clearances (n=106, 27%). Radiotherapy was given to 294 patients (74.9%). 278 patients (70.7%) received chemotherapy. Only 33 patients (30.3%) had complete pathological response after neo-adjuvant chemotherapy. Disease recurrence occurred in 83 patients (21.1%; median time: 14.5 months). Death was recorded in 127 patients (32.3%; median time: 20 months).

Conclusion

Poor clinical outcome within a short follow-up interval highlights the need for more translational research into the tumour biology of TNBC and the necessity of developing more precise and targeted surveillance and treatment strategies.

Supervisor: Miss Beatrix Elsberger

Funded by: Breast Research Endowment Fund NHS Grampian



MARCELLA COGLIANO

Rac1 and cdc42: potential targets for treatment of breast cancer

Background

Rac1 and cdc42 are genes involved in cell growth and cell cycle regulation. High expression of these genes may be involved in the pathogenesis of certain tumours, including breast cancer. These genes are potential targets for breast cancer therapy with a drug called R-ketorolac. R-ketorolac has been suggested for treatment of ovarian cancer through inhibition of rac1 and cdc42.

In this project, we investigated rac1 and cdc42 expression in normal human breast tissue and analysed whether there were statistically significant differences in the survival among breast cancer patients with high and low expression of these genes.

Methods

The expression of rac1 and cdc42 in normal human breast tissue were identified using the mRNA and protein levels from the Human Protein Atlas database.

Overall Survival (OS) in breast cancer patients with high and low expression of rac1 and cdc42 was assessed using Kaplan-Meier (KM) plotting. Furthermore, the OS was identified for the different breast cancer subtypes. The following subtypes were analysed:

- All cancer subtypes
- Oestrogen receptor (ER) positive and ER negative
- Progesterone receptor (PR) positive and PR negative
- Triple negative (PR, ER and human epidermal growth factor receptor 2 (HER2) negative)

Results

Rac1 was found to be highly expressed in breast tissue, whereas cdc42 showed medium expression. Reduced OS was identified between high and low cdc42 expression among all breast cancer patients (HR = 0.87 (0.78 - 0.96) p-value = $5.8 \times 10-3$) (Figure 1a).

Reduced OS was also found between high and low rac1 expression in ER positive patients (HR = 1.37 (1.17 - 1.6) p-value = 7.2×10^{-5}) (Figure 1b).



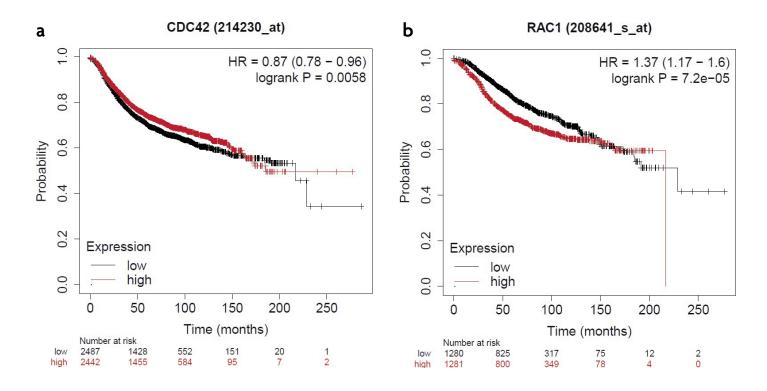


Figure 1. Overall survival between high and low cdc42 and rac1 expression in breast cancer subtypes

- (a) KM showing reduced OS in all breast cancer patients with high expression cdc42
- (b) KM showing reduced OS in ER positive breast cancer patients with high expression rac1

Conclusion

High expression of rac1 and cdc42 are potential markers for poor prognosis in ER positive and all breast cancer patients respectively. More research is needed to confirm these findings however they may support a trial for the use of R-ketorolac in different subtypes of breast cancers.

Supervisors: Professor Patrice Forget and Professor Valerie Speirs Funded by: School of Medicine, Medical Sciences and Nutrition



CHELSEA COOK

Is Molar Incisor Hypomineralisation (MIH) a new disease of the 21st century?

Background

The term Molar Incisor Hypomineralisation (MIH) was used by Weerheijm, Jälevik and Alaluusua in 2001 to describe hypomineralisation of systemic origin of 1-4 permanent first molars, frequently associated with affected incisors. Prior to this, MIH had been described as: mottling of enamel, opaque spots; idiopathic enamel opacities; demarcated enamel opacities; cheese molars; chalky enamel; non-fluoride hypomineralisation in the first molar and idiopathic enamel hypomineralisation in permanent first molars. Assessment of MIH between studies is confounded by different terminology. This results in difficulty in being able to ascertain when this disorder initially presented. The question whether MIH is a new disease of the 21st century, or whether it existed previously in past populations may help to establish if aetiological factors are linked to contemporary lifestyle.

Methods

Cochrane Library, Embase, Medline and Web of Science were the databases used to conduct an extensive literature search. Specific search terms and inclusion/exclusion criteria were used to identify publications relevant to the research question. At the end of the screening process, 13 articles were included in this systematic literature review. 5 of the studies investigated archaeological specimens, ranging from 7-20th century in age, whilst the remaining 8 were clinical studies where the participants were born before the 21st century.

Results

The four common themes identified on review of the selected publications were: suggested rates of MIH between archaeological studies vastly differ amongst them, whilst clinical studies carried out before 2001, suggested similar rates of MIH to present day, despite use of different terminology. Both archaeologic and clinical studies suggest MIH existed before the 21st century and publications using clinical assessment either focused on children, adolescents or young adults.

Conclusion

Analysis of the selected publications suggests that MIH was present before the 21st century. This is demonstrated in both clinical studies and archaeological studies.

Supervisors: Dr Rosa Moreno Lopez

Funded by: Dental Institute



FIONA CRAIGEN

Prognosis of Acute Ischaemic Stroke in Patients with Atrial Septal Defects: analysis of a National Inpatient Sample

Background

Atrial septal defects (ASD) are the third most common congenital heart lesion in adults (approximately 6-10% of cases). It has been well established that ASD are a risk factor for acute ischaemic stroke and therefore, in this study we aim to determine whether there is an association between presence of an ASD and acute ischaemic stroke (AIS) in-hospital outcomes (mortality, longer length of hospitalisation and routine home discharge).

Methods

All AIS admissions between 2016-2018 from The United States National Inpatient Sample (NIS) database were extracted. Multivariable logistic regressions were used to analyse the relationship between ASD and in- hospital outcomes, adjusting for patient demographics, a wide range of comorbidities, revascularisation therapies and the National Institute of Health Stroke Scale (NIHSS). As NIHSS had substantial missing data, a multiple imputation by chained equation algorithm with 20 iterations was employed to impute missing data for this variable.

Results

A total of 245,859 records representative of 1,229,295 admissions with AIS were included. 2.9% had co-morbid ASD. The mean age (IQR) was 72.0 (61.0-82.0) years (46% women). After controlling for aforementioned potential confounders, ASD was associated with 57% decreased odds in-hospital mortality (odds ratio [OR], 0.43; 95% CI, 0.21-0.85). There was no significant association between ASD and either prolonged hospitalisation >4 days (OR, 1.05; 95% CI, 0.86-1.29) or routine discharge (OR, 1.19; 95% CI, 0.95-1.50).

Conclusions

Our results did not show patients with co-morbid ASD had worse outcome and showed significantly less likely to die as in-patient. These surprising findings may relate to an underdiagnosis of ASD in stroke patients given that prevalence of ASD in this sample is much lower than expected population prevalence of 6-10% who may be mis-classified as non-ASD (reference group). Further research incorporating routine echocardiograhic evaluation of stroke patients may help to better understand the real impact of ASD on stroke outcomes.

Supervisors: Dr. Tiberiu Pana and Professor Phyo K Myint

Funded by: Department of Medicine for the Elderly – Leslie Wilson Endowed Scholarship



THOMAS DIFFLEY

Geriatric Major Trauma in Scotland: A Cohort Study into the Demographics, Incidence, Outcomes and Future Burdens on the NHS

Background

The unique socioeconomic and geographical environment of Scotland requires a tailored approach to medicine. Therefore, studies in England do not apply to Scotland. Geriatric Major trauma (GMT) in Scotland provides challenges in health and social care and these will only increase. This study addresses the current picture of GMT in Scotland and Investigates the future trends and demographics over the next decade.

Methods

We collected data on the demographics and outcome of patients at the age of 70 or over who had sustained an Injury Severity Score greater than 15 from the STAG Database between 2011 and 2020, with 2155 records. Outcome included discharge destination and 30-day mortality, with regression used to model the future incidence of GMT.

Results

The incidence of GMT is increasing exponentially (PMCC = 0.965, p<0.01) and is increasing in prevalence (Population growth ~2% each year whilst Incidence increased by 259% between 2011-2020). We found that Low Velocity falls account for the vast majority of Major Trauma and is the fastest growing mechanism of injury. Male GMT is increasing at a much faster rate than in females. There has been no significant change in mortality between 2011-2020 (p = 0.50).

Conclusion

GMT requires a multidisciplinary approach with the increased frailty and comorbidity of patients as they grow older. Additionally, further awareness is needed on how Low Velocity Falls are the biggest contributor to GMT and public health policy needs to focus on preventing falls to begin with, as such increased availability is needed in accessible social care to reduce the incidence of GMT and to provide respite / permanent care for patients post discharge.

Supervisor: Mr Luke Farrow Funded By: University of Aberdeen Funded by: School of Medicine, Medical Sciences and Nutrition



NATTHAYA EIAMAMPAI

Do HER2 positive breast cancer patients with higher HER2-FISH ratio and/or higher *ERBB2*-gene copy numbers have worse clinical outcomes?

Background

HER2 positivity found in 20-30% of breast cancer predicts a more aggressive phenotype and poorer outcomes, but anti-HER2 targeted therapies can improve prognosis. Patients are classed HER2-positive if immunohistochemistry receptor staining scores 3+ (IHC3+), or if IHC2+ with amplified *ERBB2*-gene by fluorescent in situ hybridisation (FISH). The study aimed to investigate whether a greater HER2:CEP17 amplification ratio and/or higher *ERBB2*-gene copy numbers influences patients' outcomes and response to HER2-targeted therapies.

Methods

HER2-positive breast cancer patients diagnosed from 2012-2019 with HER2-FISH testing were identified by NHS Grampian Cancer Audit Registry. With Caldicott approval, patients' pathological details, cytogenetic reports, treatments, and clinical events were collected and analysed using multivariate analysis including Coxregression and log-rank testing (SPSSv27).

Results

Within 217 HER2-positive patients, 76 (35%) underwent HER2-FISH testing with median age 61 years, median tumour size 18mm and 7.89% with nodal involvement. All but one HER2-positive tumours were either pathological grade 2 or 3 (56.58%/42.11%). Tumours were subdivided into those with high HER2-FISH ratio and *ERBB2*-gene copy numbers (mean >3.55/>7.43; n=29/27) or low (mean <3.55/<7.43; n=47/49).

Overall, 5 recurrence and 6 deaths were recorded in a median follow-up time of 38.5 months. Those with high HER2-FISH and *ERBB2*-gene status had a shorter mean follow-up time (by 7 and 0.5 months). Three out of 59 patients, receiving anti-HER2 therapies, had disease recurrence and two out of 17 patients, not receiving anti-HER2 therapies, had a recurrence (5.08%/11.76%).

High *ERBB2*-gene copy numbers were associated with disease recurrence and shorter survival time compared to low numbers (Kaplan-Meier p=0.045, 95% CI [67 -103] months) independent of anti-HER2 treatment.

Conclusions

The degree of HER2-gene amplification seems to influence clinical outcome. However, further research is required in a larger patient cohort with higher event rate to replicate the findings of this study.

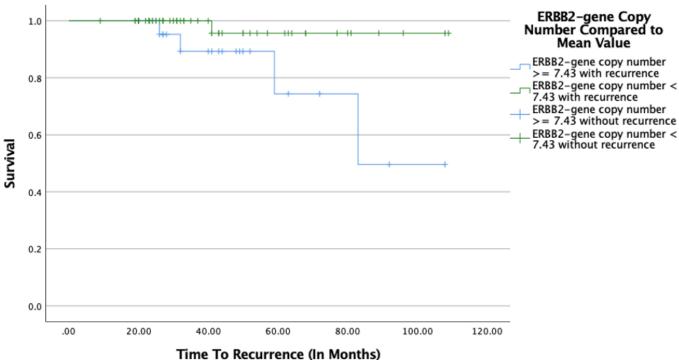
Supervisor: Miss Beatrix Elsberger

Funded by: Breast Research Endowment Fund NHS Grampian



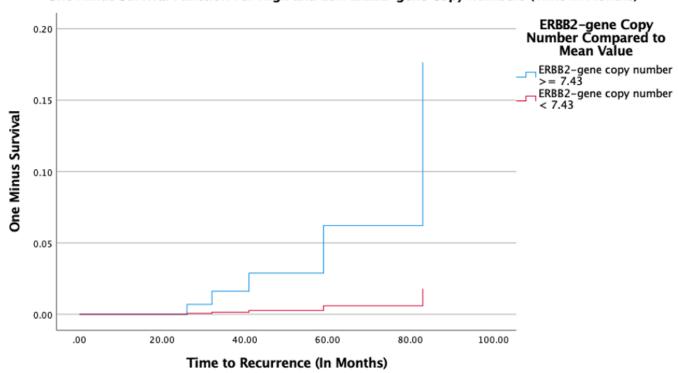
Supplementary Figures





Kaplan-Meier univariate survival analysis comparing time to recurrence between patients whose tumours have high and low ERBB2-gene copy numbers. p=0.045, 95% CI [67 -103] month.

One Minus Survival Function For High and Low ERBB2-gene Copy Numbers (Time In Months)



Whether they received Trastuzumab, tumour type, tumour grade, tumour size, nodal involvement, and tumour oestrogen receptor positivity. p=0.050, HR=10.723, 95% CI [0.009-1.002].

NADA JODEH

The Current Status of Biomarker Implementation in Bladder Cancer

Background

Bladder cancer is a major health problem globally, with high incidence. It is often detected late and has a high rate of recurrence and progression therefore requiring constant monitoring. Currently cystoscopy is the gold standard for detection, diagnosis and surveillance but it is invasive and costly. Less invasive and cheaper alternatives in the form of biomarkers have been heavily researched in the hope of addressing this issue. There is a large translation research literature but less is known about implementation into clinical practice.

Aim

To systematically review barriers and facilitators to implementation of diagnostic biomarkers in bladder cancer management.

Method

A systematic review search was performed up to 7th July 2021 in the following databases: Medline, PubMed, CINAHL, Scopus, PsycINFO and Embase. Search terms included bladder cancer AND Biomarker AND Implementation. Articles were screened against inclusion and exclusion criteria which were that the articles must be about bladder cancer and biomarkers and include mention of implementation. No primary implementation studies were identified so this review focused on available expert commentary articles to explore the barriers and enablers to biomarker implementation. Theory-based analysis was conducted using the Consolidate Framework for Implementation Research (CFIR).

Results

Systematic searches returned 240 studies and 65 remained after abstract screening. Full text screening resulted in a pool of 30 included articles which were data extracted and coded against CFIR. The analysis showed that the most frequently occurring construct among the articles that would need to be addressed to allow implementation was 'Intervention Characteristics' namely 'Intervention Source', 'Evidence Strength and Quality' and 'Complexity'.

Conclusions

This study found that the major barrier to biomarker implementation still lies at the intervention level. More work is needed at the translational research stage of biomarkers before implementation into clinical practice.

Supervisors: Dr Sara MacLennan and Dr Steven MacLennan

Funded by: Institute of Applied Health Sciences



PRAKHYA KRISHNAN

Surgical outcomes for patients with DCIS on diagnosis that had an invasive upgrade on Excision

Introduction

Ductal carcinoma in-situ (DCIS) is non-invasive disease, characterised by cancer cells not breaching the basement membrane of the terminal duct. With the introduction of screening, more cases of DCIS are being diagnosed, but many on excision show evidence of invasive disease that wasn't picked up on triple assessment. We looked at the surgical outcomes of these patients that had DCIS upgraded on excision.

Methods

Patients diagnosed with DCIS in the North-East of Scotland between 2012-2020 were identified. Of this cohort, 138 patients were identified that had DICS on their diagnostic biopsy but were upgraded to invasive disease on excision. We looked at the surgical procedures performed to the breast and axilla.

Results

138 patients were identified with age range of 32-92 (median of 66).

For their first surgery, 51 (36.9%) had mastectomy and 87 (63%) patients had breast conserving surgery (BCS). Of the BCS patients, 60 (69%) didn't need further surgery (50 Wide Local excisions and 10 Therapeutic Mammoplasties) while 27 (31%) needed further surgery. Of the 27, 16 (59.2%) had re-excision of margins so BCS was successful and 11 (40.7%) had mastectomies. Out of all the patients that started with BCS, 11 out of 87 (12.6%) still needed to have completion mastectomy.

51 had mastectomy as their first operation (21 with immediate reconstruction) and a further 11 needed mastectomies after BCS (3 with reconstruction) so 62 out of 138 (44.9%) had a mastectomy which is a high rate with an overall reconstruction rate of 38.7%.

113 (81.8%) patients had axillary surgery with 87 (76.9%) having SLNBx. Of the 113, 22 patients (19.4%) were found to have involved nodes.

Conclusion

In our cohort, we found that mastectomy rate is high, even when BCS is attempted. Not all patients had surgical staging of the axilla, but out of the axillae staged, nearly 1 in 5 was positive.

Supervisor: Mr Yazan Masannat and Miss Beatrix Elsberger Funding: Breast Surgery Department, NHS Grampian



APARNA KUMAR

Patient perceptions of treatment burden after cancer: a systematic review and synthesis of qualitative literature

Background

Treatment burden is the work which individuals with chronic illness undertake to manage their health, and the impact of this work on functioning and wellbeing. Cancer survival rates are increasing and multimorbidity is common in cancer survivors. Individuals living with and beyond cancer face complex and increasing health care-associated workload. The aim of this review is to examine perceptions of treatment burden in individuals diagnosed with breast, lung, prostate and colorectal cancer and the impact of treatment burden on their lives.

Methods

A systematic review and meta-ethnographic synthesis of qualitative literature was chosen to explore patient perceptions in depth. Medline, Embase and CINAHL were searched using terms relating to lung, breast, prostate, or colorectal cancer; cancer management; and qualitative methodology. Studies published in English after 2000 were included. Titles and abstracts were independently screened by two authors. Data extraction forms were created in Microsoft Word and Excel . Qualitative data will be imported into NVivo and analysed using an inductive, interpretative thematic approach.

Progress to date

Database searching yielded 14, 730 titles. After duplicates were removed, 7355 titles and abstracts were screened and 105 full texts were assessed. Forty-five studies met the eligibility criteria and were included. Data extraction is ongoing.

Expected outcome

Key tasks contributing to treatment burden include managing treatment side effects (for example lymphoedema, stoma care), modifying diet, engaging in exercise, self-monitoring, seeking information, and negotiating the healthcare system. Individuals perceive these tasks to be burdensome in terms of time and effort. Conversely, taking action to manage health provides cancer survivors with a sense of control.

Identifying modifiable factors that influence whether cancer self-management is perceived as mainly positive or as burdensome will be an important area of inquiry.

Supervisor: Dr Rosalind Adam

Funded by: Institute of Applied Health Sciences



KAI NEWTON

L1CAM and pFGFR1 as potential protein biomarkers for tumour recurrence in Glioblastomas

Background

Glioblastoma (GBM) is the most common and aggressive malignant primary brain tumour making up 16% of all primary brain tumours with an average survival time of 12-18 months. L1 cell adhesion molecule (L1CAM) and fibroblast growth factor receptor 1 (FGFR1) are cell signalling molecules involved in cell migration and overexpressed in GBM. L1CAM is detectable in serum and in gliomas L1CAM extracellular domain promotes cell migration by mechanisms dependent on FGFR1 activity. Currently there are no comparative studies looking into L1CAM and activated phosphorylated FGFR1 (pFGFR1) use as potential predictive protein biomarkers of GBM recurrence.

Methods

Commercial Tissue Microarrays (TMAs) consisting of GBM and normal cerebellar tissue (NCT) which had been stained immunohistochemically, were analysed with QuPath (a software platform for bioimage analysis) to determine protein expression of L1CAM and pFGFR1. The TMAs contained 208 cores (GBM=8%; NCT=8%) with tissue samples from patients aged 2 to 74. An intensity threshold of 0.2 was set to classify cells as being negative or positive for pFGFR1 and L1CAM staining as a marker of protein expression.

Results

QuPath analysis revealed that L1CAM was significantly expressed in 64.71% of GBM and NCT cores compared to 6.03% expression level of pFGFR1 (P=0.00046). When comparing the proportion of positively expressed cores of GBM with NCT, QuPath demonstrated that GBM cores had significantly greater levels of expression of L1CAM and pFGFR1 than NCT (P=0.015). There was no significant difference between the ratio of pFGFR1 positively expressed GBM tissue to NCT as compared with the ratio of L1CAM expression (P=0.17).

Conclusions

GBM showed greater levels of expression than NCT with L1CAM showing much higher expression levels than pFGFR1. This pilot study suggests that L1CAM may be better suited as a biomarker for tumour recurrence in GBM through its association with malignancy, pronounced staining and detectability in serum.

Supervisors: Professor Valerie Speirs and Dr Anke Brüning-Richardson

Funded by: Cyril & Margaret Gates Trust



EUAN RAMSAY

Frailty is associated with increased waiting time for relevant process of care measures; findings from the Emergency Laparoscopic & Laparotomy Scottish Audit (ELLSA)

Background

Emergency general surgery (EGS) is associated with high mortality. With more older patients presenting as an emergency, an understanding of frailty within the peri-operative pathway is vital to improve the standard of care for these patients.

Methods

We analysed a multi-centre Scottish National Audit which recorded patients presenting with an emergency general surgical condition and underwent surgery for a 12-month period between 2017-2018. The primary clinical outcomes were determinants of process of care measures and 30-day mortality. Secondary clinical outcomes included readmission within 30-days of index surgery and post-operative length of stay.

Results

2244 (1098 (48.9%) male) patients were included (median age 65 years (range 18-96)). All cause 30-day mortality was 9.1% (n=205). No process measure was associated with mortality. Both frailty and ASA grade were associated with mortality (CFS OR 1.84, 95%CI 1.55-2.12, p<0.0001; ASA OR 3.57, 95%CI 2.94-4.34, p<0.0001). Several temporal processes of care significantly linked frailty with longer waiting times (inc. Admission to: Surgery p<0.0001, Anaesthesia p<0.0001, CT Performed, p=0.001) within the perioperative care pathway, whereas age did not (Admission to: Surgery p=0.590; Anaesthesia p=0.800; CT Performed p=0.441).

Conclusions

Frail patients waited longer at almost all stages of the pre-operative pathway. Age alone did not explain the longer wait times displayed with increasing frailty. Temporal processes of care were poor prognostic indicators for 30-day mortality within the EGS setting. Emphasis should be placed on increasing pre-operative frailty assessment and ASA grade classification, measures shown to have a greater predictive value of 30-day mortality.

Supervisors: Prof Phyo Myint, Dr Roy Soiza and Dr Ben Carter (King's College London)
Funded by: Department of Medicine for the Elderly (Gwyn Seymour Scholarship)



DANIEL SESCU

Targeting macrophage M2 to M1 transition in mouse bladder tumour model for radiosensitisation

Background

Elderly muscle-invasive bladder cancer patients require novel non-toxic radiosensitisers as they are particularly vulnerable to current chemotherapy-related toxicity. Achieving high levels of tumour-associated macrophages (TAMs), associated with poor prognosis in bladder cancer, combined with ionising radiation (IR), is one possible approach. Agonist anti-CD40 antibodies and IR can re-programme M2-like TAMs to M1-like, which rapidly infiltrate tumours becoming tumouricidal. We hypothesised that agonist CD40 monoclonal antibodies radiosensitise tumours, via macrophage M2 to M1 transition.

Methods

BBN (carcinogen)-induced orthotopic bladder tumours were treated with 2 Gy IR (N=6). Ultrasound sonograms at 6 consecutive time points were analysed using Vevo LAB. FVB mice were injected subcutaneously with G69 mouse bladder cancer cells (N=24). Treatments [control, intraperitoneal anti-CD40, IR and anti-CD40&IR (N=24)] were given at 100 mm³ tumour size. Immune cell markers [CD3 (general T), CD8 (cytotoxic T), CD163 (M2-like TAM) and PD-L1 (immunosuppressive-signal)] were determined by immunohistochemistry and QuPath. 16S rRNA mouse faecal samples sequencing data were analysed using QIIME2 software, including gut microbiota profiling, alpha and beta-diversity.

Results

Sonograms showed that IR (2Gy) may decrease tumour growth from week 7 to 12 (p=0.05, week 12). Anti-CD40, IR and combined treatments (p<0.05) significantly delayed tumour growth, without significant inter-treatment differences. In the combined treatment group, responding mice (50.7±4.8mm³, n=3) had significantly smaller tumour volume and higher CD3 and CD8 numbers (p>0.05), compared to non-responders (186.2±11.5mm³, n=3) (p<0.001), implying enhanced immune response. A lower CD163 number and higher PD-L1 intensity (p-value>0.05) in responders suggested CD163 may be an anti-tumour response regulator. A negative correlation between PD-L1 expression and tumour size (R²=0.49, p=0.003) occurred. Gut microbiota profiling showed slightly higher relative abundances of *S24-7* and *Bifidobacterium pseudolongum* in responders (p-value>0.05).

Conclusions

IR or anti-CD40 therapies can significantly delay bladder tumour growth in mice, while lower M2-like and higher PD-L1 expression tended to associate with positive responses to combined anti-CD40/IR.

Supervisors: Professor Anne E Kiltie and Dr Chee Kin Then

Funded by: Cyril & Margaret Gates Trust



SERENA SHOKER

ecurrent Miscarriage: Effective Interventions for the Prevention of Further Miscarriage – a Review of Reviews

Background

Recurrent miscarriage (RM) has been defined by various international organisations. The Royal College of Obstetricians and Gynaecologists define RM as ≥ 3 consecutive pregnancy losses before 24 weeks gestation. The European Society of Human Reproduction and Embryology and American Society for Reproductive Medicine define RM as ≥ 2 pregnancy losses. Miscarriage occurs in 10-15% of pregnancies, primarily in the first trimester and 5% of women will experience ≥ 2 miscarriages whilst 1-2% of women experience ≥ 3 . The aetiology is unknown in 50% of cases and often unforeseen so cannot be prevented. Several interventions have been trialled although evidence supporting effectiveness of these is sparse. Systematic reviews have included trials with 2 or 3 previous miscarriages as entry criteria.

Methods

A search strategy was developed. A literature search was conducted using key search terms in MEDLINE, PubMed, Cochrane Database of Systematic Reviews and Embase using Boolean operators "AND" or "OR" to widen the search for studies looking at RM intervention. Inclusion and exclusion criteria were used to screen reviews. Data was analysed using subgroups of 2 or 3 miscarriages. Review quality was assessed using the AMSTAR 2 checklist.

Results

Fifteen reviews were analysed, assessing intervention methods for patients with a history of ≥ 2 or ≥ 3 RM. Live birth rates increased with aspirin/heparin interventions. No significant differences were reported for interventions impacting patients who had experienced ≥ 2 versus ≥ 3 RM's. The methodology of some trials was poor, and randomisation was not clearly explained, reducing study quality.

Conclusions

RM interventions are not yet in place to prevent further miscarriage or increase live birth rates. Interventions including aspirin/heparin were effective, however, limitations included poor data quality in some trials. Further research is required to determine how effective interventions may be and to conclude whether an intervention is more successful in prevention of ≥ 2 versus ≥ 3 RM's.

Supervisor: Dr Sohinee Bhattacharya

Funded by: School of Medicine, Medical Sciences and Nutrition



AMAN SINGH

The Genomic Basis of Syndromic Congenital Talipes Equinovarus

Background

Congenital talipes equinovarus (CTEV), presents as a structural deformity of the foot. With a previously reported rate of 1/1000 live births, it is the most common paediatric deformity but there is no consensus regarding the aetiology. With the rise of "-omic" technologies in the recent years, previous literature has suggested a genomic component and few candidate genes have been reported. The 100k Genomics England rare diseases dataset provides an opportunity to examine the genetic roots of syndromic CTEV within a large UK population.

Methods

We used the rare diseases subset of the 100,000 genomes project to examine the clinical features of individuals affected by bilateral CTEV. Individuals with CTEV were identified using the HPO term 'bilateral talipes equinovarus'. After identification of individuals with bilateral CTEV, an evaluation of tiered genes and tiered variants was also conducted.

Results

Of 71,241 individuals in the rare diseases dataset of the 100,000 genomes dataset, 73 individuals 0.1%) had the bilateral phenotype. Of these, 31 (42.5%) patients were female and 42 (57.5%) were male. Among these, generalised hypotonia (9.2x), joint hypermobility (5.2x) and global developmental delay (4.7x) were more common in individuals with bilateral CTEV than other individuals in the rare diseases dataset. Tiered variants in diagnostically tiered genes with implicated several genes involved in muscle development (TTN), neurological function (DOCK3, LILRBI) and the immune response (HLA-DRB5).

Conclusions

Our observations also support the previous literature implicating neurodevelopmental and musculoskeletal pathways in the development of CTEV phenotype. An in-depth, bioinformatics-based approach, going beyond tiered variants is suggested to further elucidate molecular mechanisms underlying this seemingly polygenic disorder.

Supervisors: Neil Vargesson, Martin Collinson, Zosia Miedzybrodzka Funded by: NHS Grampian medical genetics discretionary fund

Acknowledgements: Scottish Genomes Project and the 100,000 genomes project



ROSA THUEMMLER

Race and sex disparities for in-hospital outcomes of patients with acute ischemic stroke and comorbid diabetes

Objectives

To determine whether there are racial and sex disparities for in-hospital-outcomes of patients with acute ischaemic stroke (AIS) and comorbid diabetes.

Methods

We used the US National Inpatient Sample representative of 462,020 AIS patients with comorbid diabetes between Jan 2016-Dec 2018. Using multiple logistic regressions, the relationship between race (white-reference, African American, Hispanic, Asian-pacific islander and Native American) and in-hospital outcomes as well as sex differences within individual racial group was identified. We also examined the relationship between race, sex, and the likelihood of receiving stroke revascularization therapy. All models were adjusted for a wide range of comorbidities, primary payer, hospital location, teaching status and stroke severity which was adjusted for using imputed NIHSS (National Institutes of Health Stroke Scale) data.

Results

The median (IQR) age was 72 (61-79), 48.91% were women with the following racial distribution: 293,590 White (64%), 105,900 African American (23%), 45,100 Hispanic (9.7%), 14,895 Asian/Pacific Islander (3%) and 2535 Native American (0.5%). Compared to White patients, African Americans showed 28% lower odds of in-hospital mortality (odds ratio [OR], 0.72; 95% CI:0.63-0.82) but were significantly more likely to have prolonged hospitalization, be discharged to locations other than home and presented with a more severe stroke phenotype than their White counterparts. African Americans had 11% lower odds of receiving thrombolysis OR 0.89 (0.82-0.98). African Americans and Hispanics had 24% and 44% lower odds of receiving thrombectomy respectively OR 0.76 (0.65-0.88) and OR 0.66 (0.53-0.83). Compared to men, women overall had a 15% increased OR of in-hospital mortality OR 1.15 (1.04-1.27). A trend of worse adverse outcomes for women across all racial groups was observed including 23% decreased odds of receiving thrombectomy treatment OR 0.87 (0.78-0.97).

Conclusions

Our study demonstrates racial and sex disparities in the in-hospital-outcomes and odds of receiving evidence-based reperfusion therapy in patients with AIS and comorbid diabetes. Clinicians and policy makers should address these disparities to ensure health equity.

Supervisors: Dr. Tiberiu Pana; Prof. Phyo K. Myint; Dr. Amudha Poobalan

Funded by: School of Medicine, Medical Sciences and Nutrition



MANSI TOLIA

Identification and comparison of existing anticholinergic burden scales: A Systematic Review

Background

Concomitant use of medications with anticholinergic properties has a cumulative effect that has been associated with impaired physical and cognitive function, falls, cardiovascular events and mortality. In response to this, multiple risk scales have been developed to quantify anticholinergic burden (ACB) for the purpose of identifying at risk patients. The aim of this systematic review is to evaluate the quality of these ACB scales, and to identify the medications which are consistently ranked higher for their anticholinergic risk or 'potency'.

Methods

MEDLINE (OVID), EMBASE and PsycINFO were searched electronically using search terms synonymous with 'anticholinergic' and 'scale'. To be included studies had to involve human participants and propose a novel or updated scale classifying a finite list of medications based on anticholinergic 'risk' or 'potency'. Anticholinergic medication lists from eligible studies were then amalgamated into an MS Excel spreadsheet. Medications were then ranked according to the number of scales in which they are included as well as the score assigned by each scale. The quality of individual scales was assessed using a novel, proprietary tool developed for that purpose. Screening and quality assessment was conducted by two independent reviewers.

Results

We identified 18 scales. The number of medications included in each scale ranged from 27 to 225. Of the 25 highest-ranking medications identified, amitriptyline is the only medication consistently scored '3' across all the scales, highlighting the significant variation between the scoring systems used by each scale. All but 3 scales are based on a combination of expert opinion, existing literature, and in vitro data. Scales did not present information on dose, duration, and route of administration of the medication. Most of these scales are validated, however validation studies for newer scales are lacking.

Conclusions

Consistent methodologies and good quality validation studies comparing multiple scales would highlight the most robust ACB scale to academics and clinicians.

Supervisors: Professor Phyo Kyaw Myint, Dr Carrie Stewart and Dr Roy Soiza

Funded by: ASRS Programme, Department of Medicine for the Elderly (Leslie Wilson Scholarship)



MATTHEW WARD

Contribution of co-morbidity burden on dementia incidence after stroke

Background

Up to a third of patients with stroke develop dementia. Risk factors associated with post-stroke dementia (PDS) is a topic of growing interest. Identified risk factors of PSD include: recurrent stroke, older age, early seizures, dysphasia, incontinence, pre-stroke cognitive impairment and vascular risk factors. The Charlson comorbidity score (CCS) has shown high efficacy in predicting post-stroke outcomes. However, the link between comorbidity burden assessed using CSS and incidence of PSD has not been examined.

Methods

We analysed Norfolk and Norwich Stroke & TIA Register data between 2004-2017. Patients who survived to discharge, were not diagnosed with dementia pre-stroke and were not lost to follow up were included. We performed a comparative analysis of patient characteristics. A CCS was calculated for all patients. We performed a Cox-proportional hazards model (reference CCS of 1). A two-step cluster analysis was conducted to investigate how patients would be grouped based on comorbidities. Association between patients in these clusters and PSD was assessed.

Results

Of 9397 patients included, 475 (5.1%) developed dementia. Age, presence of comorbid congestive heart failure, metastatic cancer, renal disease, partial anterior circulation and total anterior circulation strokes were significant predictors of incident PSD. A lower CCS was associated with a significant risk of PSD development at a univariable level (HR 1.472 95%CI(1.13,1.91), however this was not significant in adjusted models. The cluster analysis produced 4 clusters of patients. There was significant association between PSD and Clusters 1 and 2. Cluster 1 contained patients with Cerebrovascular disease (CVD) and 0.01% HIV prevalence. Cluster 2 contained a 98.2% prevalence of CVD, there was a low percentage prevalence of the remaining recorded comorbidities except HIV and metastatic cancer which were not present.

Conclusions

Our results did not demonstrate any significant independent association between increasing comorbidity burden and incidence of PSD.

Supervisors: Professor Phyo K Myint. Professor Amanda Lee,

Dr Manimekalai Kesavan Thiruvothiyur, Miss Weronika Agnieszka Szlachetka

Funded by: Institute of Applied Health Sciences

IZABELA WOJSLAW

Survival rate of indirect restorations provided for posterior permanent teeth in a private dental practice. A retrospective study

Background

There is still wide predilection towards using full crown restorations to provide cuspal coverage for extensively damaged teeth. Considering the destructive nature of crown preparation, partial coverage restorations have been increasingly used to restore severely weakened teeth. Due to relative novelty of lithium disilicate used as indirect restorative material, there is still limited data available on its short and long-term longevity. Collected data will allow for comparison of lithium disilicate to other tooth-coloured indirect materials and to cast gold alloy used to restore posterior teeth, as well as identify potential modes of failure of these types of restorations.

Methods

This paper presents a retrospective data analysis to assess the survival of indirect restorations in adult patients. All restorations were placed by one operator in a private dental practice (Aberdeen, Scotland) between October 1999 and July 2021. Confirmation was received from the local Ethics Committee that ethical approval was not required but to comply with GDPR, all data was anonymised prior to analysis. Data on 509 partial coverage restorations was collected and entered into a spreadsheet. Survival was calculated using the method of Kaplan Meier.

Progress to Date

Statistical tests have been run and are currently being analysed.

Expected outcome

It is expected to collect and analyse data to allow for comparison of survival of indirect restorations constructed using different restorative materials and outline potential modes of failure of these restorations.

Supervisors: Mr Steve Bonsor

Funded by: Dental Institute via the INSPIRE Scheme, Academy of Medical Sciences







MARIA ANNA BANTOUNOU

Assessment of the safety and effectiveness of colorectal robotic-assisted surgery; a single-centre experience of the first 50 cases

Background

Colorectal robotic-assisted-surgery (RAS) is a novel healthcare technology with scarce real-world outcomes. The aim of this report was to ascertain the safety and effectiveness of colorectal RAS.

Methods

A retrospective review of the first 50 patients that underwent colorectal RAS in Aberdeen Royal Infirmary (ARI) was performed, using the RStudio package. P-values<0.05 were considered significant and adjusted for multiple comparisons. Cumulative sum learning curves (LC) were computed using the operative times and postoperative complications as surrogates of surgical proficiency. This study followed the SQUIRE 2.0 guidelines.

Results

The median age and BMI were 65 years (IQR,50.25-76.5) and 28.3kg/m2 (IQR,25.2-30.7), respectively, with 27 patients being female (54%). Malignancy (66%) followed by rectal prolapse (18%) were the most frequent diagnosis. All operations were elective and all malignant tumours completely resected. High anterior resection was the most performed operation (36%), followed by rectopexies (18%). The median operative time was 256.5 minutes (IQR,202.2-332.8), with abdominal perineal (p-valueadj= 0.02), high (p- valueadj<0.001) and low anterior resections (p-valueadj<0.001) being lengthier procedures than rectopexies. 2 unexpected intra-operative events occurred, with none requiring open conversion. 27 patients had anastomosis (54%), 7 a stoma formed (14%) and 7 anastomosis with defunctioning loop ileostomy (14%).

Overall blood loss was minor, with 2 patients requiring transfusion (4%). 38 complications occurred in 21 patients, with the majority being minor; CD 1 (17, 44.7%) or 2 (11, 28.9%). Moreover, 5 patients developed an anastomotic leak (10%) and 5 infections (10%). 3 patients required a re-operation (6%). Overall, the 30-day mortality and readmission rate were 0% and 8%, respectively. The median length of stay (LOS) in hospital was 6 days (IQR,4-8). All resection types, apart from low anterior resections, resulted in a longer LOS compared to rectopexies (p-valueadj<0.05). Finally, the LC indicated that 33-35 cases were needed for outcome optimization.

Conclusions

Colorectal RAS was successfully adopted in ARI producing a 0% mortality, 0% conversion to open, 6% re-operation, 8% readmissions and 20% complication (>CD 2) rate.

Supervisors: Shafaque Shaikh and Ahmed Nassar

Funded by: INSPIRE Scheme, Academy of Medical Sciences



EMMA BRANDIE

Pregnancy outcomes in women receiving biological therapy for axial spondyloarthritis

Background

Axial spondyloarthritis (AxSpA) is a chronic inflammatory disease affecting the spine and sacroiliac joints and is typically diagnosed before the age of thirty-five. Treatment of AxSpA initially consists of non-steroidal anti-inflammatory medications. In more severe disease with poor symptomatic control, treatment may be escalated to biological therapies including, tumour necrosis factor (TNF) alpha inhibitors. Thus, treatment with powerful medications is likely to coincide with the time that patients may wish to start a family. Currently, there is very limited evidence regarding the safety of biological therapies during pregnancy and the advice to patients is unclear. The aim of this paper is to identify the current evidence regarding pregnancy outcomes following exposure to biological therapy during pregnancy for the treatment of AxSpA.

Methods

A literature search was conducted through Ovid Medline and Embase to identify relevant studies in line with a PICO model outlined prior to this study. An adapted version of the PRISMA 2020 flow diagram guided screening of 15,121 studies identified during database searches. 101 studies were assessed for eligibility and their references were screened for additional papers.

Results

Six full papers were included in this study. Five of these studies reported 116 pregnancy outcomes following exposure to TNF-alpha inhibitors (adalimumab, etanercept, certolizumab) for treatment of AxSpA during pregnancy. Of these, five pregnancies were reported to have birth defects. The final study reported a higher risk of Caesarean section associated with TNF-alpha inhibitors as there were 83 and 53 deliveries by Caesarean section and spontaneous vaginal delivery, respectively.

Conclusions

There is very little published evidence on the safety of TNF-alpha inhibitors in pregnancy in AxSpA. The small evidence suggests no increased risk of adverse pregnancy outcome, although there may be an increased risk of Caesarean section. This review highlights the need for more studies to be conducted on this topic. This would enable more robust evidence-based guidelines to be produced and implemented confidently in clinical practice.

Supervisors: Professor Gareth T Jones

Funded by: INSPIRE, AMS



SONA JESENAKOVA

The sex-specific outcomes of acute stroke in patients with comorbid Systemic Lupus Erythematosus – National Inpatient Sample Study

Objectives

To explore sex differences in acute stroke outcomes amongst patients with comorbid Systemic Lupus Erythematosus (SLE).

Methods

A total of 316,531 records representing 1,581,430 acute stroke hospitalisations between 2015-2018 from the United States National Inpatient Sample (NIS) were analysed. The primary exposure of interest was comorbid SLE. Patients were grouped according to SLE status and sex: (no SLE-reference, male with SLE, female with SLE). Outcome measures of interest (in-patient mortality, length-of-stay in hospital (LoS) and routine home discharge) were examined utilising multivariable logistic regressions, adjusting for age, ethnicity, stroke type, receipt of revascularisation therapies, region, hospital status and 49 comorbidities including major cardiovascular disease.

Results

The median (interquartile range) age and LoS were 71 (60-82) years and 3 (2-6) days, respectively. There were 940 (0.06%) male and 6110 (0.39%) female stroke patients with comorbid SLE. After adjustments, female patients with SLE had 60% increased odds of dying in hospital following an acute stroke (OR=1.60, 95% CI: 1.17 – 2.18), whereas the outcome for male patients with SLE was not different from the reference group (OR=1.00, 95% CI: 0.41 - 2.40). Similar pattern was seen with the outcome of LOS >4 days OR=1.21 (95% CI: 1.06 - 1.39) for females with SLE while no significant results were observed for male patients with SLE (OR=1.07, 95% CI: 0.76 - 1.52). The odds of being routinely discharged were significantly lower (OR=0.77, 95% CI: 0.66 - 0.88) for females with SLE in comparison to a non-significant increase in the odds of 24% (OR=1.24, 95% CI: 0.88 - 1.75) for males with SLE.

Conclusions

Our results highlight the sex differences in acute stroke outcomes in patients with SLE. Due to a small sample size of males with SLE, our findings need to be cautiously interpreted. Further understanding of the influence of SLE amongst male patients with acute stroke is needed.

Supervisors: Dr Tiberiu A Pana, Professor Phyo K Myint

Funded by: INSPIRE Scholarship, Aberdeen Clinical Academic Training



GEORGIOS KOUNIDAS

Genetic Testing for Hypertriglyceridaemia in the UK

Background

Lipoprotein lipase deficiency (LPLD) is a rare disorder of lipid metabolism characterised by severe elevation of plasma triglycerides and circulating chylomicrons. Between 2013 and 2019, NHS Grampian hosted the only genetic testing service for suspected cases of the condition in the UK. We aimed to report the "real world" genetics data referred to the national centre for LPLD genetic testing and to provide a comprehensive overview to date of LPLD mutations from the United Kingdom (UK).

Methods

Retrospective de-identified review of laboratory records for cases from the UK, referred to a single UK centre for LPLD testing (LPL, APOC2, GPIHBP1, APOA5 and LMF1) between November 2013 and June 2019.

Results

A total of 292 referrals requesting LPLD analysis were identified between November 2013 and June 2019. Of these, 181 (62%) were from cases domiciled in England, 99 patients (34%) were from Scotland and three (1%) were from Wales. Primary referral reason [N=186] was confirmed hypertriglyceridemia/hyperlipidaemia on biochemical testing, followed by pancreatitis [N=66] and diabetes [N=21]. The mean age at referral was 42 and most patients were male (62%). The majority, in whom LPLD was confirmed, had homozygous (35.5%) or heterozygous (64.5%) variants in LPL (62/108), and homozygous (10.7%) or heterozygous (89.3%) variants in APOA5 (28/108). A further 28% of patients carried homozygous, heterozygous or compound heterozygous variants of unknown significance (VUS).

Conclusions

This is the first comprehensive review of LPLD mutations reported to date from the UK. In contrast to previously reported series, mutations in genes other than LPL were found to be more common, reflecting the outbred nature of the UK population, and highlighting the utility of genetic diagnosis in LPLD.

Supervisors: Professor Zosia Miedzybrodzka
Funded by: INSPIRE Scheme, NHSG Endowment



MONIKA MIKALAUSKAITE

Exploring amount and timing of protein intake to predict physical capabilities in the EPIC-Norfolk Population-based Prospective Cohort Study

Background

Dietary protein is essential for maintenance of muscle mass and strength to prevent sarcopenia, which has global prevalence of up to 30% in older people, with resultant increased risk of frailty, falls and fractures. Therefore, adequate protein intake is important to prevent long term disabilities, decreased quality of life, and increased mortality. We explored whether the amount of protein intake and its distribution across the day was important for maintaining physical capabilities.

Methods

Participants were 7,511 men and women who completed a 7-day food diary at the baseline (1993-1997) and later attended a physical capability check (2004-2011) in the EPIC-Norfolk study. Individuals were categorized into 3 protein groups: consuming <0.8, 0.8-1.0 and >1.0 g of protein/kg bw/d. Timing of protein was evaluated based on whether participants met a recommended 0.4g/kg bw during morning, afternoon and evening meals. Physical capabilities measures comprised walking speed, grip strength, chair stands and balance. Linear, Poisson and binary logistic regressions were employed as appropriate, adjusting for demographic, biological, physical activity and medical factors.

Results

The baseline mean age (SD) were 57±8 and 55±8 years for men (44%) and women (56%), respectively. Their corresponding mean (SD) protein intake were 1.1 (0.2) and 1.0 (0.2) g/kg bw/d. >60% of the participants consumed >1g/kg bw/d, i.e., above the recommendation. Only 12% men and 18% women took <0.8g/kg bw/d. Less than 2% of the participants took enough protein during all 3 meals of the day, and 60% met the recommendation for one meal only. Protein consumption was skewed towards evening meals. After adjustment, regression analyses showed no significant association between higher protein intake and better maintained physical capabilities and between participants who consumed the recommended protein amount during none, 1, 2 or 3 meals across the day.

Conclusions

While total protein intake appears adequate for the majority, recommendations were not met for most meals. This may have implication in maintenance of physical functioning in later life.

Supervisors: Professor Alex Johnstone and Professor Phyo K. Myint

Funded by: INSPIRE Interdisciplinary Scholarship



MANISHA PATEL

Worldwide impact of Diabetes on COVID-19 mortality and hospital outcomes, an on-top meta-analysis

Background

Current evidence shows that diabetes mellitus (DM) is a risk factor for SARS-CoV-2 (COVID-19) infection. This study examines the link between DM and poor COVID-19 outcomes across world regions.

Methods

This is an ONTOP systematic review and meta-analysis analysing pre-specified outcomes (mortality, ICU admission, ventilation requirement, disease severity and discharge rates) related to COVID-19 patients with DM. Four databases were searched until 30th August 2021. Retrospective and prospective studies in English, involving adults, were eligible. Following extraction of studies using ONTOP methodology and eligibility screening, 158 original studies were included. Studies were assessed using the Newcastle-Ottawa Scale (NOS) and GRADE framework.

Results

A total of 22 studies were conducted in EU, 90 in Far East, 16 in Middle East, and 30 in America. Ninety-nine studies were graded as good, forty-two as fair and eighteen as poor as per NOS. Overall, 270,212 patients were included, with a median age of 59 years [IQR 53-65], of which 56.5% were male. DM was associated with an increased risk of mortality (Studies N=135) (OR 1.75 [1.61, 2.17], P<0.0001) and typically presented with severe COVID-19 infection (N=43) (OR 2.88 [2.29, 3.63], P<0.0001). DM was also associated with higher odds of ICU admission (N=59) (OR 1.59 [1.15, 2.18], P=0.005) and invasive ventilation (N=80) (OR 1.59 [1.15, 2.18], P=0.005) except in the America world region (N=14) (OR 0.71 [0.42, 1.18], P=0.19). DM patients were less likely to be discharged within the follow-up period (N=22) (OR 0.59 [0.38, 0.93], P=0.02). Moreover, HbA1C levels under 70 mmol (N=5) and metformin use (N=7) showed protective effect, while the inverse was true for concurrent insulin use (N=8).

Conclusions

We quantified the impact of DM on severe COVID-19 outcomes in this study. There appears to be regional differences in COVID-19 outcomes in patient with DM.

Supervisors: Dr Stavroula Kastora, Dr Ben Carter (King's College London),

Professor Mirela Delibegovic, Professor Mamas (Keele University),

Professor Phyo Kyaw Myint

Funded by: INSPIRE Scheme, NHSG Vascular Surgery Department



JOSIP PLASCEVIC

Organisational Implications of the adoption of a high-sensitivity troponin I test and pathway in patients with suspected acute coronary syndrome

Background

Patients commonly present to the Emergency Department (ED) with symptoms suspicious for acute coronary syndrome (ACS) of whom about 20% are suffering a myocardial infarction (MI). High-sensitivity cardiac troponin (hs-cTn) tests have revolutionised the discrimination of patients at low risk, facilitating safe early discharge. However, concerns exist that hs-cTn tests may increase overall healthcare resource use.

The aim was to evaluate clinical safety and organisational resource use before and after implementation of a new clinical pathway utilising a hs-cTn test for suspected ACS patients in NHS Grampian.

Methods

A retrospective before and after cohort study of consecutive emergency patients (>16 years) investigated for suspected ACS was performed.

Patients with suspected ACS who had serum troponin requested were identified from an electronic search of laboratory databases. Relevant patient demographics were recorded and InterSystem TrakCare®, interrogated for clinical outcomes, length of stay (LOS) and need for specialist cardiac investigations or treatments. The clinical safety endpoint was the development of Type 1 or 4 MI or cardiac death within 30 days. Comparative analysis was performed using SPSS (v27).

Progress to Date

To date, 959 patients with suspected ACS symptoms [mean age 63 (SD 17) years, 46% women] have database entries. The cohort before introduction of hs-cTn contains 538 patients and the post-introduction population currently contains 423 completed entries.

There is still data to enter on about 80 patients and the process of independent adjudication of clinical outcomes is nearing completion. Once both are accomplished, the comparative analysis can be run. The only result to date shows a reduction in overall hospital LOS from 18.7ffl61.1 hours to 17.1ffl58.2 hours (median, IQR) with the new pathway.

Expected Outcome

We hope the new pathway will have acceptable safety, whilst demonstrating palpable benefits in downstream hospital resource use.

Supervisors: Dr Jamie Cooper

Funded by: INSPIRE Scheme, Academy of Medical Sciences



JIABEI YU (HELENA)

Development of a social dimension healthy ageing score to explore its relative contribution to healthy ageing using the English Longitudinal Study of Ageing (ELSA) prospective cohort

Background

Modern concepts of healthy ageing emphasise holistic appreciation of various domains of wellbeing, including social dimensions. We identified social support, community engagement and financial security as three main social determinants from contemporary frameworks of healthy ageing. We aimed to devise a scoring framework based on these determinants and evaluate the relationship between them and future quality-of-life assessed using CASP-19.

Methods

We used data from ELSA which is a large prospective cohort study including participants aged >50 years from England, UK. Data covering health, social and economic status were collected from participants biannually, known as waves, during March 2002-July 2019. Variables were extracted on three main social determinants: relationships with families and friends for social support, volunteering and sense of belonging for community engagement and income and benefits received for financial support. Responses were converted to a binary measure (0 for negative responses, 1 for positive responses), and binary scores from variables were aggregated to obtain a final binary score for each category. Statistical analysis determining the independent relationship between social determinants and CASP-19 controlling for other determinants of healthy ageing is ongoing.

Progress to data

We included 9,432 participants of ELSA from Wave 2. Seventy variables related to social wellbeing determinants, including 42 for social support, 26 for community engagement and 2 for financial security, were selected after a consensus. In over 80% selected variables, >50% of participants had binary score of 1 indicating the possession of a social determinant. Participants scored 1 point for every positive-responded variable. Total scores for each domain will be standardised and converted to an overall binary score. Results on the relationship between social determinants and CASP-19 from Wave 4 are awaited.

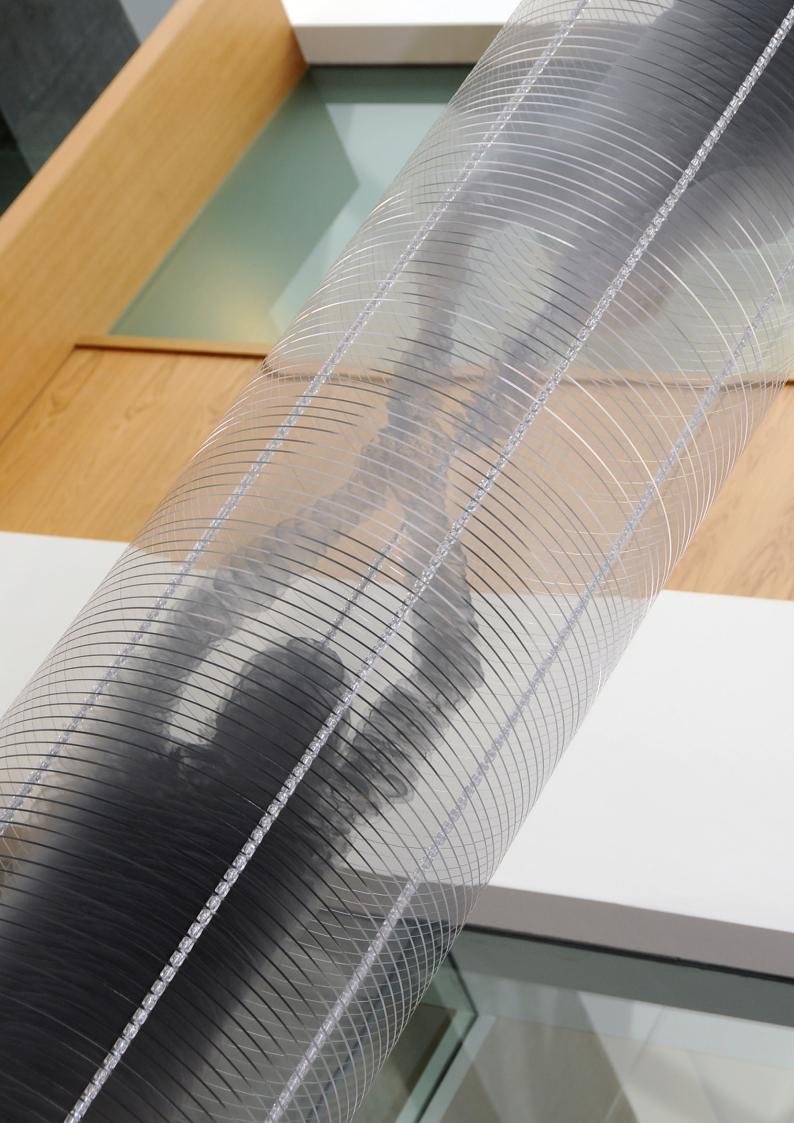
Expected outcome

This scoring approach is expected to help quantify the relationship between social determinants and healthy ageing outcome of CASP-19.

Supervisors: Professor Phyo Myint, Dr Kathryn Martin, Dr. Toby Smith and Zahra Pasdar

Funded by: INSPIRE Scheme, NHS Grampian Vascular Surgery Department







BENJAMIN LAWRENCE

Spinal Muscular Atrophy: A stereological analysis of motor neuron density within the thoracic spinal cord

Background

Spinal Muscular Atrophy (SMA) is a leading, inherited cause of infantile morbidity and mortality. Mutations in the Survival Motor Neuron 1 (SMN1) gene give rise to low levels of cell ubiquitous SMN protein, historically characterised by lower motor neuron (LMN)-related phenotypes. However, SMN depletion also results in extensive non-neuromuscular pathologies, including vascular defects in the spinal cord capillary bed. LMNs are functionally dependent on this microcirculation, therefore ensuing spinal cord hypoxia may affect or worsen neurodegeneration in SMA. Prior to assessing vascularity, we set out to quantify baseline thoracic LMN density in the ventral horn of SMA spinal cord and compare this to controls to gain an accurate measure of the extent of LMN damage in SMA.

Methods

Following fixation, spinal cord from control and SMA patients were embedded in OCT. Serial sections of 8 µm were cut from each tissue block with a cryostat and later stained using luxol blue and cresyl violet protocols. LMNs were counted and measured utilising a gold-standard physical fractionator stereological technique alongside strict morphological and topographical criteria.

Results

Thoracic LMN counts showed a reduced density in SMA (64%) compared to control cords. Spared LMNs had predominantly smaller cell body diameters (20-29 μ m) compared to the broader distribution in controls (20-59 μ m). LMNs were poorly defined from adjacent non-neuronal tissue, less dense in nissl-substance, and lacked multipolarity in SMA compared to control cords.

Conclusions

Although initial results, as predicted, suggest that thoracic LMN density is reduced in SMA, this is a relatively novel finding as there is little supporting data from the thoracic spinal cord. In SMA, increases in the proportion of smaller LMNs, and larger LMN loss, may be evidence of LMN shrinkage. It remains unclear, however, whether this possible shrinkage is a precursor to LMN loss, or a pathological change in residual LMN populations. Future work aims to correlate these findings to vascular abnormalities previously documented within the SMA spinal cord.

Supervisors: Regius Prof. Simon Parson & Miss Hazel Allardyce

Funded by: DuthStra Surgical Endowed Scholarship





ELLA MAXWELL

Assessment of survival after significant milestones in Parkinson's disease in the PINE study

Background

The PINE study is a prospective observational study which documents the long-term prognosis in an incident cohort of Parkinsonian disorders, including Parkinson's disease (PD). PD can affect multiple areas of an individual's life including mobility, cognitive function, and their mental health. Prognosis can vary markedly and the reasons for this variability are still being studied.

A previous study suggested that once someone with PD hits certain important clinical milestones the subsequent survival time becomes remarkably similar regardless of age at diagnosis or death. Our aim was to analyse whether the same applied in the PINE study.

Methods

We included all people with PD who had died within 12-years of follow-up from diagnosis and defined when each patient developed the following milestones: regular falls, loss of independence (Schwab & England score <80), wheelchair dependency, visual hallucinations, dementia, and institutionalisation. We then compared the median survival duration after each milestone subdivided by age at onset (<70, 70-74, 75-79, 80-84, 85+) and death (<75, 75-79, 80-84, 85-59, 90+) to calculate prognosis.

Results

164 patients (64.6% male, mean age at diagnosis of 75.4 years and at death of 82.0 years) from the original 201 individuals had died.

There were no statistically significant differences in total disease duration or time from milestone to death between any of the age-at-death groups. With regards to age at baseline, we found that those in the 85+ category had a significantly lower total disease duration when compared with other age groups and a shorter survival time after developing visual hallucinations, recurrent falls, and a loss of independence.

Conclusions

This work has helped build on the research into the prognosis of PD and the dynamic prediction of outcomes over time. It may also be useful clinically to inform the patient's management once they hit a milestone.

Supervisors: Dr. Carl Counsell

Funded by: Flora Gow Murray Neuroscience Scholarship



NOOREEN AKHTAR

An investigation into how the media reported the impact of the Covid-19 pandemic on the mental health of healthcare workers

Background

The media provides members of public a second-hand reality about the events and situations occurring around the world, and people's behaviour and opinions may be derived in large parts from resources drawn from the media. The Covid-19 pandemic has consumed the headlines for the last eighteen months. The aim of this project was to explore how pandemic related Post- traumatic Stress Disorder (PTSD) experienced by healthcare workers was portrayed in newspapers published in the United Kingdom (UK) and communicated to the public.

Method and Progress to date

Using the LexisNexis Newspaper database, UK newspapers published between 1st January 2020 and 31st August 2021 were collected and examined for articles that made mention of the impact the Covid-19 pandemic had on the mental health of healthcare workers. In total, 2380 newspaper articles were collected and were filtered for articles that exclusively explored the impact the pandemic had on the mental health of healthcare workers. The final number of articles was 166. PTSD was mentioned in several articles, and the next stage of the project will be to perform thematic analysis on these articles and examine the emerging themes.

Expected Outcome

The Covid-19 pandemic provided a unique opportunity to explore how newspapers have reported the extreme stress and trauma healthcare workers have faced over the last eighteen months and the initial results of this study indicate a sympathetic and compassionate narrative, which differs from the negative portrayal other studies have reported in the past. As studies have shown, the media plays a crucial role in helping the public form opinions and inform decisions relating to their health. They have also shown that the public may develop perceptions about their healthcare providers from what they read in the media. The results of this study could inform future investigations as to whether the pandemic has led to a shift in the perception of healthcare workers, and potentially help reinforce the relationship between clinicians and their patients.

Supervisors: Dr Carrie Stewart, Dr Roy Soiza and Professor Phyo Myint

Funded by: Innes Wills Scholarship



RAMISHA BASHARAT

Morphological and Immunological Characterization of Oral Potentially Malignant Disorders using Digital Imaging

Background

Head and Neck Cancer (HNC) is the 8th most common cancer in the UK. Despite advances in treatment, mortality rates are high due to late diagnosis. Oral potentially malignant disorders (OPMDs) carry a high risk of developing into malignancy. The aims of this project were to identify morphological and immunological markers associated with disease progression by assessing morphological descriptors of cell and nuclear shape and size and quantification of PDL-1 expression in normal, OPMDs and malignant oral tissues.

Methods

Histological samples from the oral cavity were obtained from NHS Grampian Biorepository. Diagnostic groups included Squamous Cell Carcinoma (n = 6), OPMDs (low and high grades) (n = 6) and normal controls (n = 6). Immunohistochemistry staining was used to detect PDL-1 expression. Using Qu-Path software, the epithelium was annotated and various descriptors of cell and nuclear shape and size in addition to PDL-1 expression were analyzed and compared between the different diagnostic groups.

Progress to Date

Semi-automated annotation of the epithelial compartment to separate it from the underlying connective tissue was done for all diagnostic groups. As some I samples included multiple tissue sections, the total number of annotated sections was 7 normal control sections, 9 OPMD sections, and 10 Squamous Cell Carcinoma sections. Data extraction and analysis is currently in progress. This includes automated cell and nuclear detection within the epithelial compartment, as well as positive cell detection for PDL-1 expression. Analysis will be done to quantify morphological descriptors and PDL-1 expression and compare them between the different diagnostic groups.

The results of our analysis are anticipated to elucidate changes in morphology and PDL-1 expression as the epithelium progresses from normal to dysplastic to carcinoma in oral tissues.

Supervisors: Dr Rasha Abu Eid, Institute of Dentistry



LORENA BRASNIC

A Closed Loop Audit of Blood Transfusion in Hip Fracture Patients

Background

A critical component in perioperative hip fracture care is blood management. Blood loss can occur due to fracture and/or surgery and often necessitates blood transfusion. New Scottish Hip Fracture Anaesthesia Recommendations (SHARE) suggest transfusion if haemoglobin levels are <90 or <100 if co-existing cardiac disease is present. The aim of this study was to compare the impact of these updated guidelines on transfusion practice within our local hip fracture unit through a standard audit cycle process.

Methods

A first audit cycle of local hip fracture transfusion practice was undertaken in January 2021, prior to introduction of the SHARE guidelines. All cases within a one-month period admitted were assessed. Patients were identified from theatre lists and screened against the inclusion criteria. The primary outcome was an episode of blood transfusion perioperatively. Following the first cycle of the audit, details regarding the new transfusion protocol were introduced on the ward and included in the post-operative note template. A second cycle was then performed July 2021 utilising the same methodology.

Results

A total of 98 patients were included in the audit (61 and 37 in January and July 2021 respectively). There were 15 and 6 transfusion episodes for the first and second cycles respectively. During the second cycle 46% (n=6) of the patients were transfused in line with SHARE. All non-transfused, but eligible patients (n=7) in this cohort had co-existing cardiac disease with post-operative haemoglobin levels of average 93 g/L.

Conclusions

Overall lack of compliance to SHARE is due to decreased blood issuing in the cardiac disease cohort. Absence of specific transfusion recommendations based on severity of haemodynamic instability and variable availability of transfusion protocols likely contributed to this. As cardiac injury strongly correlates with adverse post-operative outcomes, this audit will inform further proposals for practical interventions to improve transfusion guideline compliance.

Supervisors: Mr Luke Farrow, Dr Rebecca Hall Funded by: Endowed Innes Will Scholarship



REEYA CHANDARANA

Investigating the heritability of hypertensive disorders in mothers and daughters: A systematic review of epidemiological studies

Background

'Hypertensive disorders of pregnancy' (HDP) represents conditions including pre-eclampsia, eclampsia and gestational hypertension; they are global causes of maternal and foetal death. HDP cause severe complications for mother and baby, attributing to increased risk of cardiovascular disease in later life. current evidence shows a genetic link between mothers and adult offspring however, there is little regarding heritability of HDP on specifically female offspring. This review investigates heritability of hypertensive disorders in mothers and daughters.

Methods

The search was conducted using Medline and Embase on the platform OVID. The PECO format was used to identify the keywords (female offspring, pre-eclampsia, eclampsia, intergenerational. 57 papers were identified and reviewed using an eligibility criteria. Studies were assessed using the CASP checklists. Finally, narrative synthesis of the findings from included studies was done.

Results

Five papers were eligible; two from study retrieval and three from screening references outside of OVID. An intergenerational cohort study looking at 17302 nulliparous women found an increased risk of preeclampsia in women born to pre-eclamptic mothers (adjusted relative risk ratio 2.55 95% CI 1.87-3.47). Another population-based cohort study also supported this. A review found pregnancies with pre-eclampsia due to placental insufficiency, led to female offspring at higher risk of pregnancies with pre-eclampsia. Additionally, their female siblings who were not born to pre-eclamptic pregnancies themselves, had an increased risk of developing it. A report indicated pre-eclampsia and eclampsia are highly heritable in female relatives and a single gene may be responsible for this. Contrastingly a Norwegian, population-based study reported that foetuses are also affected by paternal genes. Women with a half-sister sharing a father have increased (1.8) risk of pre-eclampsia compared with that of sharing a mother (1.6).

Conclusions

The findings suggest that HDP show strong heritability between mothers and daughters.

Supervisors: Doctor Sohinee Bhattacharya

Funded by: Innes Will Scholarship



TJASA DOBOVSEK

Association between Sociodemographic Characteristics and Migraine During the COVID-19 Pandemic

Background

Migraine is a common neurological condition with over 1.1 billion global cases and a lifetime prevalence of 33% in women and 13% in men. It is characterised by recurring attacks that usually present as a moderate to severe unilateral pulsating headache. The COVID-19 pandemic has had a substantial impact on healthcare and our goal was to conduct a systematic review which will investigate the impact on migraine, specifically looking at migraine outcomes and changes in treatment, and how they have been affected by different sociodemographic factors and which sociodemographic groups may be at more risk of deterioration.

Methods

We conducted a search on three electronic bibliographic databases between January 1996 and July 2021: Embase, Medline and PsycINFO. We identified 303 citations. Desired outcomes included changes in migraine severity, frequency and treatment. We only included English studies and excluded studies that looked at migraine outcomes in COVID-19 patients or patients with new diagnosis of migraine. In addition, we excluded studies that focused on migraine outcomes based on telemedicine applications as this has already been researched. After critical appraisal, 14 studies met our criteria. All the relevant data was extracted using a standard format.

Progress to Date

After conducting a search and identifying the studies that meet our criteria we started a data extraction process via a data extraction form. This process is now complete and we have started to combine the studies which are awaiting meta-analysis and meta-regression to show the relationship between sociodemographic characteristics and migraine outcomes.

Expected Outcome

Before data extraction it was expected that migraine has worsened due to implications of social distancing. Different studies show positive and negative ramifications. It is important to further analyse the collected data to detect which groups of people are subject to worsening or improvement in order to fully understand what was the true impact of the COVID-19 pandemic on patients with migraine.

Supervisor: Dr Amudha Poobalan



ELLIE B. FERGUSON

Investigating Sorcin expression in sarcomas and carcinomas - does it have multidrug resistance biomarker potential?

Background

Multidrug resistance (MDR) is a cellular mechanism by which cancers develop resistance to chemotherapy drugs and this is a major cause of treatment failure. A protein called Sorcin (Soluble Resistance-related Calcium binding protein) is expressed by several normal tissues, including liver, lungs and heart, where it regulates important calcium-dependent cellular processes. However, abnormally high levels of sorcin can cause cancer and 'switch-on' multidrug resistance in cancer cell lines. Sorcin activity increases drug resistance to a number of commonly used chemotherapy drugs but, importantly, inhibiting overexpressed sorcin activity in experimental systems reverses tumour cell multidrug resistance, implying that it could provide a novel therapeutic target to circumvent MDR. The Sorcin gene, located on chromosome 7, is in the same amplicon as other genes known to be involved in multidrug resistance, including ABCB4/ ABCB1 (P-glycoprotein 1) and it is a putative biomarker of MDR.

A key question is to identify which different types of tumour tissues over express sorcin and determine whether sorcin expression is a biomarker, or correlate of, known chemotherapy responsiveness. The aim of this study is to immunohistochemically evaluate sorcin expression by several different, histologically well-defined, types of tumour in tissue microarrays, (TMA's).

Methods

A tissue microarray of different muscle-invasive urothelial cell carcinomas (IUUC) identified in the ARI Pathology archive was constructed. This TMAs and a pre-formed multi-tumour tissue microarray were immunohistochemically stained using Sorcin antibody. The stained TMA's were scored using light microscopy. Tumour- specific expression patterns were evaluated.

Results

40% of carcinomas in the multi-tumour tissue microarray stained positive for sorcin, of the bladder carcinomas in this array 75% were positive. 63% of the samples in the IUUC microarray stained positive for sorcin, 25% strongly positive.

Conclusions

The results suggest that sorcin is expressed by IUCC so should be compared with chemotherapy responses defined by the final, retrospective, ypTNM stage of patient-matched resected bladder specimens to determine if sorcin effects their chemotherapy response.

Supervisor: Dr Sinclair R. Dundas



SAMANTHA GREEN

Mechanisms of Weight Loss in Parkinson's Disease: A systematic review

Background

Parkinson's disease (PD) is a progressive neurodegenerative condition that is common in the elderly. Weight loss is a common feature seen in PD and often occurs early in the disease. This early weight loss, if sustained, is associated with higher rates of dependency, dementia, and an earlier death. These findings suggest that interventions to prevent or treat weight loss in parkinsonism may improve outcomes. However, many aspects of the mechanisms of weight loss in parkinsonism as well as the association between weight loss and patient outcomes are not yet clear. The aim of this project was to update existing systematic review data.

Methods

In the previous systematic review, searches of MEDLINE and EMBASE identified 5783 studies with 57 of these included in a review in 2018. The search strategy combined terms for weight loss and nutritional status with terms for PD. We performed a second search from June 2018 to June 2021 to update this review, which identified a further 2028 results. Of these, 20 were identified as relevant and added to the 57 previously analysed.

Progress to Date

19 potential mechanisms of weight loss were identified in the previous review. Mechanisms with the most supporting data included PD severity, dopamine replacement therapy, psychological factors, hormones and GI changes. Mechanisms with less evidence included appetite, dyskinesias, physical activity, sleep, dysphagia, nutritional intake, brain imaging findings, cognition, olfaction, metabolic rate, motor fluctuation and alcohol consumption. Data extraction from the updated systematic review is still ongoing.

Expected Outcome

Conflicting results and a high risk of bias in studies included thus far mean we lack clear evidence on mechanisms of weight loss in PD. This update will add more recent studies, which may make some aspects clearer, but it is likely that further research is still needed.

Supervisors: Dr Angus Macleod

Funding: Innes Will Endowed Scholarship



RACHEL JACKSON

The evaluation of drawing tasks to aid the transition of undergraduate dental students from pre-clinical to clinical practise

Background

Dentistry is a multifaceted, rapidly advancing discipline in which professionals need to continuously acquire new knowledge and skills. Research suggests that current teaching of practical operative skills appear to be compromised by an ever-expanding academic curriculum and reduced patient contact. Efforts to address this may be misdirected if they are based on narrow teaching methodologies. It is hoped that through the production and analysis of a drawing course, any teaching method that could strengthen the attainment of practical skill be exposed.

Methods

An opt-in online self-directed drawing course was created for the topic of Tooth Morphology and made available to second year undergraduate dental students at the Institute of Dentistry Aberdeen. Prior to clinical skills exposure, students completed a workbook which provided evidence of the students' knowledge, skills and abilities. These were double marked using templates. Ethical approval is pending for the full use of data, including students' pre and post-course questionnaires and their workbook results.

Results

Out of a possible twenty-one students, thirteen completed the drawing course. A response rate of (61%). 97% of students successfully completed the course and 100% of students had improved their drawing skills from their pre-instruction drawing to their final piece. 100% of students were able to successfully apply their knowledge and skills within a clinical context. Multiple themes emerged from both a teaching and learning perspective.

Conclusion

The course evaluation concluded that drawing tasks can amalgamate multiple cognitive processes within focused non-clinical learning events that are complementary to the learning of knowledge and practical skills for dentistry. Furthermore, drawing templates make drawing tasks more reliably assessable by teaching staff. Yet specific drawing methods and task design are key in facilitating the required learning.

Supervisor: Dr Rosa Morino Lopez



KIRSTY TAY, LAU JIE FEI

Evaluating Patient and Public Involvement (PPI) in Chronic Pain Research

Background

Patient and public involvement (PPI) in research is defined by the NIHR to be 'research that is carried out with or by members of the public rather than to, about or for them'. PPI in research, particularly chronic pain (CP) research, has become increasingly recognised as a valued collaborative process. Since CP affects all aspects of patients' lives, its management is complex and multi-faceted. To ensure that chronic pain research is impactful, it should be guided by patients with lived experience. Thus, researchers will continue to be challenged in their preconceived ideas of what is important to the patient population. The aim of this project was to undertake a topical review to evaluate PPI across the research cycle as reported in CP literature.

Methods

A search strategy was constructed for each research-cycle stage, and six Ovid databases were searched. Following screening, evidence of PPI was collated into the respective parts of the research cycle to elucidate the nature and level of PPI in each study. The GRIPP2 tool, the guidance for reporting of PPI in research, was used to assess the quality of PPI in each paper. A patient partner was involved in identifying and prioritising, designing, and undertaking of the project to date as a co-author.

Results

1042 papers were identified through the search strategy, 13 of which met our eligibility criteria after abstract and full-text screening. The sections that had most PPI reporting in were design and managing, as well as undertaking. Papers lacked PPI under commissioning and implementation. Patients were often recruited for research, but as participants rather than collaborators.

Conclusions

Despite the promising amount of CP research, few articles report PPI activities in a meaningful way. Nonetheless, the importance of PPI is increasingly recognised and reporting can be improved through the GRIPP2 tool.

Supervisors: Dr Kathryn Martin and Dr Gillian Craig



RIBEYA MAHMOOD

Longitudinal Functional Changes in Parkinson's Disease: analysis of the English Longitudinal Study of Ageing (ELSA)

Background

Heterogenous functional and cognitive changes occur in Parkinson's Disease (PD) over time. To date, studies have focused mostly on cognitive or functional decline. Functional outcomes usually measured were subjective self-reported outcomes such as activities of daily living. More recently, objective measurements of motor function (chair rise, grip strength and timed walk) have been highlighted as potential outcomes to examine.

Objective

We aim to compare the functional changes measured objectively, specifically motor function, over long-term follow-up in people with PD compared to those without PD.

Methods/Study Design

This is a nested case-control study using data from the English Longitudinal Study of Ageing (ELSA) (2002- 2017), a population-based prospective cohort with 2 yearly longitudinal follow-up. Cases were participants with a PD diagnosis at any time point (n=156). They were matched by age, sex and total number of co-morbidities with 6 controls without PD. Multi-level linear regression analysis will be performed using STATA to analyse the change in objective functional outcomes over time (chair rise, grip strength and timed walk measures), adjusting for smoking, cardiovascular disease, diabetes, stroke and musculoskeletal disorders.

Progress to Date

After data cleaning and identifying cases and controls, there is significant amount of missing data including some of the outcome measures. Therefore, imputation by chained equations (MICE) accounting for the longitudinal nature of the data is required before performing the multi-level linear regression analyses. Next step will be to perform imputations using MICE for variables of interest with missing data and perform the pre-specified multi-level linear regression analyses to determine the association between PD and longitudinal functional decline.

Expected Outcome

We expect these objective measures to show significant functional/motor decline over time. We hope to identify timescale(s) that may show the most significant decline to gain a better understanding of the trajectory in PD compared to matched non-PD participants.

Supervisors: Dr Tiberiu Pana; Dr Ben Carter; Prof. Phyo K Myint



RIBEYA MAHMOOD

Dementia and In-Hospital Outcomes in Haemorrhagic Stroke: A National Inpatient Sample Study

Background

The relationship between Dementia and Stroke is well established in the literature. Dementia is both a risk factor for stroke as well as a long-term complication after stroke. Nevertheless, previous studies have focused solely on the relationship between ischaemic stroke and dementia. The relationship between dementia and haemorrhagic stroke (HS) therefore remains largely undescribed.

Objective

We aimed to determine the relationship between comorbid dementia and HS in-hospital outcomes.

Methods

All HS admissions between October 2015-December 2018 were extracted from the US National Inpatient Sample (NIS) Dataset. Logistic regressions were used to analyse the relationship between dementia and hospital outcomes (mortality, prolonged stay >4days and routine home discharge), adjusting for demographics and a wide range of co-morbidities.

Results

A total of 37, 347 records representative 186 735 admissions were included. 11.77% of patients had co-morbid Dementia, with a significantly higher prevalence amongst females: 14.7% of females and 8.97% of males, (P value =<0.01). After adjustment for confounders, dementia was not associated with increased in- hospital mortality (odds ratio [OR], 0.77; 95% CI, 0.71-0.85). But it was associated with increased odds of prolonged hospital stay (OR, 1.23; 95% CI, 1.14-1.33, (P<0.01)) and decreased odds of routine discharge (OR, 0.45; 95% CI, 0.40-0.52, (P<0.01)).

Conclusions

Dementia was associated with lower odds of in-hospital mortality but was significantly associated with prolonged hospital stay and discharge to other locations than home.

Supervisors: Dr Tiberiu Pana and Professor Phyo Myint



JOHN SAGANTY

Issues with NHS PREDICT in estimating 5-year survival in multifocal breast cancer

Background

Online tools are rapidly growing in assisting clinical decision making for breast cancer patients. PREDICT (http://www.predict.nhs.uk), is a web tool used to estimate survival at 5 and 10 years in women receiving adjuvant therapy for breast cancer. However, PREDICT can only use data from one tumour foci to calculate survival. This raises issues for patients with multifocal disease (≥2 tumours in the same breast), as variable results may be produced depending on the tumour used. This could mean inaccurate predicted survival estimates for up to 60% of breast cancers.

This retrospective cohort study aimed to examine the variation in PREDICT's 5-year survival estimates in consenting patients with multifocal or bilateral disease.

Methods

Eligible patients for the study were those with primary breast cancer that was multifocal or bilateral. We analysed 227 patients from Aberdeen (n=88), Birmingham (n =29), Leeds (n = 26) and Barts and the London Hospitals (n = 84). Using electronic patient records, 5-year survival estimates for each focal disease were calculated to assess for any variation within patients. Proportion of patients with multifocal disease that had variation in PREDICT outcome scores were calculated, as well as the difference in PREDICT scores.

Progress to Date

Patient sample 5-year PREDICT score variations ranged from 0 to 64% depending on the tumour foci selected. Most cases (203 out of the total 227 samples; 89%) had foci variation in their PREDICT scores: with 139 having a difference of 1-5%; 27 had 6-10%; 24 had 11-20%; and 13 had >20%.

Expected Outcome

Our results suggest that PREDICT is an inaccurate tool to assess 5-year survival in multifocal disease. This means that treatment decisions made using the algorithm may not be the most appropriate for all patients, leading to worse than expected outcomes and potentially breast cancer recurrence.

Supervisor: Professor Valerie Speirs Funded by: Innes Will Scholarship



ANSU MARI SAJI

A systematic review to examine the relationship between maternal hypertension during pregnancy and cardiovascular diseases risk in adult offspring

Background

Hypertensive disorders of pregnancy predispose mothers to an increased cardiovascular risk. Studies have reported a similar association in offspring born to hypertensive pregnancies. Our objective was to assess the evidence supporting any association between maternal hypertension and cardiovascular disease in adult offspring.

Methods

A systematic review and meta-analysis was conducted on studies examining cardiovascular disease risk of adult offspring born to hypertensive pregnancies compared to those of normotensive pregnancies. The cardiovascular outcomes included blood pressure, stroke and coronary heart disease. Medline and Embase were searched to identify studies published between 1948 and 2021. CASP checklist was used to assess quality of the included studies.

Results

The search identified eight studies for meta-analysis and two studies for qualitative synthesis. Meta analysis using the fixed effects model showed a 3.54mmHg (95% CI 2.08-5.00) higher systolic but 1.86mmHg (95% CI 0.64-3.07) higher diastolic blood pressure in adult offspring exposed to hypertensive disorders of pregnancy. Severe pre-eclampsia (2.2 relative risk 95% CI 1.2-4.1) but not gestational hypertension (1.4 relative risk 95% CI 1.0-1.8) was associated with an increased risk of stroke in adult offspring. Risk of coronary heart disease in adult offspring was not associated with gestational hypertension or severe and non-severe pre-eclampsia.

Conclusions

Maternal hypertension was associated with increased systolic and diastolic blood pressure in adult offspring. Preventative measures should be developed to protect these individuals from the risk of hypertension and prevent subsequent cardiovascular disease.

Supervisors: Dr Sohinee Bhattacharya



EMILY SALT

Morphometric analysis of Epithelial Cell Layers in Normal, Dysplastic, and Neoplastic Oral Tissues

Background

Squamous Cell Carcinoma (SCC) represents over 90% of oral cancers, which typically originate in the most basal layers of the epithelium. Globally, the morbidity and mortality remain high due to late diagnosis. Some cancers are preceded by dysplastic changes; however, it remains difficult to predict which dysplastic lesions have the potential for malignant transformation. Currently, there is a deficit in available biomarkers capable of predicting disease progression. Morphological changes associated with premalignant and malignant transformation have significant diagnostic utility; however, their prognostic utility remains uncertain. The aim of this study was to look for morphological differences between normal, dysplastic, and cancerous cells found within corresponding layers of oral epithelium.

Methods

23 images representing the epithelial compartment of samples from the floor-of-mouth (7 normal, 6 low-grade dysplasia, 6 high-grade dysplasia, 4 SCC) were analysed. Cells within the epithelium were detected using QuPath and binary images produced and processed using ImageJ. Cell layers were determined, numbered, and counted both from the basal layer upwards and the superficial layer downwards. Twenty- one morphological variables were used to compare the shape and size of every cell allocated the same epithelial layer number across the different diagnostic groups.

Results

87,735 cells were analysed and grouped into 30 and 36 layers when counted from the basal and superficial layers respectively. The majority of the morphological features (19/21) showed significant changes between normal and pathological samples. Interestingly, these differences became less apparent when more superficial layers were assessed.

Conclusions

As malignant lesions typically develop within the basal layer of the epithelium, it is unsurprising that cells from this layer showed the most significant differences between the diagnostic groups. However, differences were also observed in the supra-basal layers; therefore, morphological analysis of these layers may offer greater diagnostic and prognostic potential than previously assumed.

Supervisor: Dr Rasha Abu-Eid



YUSUF SARWAR

Biomarkers and anthracycline induced cardiotoxicity, a systematic review and meta-analysis

Background

Breast cancer is an extremely prevalent condition, consistently been recognised amongst the most frequent cancers worldwide. With the diagnosis of breast cancer comes a mortality rate of 33.3% in females. Anthracyclines are a mainstay in the treatment process of breast cancer patients.

Whilst the use of anthracyclines has made significant strides in reducing mortality, they have been associated with a number of side-effects – most notably among these are reports of cardiotoxicity. Several studies have used the measure of left ventricular ejection fraction (LVEF) to investigate potential cardiotoxicity.

Methods

A literature search was performed on 5 databases – Google scholar, OVID, MedRvix, Medline and Clinicaltrials. gov. The search terms used were (Anthracyclines and/or doxorubicin and/or epirubicin) AND (Cardiotoxicity) AND (Breast cancer or malignancy) AND (Biomarker). Through screening and subsequent elimination of less relevant papers, 5 observational studies were found to be eligible for inclusion in this meta-analysis.

Results

Our meta-analysis of 5 studies therefore investigated 8 biomarkers associated with cardiotoxicity. Of these, GDF15 and GAL3 demonstrate positive hazard ratios of 3.73 [95% CI 2.69, 5.17] and HR 4.48 [95% CI 3.27, 6.13] respectively.

Conclusions

Our studies highlight novel biomarkers not previously assessed. Furthermore, future research is required to investigate whether standardised imaging or the use of biomarkers would prove to be a safer, more cost-effective measure of cardiotoxicity in breast cancer patients undergoing anthracycline chemotherapy.

Supervisors: Dr Stavroula Kastora and Professor Phyo Myint

Funded by: Pathological Society Research Council Centre for Medical Mycology





SHIMA PASDAR

Student preferences on assessments depending on their learning styles

Background

A vital element of students' academic performance relates to the outcome of their summative examinations. There are many factors which affect the grades of students in these examinations. One of these factors are the variety of different learning styles students foster to understand and retain information from their course. There are several different learning preference inventories used to identify the individual learning styles and learning approaches the student adopts. Whilst there are numerous studies identifying different teaching methods to suit the students individual learning styles, there is little research which looks on assessing the impact of changing assessment types to suit student learning styles. The aim of this systematic review was therefore to assess the value of changing assessment types to suit different learning styles in healthcare students.

Methods

Six databases were searched including Medline, Embase, PubMed, Web of Science, Cochrane Library and ERIC from mid to end of July 2021. The papers identified were subsequently title and abstract screened by an independent reviewer. Full text screen of the papers was carried out by two independent reviewers. Papers were screened based on pre-determined inclusion and exclusion criteria.

Results

Twenty-seven papers were included in this study. Of these papers the different learning styles and approaches to learning were identified using different questionnaires including the Kolb Learning Style Inventory and VARK (Visual, Aural, Read/Write, Kinaesthetic). Twenty-four papers included written examination assessments, nine contained practical examinations and one contained an oral examination with some papers containing more than one type of assessments. Only one study analysed the effects of various learning styles on different assessments and found weak correlations.

Conclusions

Initial screening showed various learning styles to be associated with objective measures of academic achievement. Weak correlations between different learning styles and different assessments were found.

Supervisors: Dr Rosa Moreno Lopez

Funded by: Institute of Dentistry for Summer Education Teaching Development Project



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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.









Aberdeen Clinical Academic Training (ACAT)

Training programmes and support for postgraduate clinicians in Aberdeen.



www.abdn.ac.uk/smmsn/acat



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