GROWTH FACTOR RECEPTOR-BOUND PROTEIN 7: A POTENTIAL THERAPEUTIC TARGET FOR OESOPHAGEAL CANCER?

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Introduction: Oesophageal cancer has poor clinical outcomes with limited treatment options. Targeting molecular pathways that are critical for tumour proliferation may facilitate personalised therapies to improve patient outcomes. Growth Factor Receptor-bound Protein 7 (GRB7) is an intracellular adaptor molecule that can interact with multiple signal transduction pathways implicated in cell growth and migration. GRB7 is over-expressed concurrently with the Her2/Neu oncogene in 30% of oesophageal cancers, and is associated with metastatic disease and lower survival. In this study, we evaluated GRB7 as a potential therapeutic target for oesophageal cancer.
Methods: A panel of eight cell lines (Adenocarcinoma: OE19, OE33, OAC-NC1, JH-Eso-Ad1, Flo1. Squamous cell carcinoma; TE7, OE21 and Normal oesophagus: NES) were examined for GRB7 and Her2/Neu gene expression and amplification using RT-qPCR. RNA interference (siRNA) was used to study the effects of GRB7 gene knockdown on cell proliferation.
Results: GRB7 and Her2/Neu gene expression were elevated in OE19 (GRB7: 727-fold, Her2/Neu: 252-fold, $p < 0.001$) and OE33 (GRB7: 111 fold, Her2/Neu: 26 fold, $p < 0.001$) cells compared with NES cells. This corresponded to significant GRB7 (OE19: 61-fold, OE33: 6-fold, $p < 0.01$) and Her2/Neu (OE19: 54-fold, OE33: 4-fold, $p < 0.01$) gene amplification on chromosome 17q12-21, a region previously reported to be amplified in upper gastrointestinal cancers. Importantly, GRB7 gene knockdown in OE19 cells significantly inhibited cellular proliferation by 57.9% ($p < 0.001$) compared with non-targeted controls. In contrast, GRB7 gene knockdown in OAC-NC1 cells, with normal levels of GRB7 and Her2/Neu expression, did not impair cell growth.
Conclusions: GRB7 gene knockdown specifically inhibits growth of GRB7 and Her2/Neu over-expressing oesophageal cancer cells. GRB7 may be a potential therapeutic target for oesophageal cancer.

A NOVEL THERAPY TARGETING FLIGHTLESS REDUCES HYPERTROPHIC SCARRING BY MODULATING FIBROBLAST PHENOTYPE

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Introduction: Hypertrophic scarring results from an overproduction of collagenous extracellular matrix, which occurs following injury. In addition to severe disfigurement, scar contracture over time leads to significant disability. Flightless (Flii) is a gelsolin like protein shown to be a negative regulator of wound healing. We demonstrate a Flii neutralising antibody treatment prevents hypertrophic scarring in an animal model due to its effect of fibroblast phenotype.
Methods: A model of hypertrophic scarring was applied to wild type, Flii knockout and Flii overexpressing mice. Resulting scars were analysed for scar severity, as well as key determinants of scarring using histological and immunohistochemical techniques.
Flii neutralising antibody was applied to the murine model of hypertrophic scarring. Treated scars were compared IgG treated controls using in terms of scar severity and other key determinants of scarring. *In vitro* studies were carried out using primary fibroblast cultured from human and murine skin in order to determine the cellular basis for the observed treatment effect.
Results: Scarring was significantly reduced in Flii knockout mouse compared to wild type and increased in Flii overexpressing mice at both 28 days and 56 days. Scarring was significantly reduced in mice treated with Flii neutralising Ab. Reducing Flii in vitro modulated the phenotypic change of fibroblasts to myofibroblasts.
Conclusions: Flii appears to be a key regulator of hypertrophic scarring. Treatment with Flii neutralising antibody treatment led to a significant improvement in scarring in a murine model. This effect appears to be due to an effect on fibroblast-myofibroblast phenotype. Flii neutralising monoclonal antibody therapy represents a promising candidate for a novel treatment for hypertrophic scarring.

INFLUENCE OF SPHINCTER PRESERVATION ON HEALTH-RELATED QUALITY OF LIFE FOLLOWING RECTAL RESECTION: A COMPARATIVE STUDY

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Introduction: Previous studies comparing health-related quality of life (HRQOL) following abdomino-perineal excision of rectum (APER) and anterior resection (AR) have demonstrated inconsistent results. Bowel function following AR is highly variable and previous studies have failed to make comparison according to functional outcome, which might explain this inconsistency. Therefore, this study aimed to compare HRQOL of patients following APER to subgroups of patients after AR, stratified according to type of bowel dysfunction.
Methods: A cross-sectional study of consecutive patients who underwent APER/AR at a tertiary centre (2001–2011) was performed. HRQOL was assessed subjectively by elucidating patient satisfaction with their stoma and objectively using the validated SF-36. These measures were compared to patients who underwent AR stratified by those with and without evacuation and/or storage dysfunction.
Results: Of 54 patients identified, 39 (72.2%) participated (23 M, 69 years). Over two-thirds (69.2%) reported satisfaction with their stoma and only one-quarter (25.6%) felt that life with a stoma was worse than originally expected. SF-36 scores were lower following APER compared to those undergoing AR and with *normal* post-operative bowel function (mental composite scores [MCS]: 47.4 ± 13.9 vs. 55.4 ± 8.0, $P < 0.01$; physical composite scores [PCS]: 42.9 ± 12.6 vs. 48.6 ± 11.1, $P<0.05$). However, SF-36 scores following APER were similar to AR patients with post-operative evacuation and storage dysfunction (MCS: 47.4 ± 13.9 vs. 49.9 ± 10.6, $P = 0.4$; PCS: 42.9 ± 12.6 vs. 44.9 ± 10.1, $P = 0.3$).
Conclusions: The majority of patients are satisfied with their stoma following APER. HRQOL outcomes are potentially superior following AR compared with APER, but only if normal post-operative bowel function is achieved.

ASSESSING THE VIABILITY OF DONATION AFTER CIRCULATORY DEATH (DCD) DONOR CARDIAC ALLOGRAFTS FOR TRANSPLANTATION

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Introduction: Use of DCD donors for heart transplantation is limited by warm ischaemic (WI) damage. We aimed to assess the limit of tolerable WI time prior to irreversible damage, and the ability of ischaemic post-conditioning (IPC) strategies to enhance myocardial preservation, in an orthotopic transplantation model.
Methods: In a porcine DCD model, 3 warm ischaemic times (WIT) (20–40 minutes) were evaluated ($n = 6$/group). Post-WI, hearts were flushed with Celsior alone or Celsior with IPC pharmacological agents (glyceryl trinitrate, erythropoietin, zoniporide). Hearts were assessed on an isolated working heart circuit, evaluating functional, metabolic and biochemical parameters of myocardial injury. Viable hearts were subsequently stored for 3.5–4 hours utilizing a clinically approved ex-vivo perfusion device and tested in a porcine orthotopic transplant model.
Results: Compared to control hearts (no WI), hearts exposed to WIT of 30 minutes and IPC strategies demonstrated complete recovery on the ex-vivo circuit (Cardiac Output $p = 0.18$, troponin 0.16, lactate 0.07, myocardial oedema 0.07). IPC treated 30 min WIT hearts were then validated in an orthotopic transplant model. 7/8 hearts had viable lactate profiles on the OCS, and post-transplant were successfully weaned off CPB, supporting recipient circulation on low-dose inotropes.

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Conclusions: Utilizing IPC strategies, hearts with WIT of ≤30 minutes demonstrated excellent recovery and viability post-transplant in a large animal model. In the present climate of organ shortages, these DCD hearts have the potential to provide an additional source of organs for cardiac transplantation. Studies of human DCD hearts are warranted and currently underway.

A SYSTEMATIC REVIEW OF THE EXTRA-PANCREATIC INFECTIOUS COMPLICATIONS IN ACUTE PANCREATITIS

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Introduction: Extra-pancreatic infectious complications (EIC) in patients with acute pancreatitis has been shown to influence morbidity and mortality.[1–3] Further, on review of the bacteriology of infection of necrosis, close to half of the bacteria are not of enteric origin.[4] This raises the possibility of systemic infection as the origin of infection. The aim of this systematic review was to assess the incidence of EIC in patients with acute pancreatitis, its potential impact and the timing of diagnosis of the infection.
Methods: Search performed of Ovid MEDLINE (1946 to present), Embase (1980 to present) and Cochrane Libraries. Search terms used "Pancreatitis" and "Infection" and ("Complication" or "Outcome"), using PRISMA guidelines.
Results: A total of 1041 papers were screened, with 19 studies included in the final analysis. The studies consisted of two prospective non-RCTs and 17 RCTs. A total number of 1,741 patients with acute pancreatitis were included, with a combined mortality of 10%. The total prevalence of extra-pancreatic infection was 26%, with pneumonia (and other respiratory infections) the most common at 9.2%. Two studies (N = 781 patients) reported diagnosis of EIC occurring at median 7.5 days. Compared to pancreatic infection, reported in four studies (N = 843 patients) occurring later, at 23.4 days.
Conclusions: Extra-pancreatic infection is a common complication in patients with acute pancreatitis with respiratory infection the most prevalent. EICs are most likely to occur early in the course of acute pancreatitis. Recognition should be made of the occurrence of EIC in acute pancreatitis, with prevention/treatment modalities administered early to curb morbidity and mortality.

References

1. Besselink MG, Santvoort HCv, Boermeester MA, Nieuwenhuijs VB, Goor Hv, Dejong CHC, et al. Timing and impact of infections in acute pancreatitis. *Br. J. Surg.* 2009; **96**: 267–73.
2. Xue P, Deng L-H, Zhang Z-D, Yang X-N, Wan M-H, Song B, et al. Infectious complications in patients with severe acute pancreatitis. *Dig. Dis. Sci.* 2009; **54**: 2748–53.
3. Wu BU, Johannes RS, Kurtz S, Banks PA. The impact of hospital-acquired infection on outcome in acute pancreatitis. *Gastroenterology* 2008; **135**: 816–20.
4. Buchler M, Gloor B, Muller C, Friess H, Seiler C, Uhl W. Acute necrotizing pancreatitis: treatment strategy according to the status of infection. *Ann. Surg.* 2000; **232**(5): 619–26.

MEDICAL STUDENT INTEREST IN SURGERY – OPERATING AT A LOSS?

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Introduction: There are some concerns that medical student interest in surgery is suffering. The aim of this project was to investigate the proportion of medical students interested in surgery from years one to four, explore influential attitudinal and demographic factors and establish baseline data to study the future effects of the Surgical Interest Association.
Methods: Students were surveyed through an audience response system in year orientation sessions. For a majority of the analyses, respondents were dichotomised based on expressing an interest in surgery or not.
Results: There were no significant differences in the interest students had for a surgical career between medical student year levels or in females versus males in a cross-sectional analysis. However, available longitudinal data demonstrated a significant decrease in surgical interest from first years in 2012 to second years in 2013. Lifestyle, working hours and training length concerns had minimal effects as career influences on students interested in surgery, whilst academic interest and career opportunities were motivating factors in choosing this career.
Conclusions: The results suggested no difference between levels of interest from first to final year students in surgery as a career, though only 22% of final year students were interested in surgery. This study also suggested that promoting the academic and scientific side of surgery, along with career opportunities available, may be an important avenue to encourage students into surgery. Future research should investigate the changing interests of students in surgery longitudinally throughout medical school and to analyse the effects of the Surgical Interest Association.

MITOCHONDRIAL AND NUCLEAR DNA RELEASE IS CONTINUOUS OVER 5 DAYS FOLLOWING TRAUMA SURGERY

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Introduction: Mitochondrial DNA (mtDNA), a potent pro-inflammatory damage associated molecular pattern (DAMP) has been shown to be released in large titres following trauma. We hypothesised that increases in mtDNA would be related to the degree of tissue injury sustained in surgery and would decrease rapidly following surgery in uncomplicated recovery.
Methods: Plasma was obtained from 35 trauma patients who underwent orthopaedic surgical intervention. Sampling was done at 6 peri-operative time points: Pre-op, 7 h, 24 h, 3 days and 5 days. DNA was extracted and the mtDNA, nuclear DNA (nDNA) were assessed using quantitative polymerase chain reaction (qPCR). Markers of cell necrosis were assayed including CK (direct skeletal muscle injury/necrosis), LDH and AST (remote secondary liver inflammatory injury/necrosis).
Results: Results show high levels of free plasma mtDNA compared to healthy controls at all-time points. Pre-Op – 240 ng/ml + 156 ng/ml Post-Op – 158 ng/ml + 103 ng/ml 7 h – 153 ng/ml + 92 ng/ml 24 h – 212 ng/ml + 200 ng/ml 3 days – 266 ng/ml + 184 ng/ml 5 days – 332 ng/ml + 191 ng/ml. MtDNA concentration remained elevated during the 5 days post-operatively. MtDNA was significantly elevated compared to nDNA levels in the study cohort at Pre-Op, 3-day and 5-day time points. No significant correlation was found between DNA levels and markers of cell necrosis (CK, LDH and AST).
Conclusions: Release of mtDNA and nDNA is continuous in the recovery period following trauma surgery. The majority of DNA does not appear to be released by tissues directly injured in the surgical intervention or those injured through secondary inflammatory damage. Increased mtDNA levels could instigate systemic inflammation associated with post-injury surgical interventions. Systemic inflammation could then propagate further mtDNA release creating a self-perpetuating inflammatory process even in uncomplicated recovery.

ADAPTATION OF SPATIOTEMPORAL GAIT CHARACTERISTICS FOLLOWING MULTIPLE-LIGAMENT KNEE RECONSTRUCTION

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Introduction: Gait adaptations following knee surgery may have important implications for the risk of accelerated joint wear later in life. The aims of this study were to (i) compare the spatiotemporal characteristics of gait in patients with surgical reconstruction of MLKI with healthy controls and (ii) test the association between clinical characteristics and gait characteristics in these patients.
Methods: A sample of patients (N = 16) that underwent surgical knee reconstruction with two or more disrupted ligaments were invited to participate. A sample of healthy controls was recruited from the general public that were matched by age, height and weight to each patient. Participants were asked to complete 10 trials walking along a 10 m walkway at a comfortable, self-selected pace. Kinematic data was collected using a motion capture system and ground reaction forces were recorded from 2 force plates embedded into the laboratory floor. Walking velocity, step length, step width,

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cadence, as well as duration of single and double support were calculated for each trial and compared between patients and controls with group and single-subject statistical analyses. Linear regression was used to associate clinical characteristics (KOOS scores, demographics, injury pattern etc) with spatio-temporal gait data.
Results: Significant ($p < 0.05$) differences were detected for all spatiotemporal variables between patients and healthy controls. However, single-subject analysis revealed that some patients responded differently to others. Linear regression revealed significant ($p < 0.05$) relationships between patient clinical characteristics and gait adaptations.
Conclusions: Patients demonstrated significant gait adaptations following multiple-ligament knee reconstruction compared to healthy controls. The underlying causes of these adaptations appear variable between patients and future work is required to identify the relative contributions of functional deficits and other clinical characteristics on predicting long-term gait adaptations.
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DRUG ELUTING BALLOONS (DEB) IN THE TIBIAL VESSELS: DOES IT WORK?

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Introduction: With the increase in type 2 diabetes mellitus and obesity, critical limb ischaemia (CLI) due to tibial disease is becoming more prevalent. The value of angioplasty for below-knee arterial CLI is limited by its' short term durability. The aim of this study was to ascertain the results of tibial angioplasty with DEBs compared to standard balloon angioplasty (SBA) with primary focus on limb salvage, patency and mortality
Methods: All patients undergoing standard (SBA) tibial angioplasty from 2009–2011 were compared with patients undergoing tibial angioplasty with DEBs from 2012–2013. Over the time period there was no change in proceduralist, risk factor modification and antiplatelet strategy remained the same. Follow was organised prospectively with Duplex at 6 weeks, 3, 6 and 12 months. Mortality, vessel patency and amputations were recorded as primary outcomes.
Results: Complete data is present for 61 patients, 40 patients underwent SBA on 52 tibial vessels with 21 patients receiving DEB angioplasty on 25 vessels. There was no difference in age, gender, risk factors or indications between the groups. Radiological success was 93.2% for all patients. Primary patency at 3, 6 and 12 months for SBA vs DEB was 71.7% vs 79.3%, 50.6 vs 63.2% and 23.2 vs 42.8% ($P < 0.05$ M-W u test). Overall mortality was similar at 41.4 vs 37.5%, there was a trend to a lower amputation rate 19.2 vs 12.7% (P 0.07).
Conclusions: These results suggest that the 12 month patency of tibial vessels is improved with DEB, with a larger group this may translate into a significant reduction in amputation rate at 12 months, offsetting the cost of the DEB.

A SYSTEMATIC REVIEW OF THE IMPACT OF SACRAL NEUROMODULATION ON SYMPTOMS AND ANORECTAL PHYSIOLOGICAL FUNCTION IN PATIENTS WITH FAECAL INCONTINENCE

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Introduction: Sacral Neuro Modulation (SNM) has emerged as a treatment option for faecal incontinence (FI). However, its objective effect on symptoms and anorectal function is inconsistently described. This study aimed to systematically review the impact of SNM on clinical symptoms and anorectal physiology in patients with FI.
Methods: An electronic search of MEDLINE (1950–2013) database was performed. Articles that reported the relevant outcome measures following SNM were included. Outcomes evaluated included: frequency of FI episodes, Wexner incontinence score and anorectal physiology (anal pressures and rectal sensation). Review was performed as per PRISMA guidelines.
Results: Of 500 citations identified, clinical and physiological data were extracted from 61 studies. With only two case-crossover and one randomised trial, most studies were case series with heterogeneity of outcome measures reported and physiological techniques employed. Meta-analysis of the data was precluded due to lack of a comparison group in most studies. After permanent stimulation, perfect continence was noted in 36-78% of patients. Most studies reported reduction in weekly FI episodes [median difference of the mean (MDM) −7.5 (range: −24.8 to −2.7)] and Wexner scores [MDM −11 (−14.9 to −6)]. A trend towards improved resting and squeeze anal pressures and a reduction in rectal sensory volumes were also noted in most studies.
Conclusions: SNM improves clinical symptoms and reduces number of incontinence episodes and severity scores in patients with FI, in part by improving anorectal physiological function. However, intervention studies with standardised outcome measures and physiological techniques are required to robustly assess the physiological impact of SNM.

IMPLEMENTATION OF STANDARDISED SURGICAL EQUIPMENT SETUPS FOR COMMON OPERATIONS TO IMPROVE EFFICIENCY AND REDUCE COSTS

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Introduction: Previously, there were eight different preference cards for Laparoscopic Appendicectomy and Laparoscopic Cholecystectomy equipment amongst thirteen surgeons in our Acute General Surgery Unit. This caused confusion and incorrect or unavailable equipment in the Operating Theatre leading to time delays, frustration and excess cost due to opened but unused equipment. The objective was to standardise surgical equipment lists for these two common acute operations, in order to improve Operating Theatre efficiency and reduce equipment costs.
Methods: Pre- and post-introduction surveys of Operating Theatre nursing staff were done assessing satisfaction regarding equipment variability amongst surgeons for these operations. All thirteen surgeons participated in the development of an agreed list of essential single use items for each operation. Two industry suppliers were then invited to prepare the required equipment, and the surgeons voted on their preferred choice. The most competitive price for the preferred kit was negotiated by a medical administrator. Cost analysis was performed to determine savings on an individual patient and per annum basis.
Results: All thirteen surgeons and all surgical fellows and trainees now use the standardised equipment kit. Satisfaction of Operating Theatre nursing staff has improved. Surgeon satisfaction is adequate. We obtained a 20% and 22% cost reduction on single use items for Laparoscopic Appendicectomy and Laparoscopic Cholecystectomy respectively. This simple standardised approach equates to a minimum annual saving of AU$45,000 on 600 operations per year.
Conclusions: Implementation of standardised equipment for two index acute General Surgery operations has resulted in improved staff satisfaction, efficiency in theatre, and substantial cost reductions.

INFLUENCE OF AGE AND SITE OF DISEASE ON LYMPH NODE YIELD IN COLORECTAL CANCER

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Introduction: Colorectal cancer (CRC) is a leading cause of morbidity and mortality in Australia and New Zealand. Lymph node yield (LNY) is an

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independent prognostic factor, regardless of metastatic involvement, and a LNY of 12 or more it the current recommended standard. In this study the effect of patient's age and site of the disease on LNY is examined.
Methods: A retrospective review of prospectively collected data of patients undergoing elective surgery for colorectal cancer at Dunedin Hospital between 1995 and 2012 was conducted. The relationship between LNY and pathological and demographic variables including age, site of disease, sex and tumour stage was examined.
Results: 824 patients were included in this study (mean age: 70.5 years, 49% male, mean LNY 17.9 ± 10.1). A significant but weak negative correlation was present between age at operation and LNY ($r = -0.08$; $p = 0.024$); which was more pronounced in patients with right sided colon cancer ($r = 0.18$; $p = 0.001$). In addition LNY was higher for right colon cancers (mean 20.5) than left colon (mean 16.8) or rectal cancers (mean 14.6) ($p<0.001$). After adjusting for pathological and demographic variables, mean LNY reduced by 1 for every 7 years advancement in age.
Conclusions: LNY declines with advancing age and LNY is higher in the right sided colon cancers. More studies are required to examine the immunological role of LNs in CRC and how this may be affected by immunosenescence.

NECROTISING FASCIITIS IN WESTERN SYDNEY

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Introduction: Necrotising fasciitis (NF) is a rapidly progressing subcutaneous tissue infection with high morbidity and mortality. This study describes the epidemiology and outcomes of patients with NF in Blacktown/Mt Druitt Hospitals (BMDH).
Methods: A retrospective cohort analysis of patients presenting with NF to BMDH from January 2002–January 2013 was performed. Ethics approval was obtained from the SWLHD Ethics Committee.
Results: There were 39 admissions with NF in the study period. The median age was 59 and 57% were male. Twenty-nine (78%) had multiple comorbidities, commonly diabetes (32%) and obesity (38%). The most common sites of NF were perineum (28%) and lower limb (36%). Polymicrobial infections were found in 72.2% of patients. Median time to surgical debridement was 15.5 hours (range 2–336 h). Twenty-five (64.1%) patients developed complications, commonly septic shock (38.5%) and acute renal failure (30.7%). Eleven (29.7%) patients died. Initial diagnosis in the emergency department was correct in 2 cases, common misdiagnoses were abscess (12) and cellulitis (10). Seventeen (45%) patients were not admitted under a general surgery team and these patients had a 5-fold increased risk of mortality (OR 5.33, 95% CI 1.13–25.12, p = 0.0342) and were 28 times more likely to have debridement delayed >20 hours (OR 28.3, 95% CI 4.02–199.6, p < 0.05)
Conclusions: NF is a condition with high morbidity and mortality in Western Sydney. The majority of patients had polymicrobial infection and multiple comorbidities. Early diagnosis of NF remains difficult, and patients not admitted under general surgery had increased mortality and delayed time to debridement.

PREVALENCE OF AND FACTORS ASSOCIATED WITH FAECAL INCONTINENCE IN THE COMMUNITY: A SYSTEMATIC REVIEW

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Introduction: Faecal incontinence (FI) is a chronic and debilitating condition with significant health burden. Despite its clinical relevance, the prevalence of FI remains inconsistently described. This study systematically reviewed the literature regarding the prevalence of and factors associated with FI amongst community-dwelling adults.
Methods: A search of electronic databases was performed. Studies that reported the prevalence of ± factors associated with incontinence to liquid/solid stool or flatus in a community-based adult population were included. Two independent assessors reviewed eligible articles. Study quality was assessed using pre-defined criteria. Relevant data were extracted from each study and presented in descriptive form.
Results: Of 3,438 citations identified, 37 studies were included for review. The reported prevalence of FI ranged from 2.0% to 20.7% (males: 2.3%–16.1%; females: 2.0%–20.7%), and increased with age (15–34 years: 5.7%; >90 years: 26.8%). However, the studies were heterogeneous in their study population and diagnostic criteria, thus precluding any meaningful pooling of prevalence estimates. Study quality assessment revealed five 'high-quality' studies, of which only three investigated the prevalence of FI in a representative sample of adult community-dwellers; the prevalence of FI reported in these latter studies ranged between 8.3% and 13.2%. The factors most commonly reported to be associated with FI included increasing age, diarrhoea, and urinary incontinence.
Conclusions: FI is a prevalent condition of equal gender distribution affecting approximately 10% of the adult community with identifiable associated factors. The paucity of 'high-quality' prevalence studies emphasises the need for future population-based studies that use standardised diagnostic criteria for FI.

ELECTROPHYSIOLOGICAL CHARACTERISATION OF HUMAN VISCERAL AFFERENT NERVES: FIRST IN MAN

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Introduction: During the last decade, abnormal afferent activity gained recognition as being important in the development of functional gastrointestinal disorders. Since it is not possible to directly measure visceral afferent activity '*in vivo*' in humans, in this study we aimed to make direct electrophysiological recordings (*in vitro)* from extrinsic afferents supplying the human colon and rectum.
Methods: Sections of normal rectum and colon were procured from anterior resection and right hemicolectomy specimens, respectively. Sections were pinned flat and mesenteric nerves dissected. Extracellular visceral afferent nerve activity was recorded. Neuronal responses to chemical (capsaicin and 'inflammatory solution' [IS][1]) and mechanical (Von Frey probing) stimulation were recorded and quantified by determining peak firing rates [range] in one-second intervals.
Results: 21 nerves were studied from six rectums. Of these, spontaneous afferent activity was recorded in 18 nerves. Peak discharge rates increased significantly following capsaicin (7 [4–25] spikes/sec vs. 3 [2–6], P = 0.001) and IS (5 [3–18] spikes/sec vs. 4 [3–12], P = 0.003) application. Punctate mechanosensitive 'hot-spots' were identified in 11 nerves (threshold 2.0g [1.4–4.0g]). In six of these, the threshold decreased following IS (1.0g [0.4–1.4g]). By comparison, no 'hot spots' were identified and spontaneous activity in only one of 18 nerves studied from five colons.
Conclusions: This is the first study to record from extrinsic rectal afferent nerves and to confirm their chemo- and mechano-sensitivity. Colonic afferents appear less responsive to mechanical stimulation, suggesting differences in electrophysiological characteristics. This technique offers the opportunity to measure electrophysiological properties of extrinsic nerves in disease states.

References

1. 10 μM each of histamine, serotonin, bradykinin, and prostaglandin E_2, as in Feng B, Gebhart GF. Characterization of silent afferents in the pelvic and splanchnic innervations of the mouse colorectum. *Am. J. Physiol. Gastrointest. Liver Physiol.* 2011; **300**(1): G170–80.

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TENDON-BONE HEALING IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION USING AN OVINE MODEL – THE INFLUENCE OF GRAFT FIXATION TECHNIQUE

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Introduction: Early failure of ACL tendon grafts occurs most commonly in the bone tunnels rather than through the intra-articular portion of the graft. This current study compares bone-tendon healing in ACL reconstructions (ACLR) using different fixation techniques – suspensory and aperture fixation.
Methods: ACLR using extensor tendon autograft was performed on 18-month-old sheep (n = 19) using three fixation techniques. Group A – Suspensory fixation on the femur and screw fixation on the tibia; Group B – screw fixation of femur (outside-in technique) and tibia; Group C – screw fixation of femur (inside-out technique) and tibia. Group C (n = 13) were euthanased at 12, 26 and 52 weeks. Group A and B (n = 3 each) at 26 weeks only.
Results: X-rays, micro-CT and MRI showed no differences, with particular reference to graft osteointegration, between any groups at any time points. Group A had the highest load to failure in AP translation, followed by group B then C. These were not statistically significant between groups at any time point.
Conclusions: This study was unable to show any differences between three different ACLR fixation techniques. The results are limited by the relatively small numbers of animals utilised in this study. It is apparent that a larger number of animals with longer time points should be considered, probably in excess of 12 months, for future studies that aim to examine tendon-bone healing in an ovine model.33.

IS CRP A GOOD INDICATOR OF ANASTOMOTIC LEAK AND OTHER SEPTIC COMPLICATIONS FOLLOWING COLORECTAL ANASTOMOSIS?

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Introduction: Anastomotic leak and other septic complications are significant complications following colorectal resections. Diagnostic delay significantly contributes to overall mortality/morbidity. CRP is shown to be a good indicator of septic complications. This study was conducted retrospectively and reviewed CRP measurements as an indicator of anastomotic leak and septic complications.
Methods: Data was collected from a prospectively maintained electronic database (2005–2010) in the Department of Surgery, Geelong hospital, Victoria. Statistical analysis was done by the Mann–Whitney test.
Results: 595 patients (M: F, 49:51), mean age 65.5 years. Indications for resection: Neoplasms (64.2%), inflammatory bowel disease (6.1%), diverticular disease (9.1%), ischaemic bowel (1.5%) and others (19.1%). Stapled anastomosis was done for 83%, hand-sewn fro 14% and 3% was unknown. Septic complications are: anastomotic leak (5.5%), pneumonia (12.1%) and wound infections (12.6%). The mean post operative day (POD) on which leaks were diagnosed, was Day 7 (3–18). CRP on POD 2 was significant for leak ($p = 0.035$); day 3 neared significance ($p = 0.065$). A notable finding is the negative slope in CRP values common to both patients with and without leak between POD 3–6, highlighted on chart 1. CRP on POD 1–7 was significant for septic complications ($p \leq 0.05$). CRP >164.8 mg/L on POD 2 identified 87.5% of patients with anastomotic leak (95% CI: 47.4–97.9%), with 70.0% specificity (62.5–76.9%). CRP >95.1 mg/L on POD 1 identified 59.4% (40.7–76.3%) of patients with septic complications, and ruled out septic complications in 72.2% (61.8–81.1%).
Conclusions: CRP is a good indicator of colorectal septic complications and possibly leaks. Fall in the CRP levels by day 5–6 can give a false sense of security, in patients with anastomotic leak.34

SYSTEMATIC REVIEW OF ROBOT-ASSISTED LIVER SURGERY

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Introduction: Robot-assisted liver surgery was introduced to potentially improve the outcomes of laparoscopic hepatic resection. The laparoscopic approach was found to be beneficial only in certain types of liver surgery due to its limited freedom of movement and two-dimensional plane of vision. This systematic review aims to assess the perioperative and short-term oncological outcomes of robot-assisted liver surgery.
Methods: Literature search was conducted using Medline and Embase databases for studies published up to August 2013. Case series reporting ≥10 cases were selected. Animal studies, non-English, review articles and conference abstracts were excluded. If multiple studies were published by one centre, the study with the largest number of participants was selected. Study characteristics such as patient demographics, perioperative and oncological outcomes were extracted and means calculated.
Results: Six retrospective case series reporting on a total of 205 patients who underwent robot-assisted liver surgery were included for analysis. Mean operation time was 314.7 ± 90.4 min and mean blood loss was 568.2 mL (range, 10–3500). The conversion and complication rates were 8.3% and 19.4% respectively. The main reason for conversion was bleeding. Overall mortality was 0%. Mean length of stay was 8.4 (range, 2–46) days. Negative surgical margins were obtained in 92.2% of patients.
Conclusions: Robotic liver surgery appears to be a safe and feasible approach to hepatic resection. Extensive randomized studies are needed to compare perioperative outcomes and long-term oncological outcomes of robot-assisted and laparoscopic liver surgery.

THE SURGICAL INTEREST ASSOCIATION – PROMOTING SURGICAL RESEARCH TO STUDENTS

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Introduction: The Surgical Interest Association (Surgia) was formed by Griffith University medical students in 2012 in response to a declining student interest in surgery. This organisation promotes the profession of surgery, by hosting anatomy, skills, academic, professionalism and networking events for over 300 student and 30 professional members. In response to a deficiency in the amount of research and in particular surgical research being performed in the South-East Queensland region, Surgia have put in place various programs and events in order to ameliorate this research deficit.
Methods: As part of a research initiative, Surgia have introduced: Journal Clubs; in-house research projects; a Research Program; a proposed Research Database; and a 2014 Research Conference. The Surgia Journal Club is run quarterly by medical consultants to encourage critical thinking in students and stimulate discussions about interesting research. In 2014, Surgia will expand this program to monthly meetings and establish an online forum to facilitate further discussion. The in-house research is currently conducted by Surgia executive members and includes projects on: anatomy, surgical skills, surgery in rural centres, student interest in surgery and interest in maxillofacial surgery. Surgia are also instigating a Research Program with an established research institute at Griffith University in which medical students can undertake laboratory and clinical research as a 'Visiting Researcher' along-side their medical studies, in order to gain experience and publications from their chosen project. Furthermore, due to a lack of communication between interested and capable medical students and surgeons intending to conduct surgical research, Surgia are launching a Research Database. This database will provide a platform for local surgeons to list their current research projects or ideas, and for students to express their interest in the listed research opportunity. Finally, Surgia intend to host a Surgical Research Conference in 2014 to provide notable professionals and Surgia members with the opportunity to present their research and ultimately celebrate surgical research as a crucial enterprise to improving surgical services in our community and establishing South-East Queensland as a hub of scientific knowledge and innovation.

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THE SURGICAL MANAGEMENT OF DIABETIC FOOT INFECTIONS IN A LARGE REGIONAL HOSPITAL

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Introduction: Foot infections are a significant source of morbidity in persons with diabetes mellitus, and a growing burden on the Australian health care system (1, 2). To date, there have been few studies on the surgical management of diabetic foot infections (DFIs) in Australia (3). We performed a retrospective clinical audit of surgically-managed DFIs to determine the operative management and amputation rate for DFI's, and determine what factors may predict amputation.
Methods: All adult diabetic patients with an inframalleolar infection that required both inpatient antibiotics and surgical intervention at Wollongong Hospital between 01/01/2007 and 31/12/2009 were included. The presence or absence of DFI was defined according to the IDSA Guidelines (4). Only the first presentation for DFI requiring both inpatient antibiotics and surgical intervention was recorded. Data recorded included demographics, clinical presentation, investigations, antibiotics, formal operations, length of stay, and subsequent admissions.
Results: The observed overall amputation rate in this population was 74.7% (68/91 patients) with 20 major and 48 minor amputations. Twenty-one percent of patients who represented underwent amputation. Multivariate analysis showed amputation rate increased significantly with male gender (OR 4.2, CI 95% 1.3–13.4, p = 0.014) and WCC (OR 1.42 for each increase of 1.0 $\times 10^9$/L WCC, CI 95% 1.1–1.8, P = 0.004).
Conclusions: Our study had a lower rate of overall amputation and major amputation, and a similar rate of minor amputation compared with previous Australian data. The amputation rate reported in this study provides a valuable benchmark for improving the surgical management of DFI in Australia.

References

1. Australian Institute of Health and Welfare. Diabetes: Australian Facts 2008, Canberra: Australian Institute of Health and Welfare, 2008.
2. Diabetes Australia. National Priorities for Turning around the Diabetes Epidemic. Canberra: Diabetes Australia, 2007
3. Steffen C and O'Rourke S. Surgical management of diabetic foot complications: the Far North Queensland profile. *Aust. N. Z. J. Surg.* 1998; **68**(4): 258–60
4. Lipsky BA, et al. Diagnosis and treatment of diabetic foot infections. *Clin. Infect. Dis.* 2004; **39**(7): 885–910.

THE FIRST WORLDWIDE CLINICAL LAPAROSCOPIC KIDNEY TRANSPLANT BY EXTRAPERITONEAL APPROACH

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Introduction: The aim of this study is to develop laparoscopic kidney transplant by extra peritoneal approach. It describes a way of safe transition of the new laparoscopic technique from the laboratory to its clinical application.
Methods: Since December 2009, the safety and feasibility of laparoscopic kidney transplant have been explored by our team. All approvals were obtained from the research ethic committees and hospital medical executive committee. Following the successful animal experiment and establishment of human cadaver models for extraperitoneal approach laparoscopic kidney transplant, a period of training in the pioneering centre using intra peritoneal approach was also attended. The informed consent was signed prior to listing specifically for this new procedure.
Results: In September 2013, one candidate received the pure laparoscopic kidney transplant by extraperitoneal approach. A 6 cm Pfannenstiel incision and 3 ports were required. Estimated blood loss was 150 ml. The perfusion of kidney graft was excellent. Much less analgesia was required by the patient. The kidney presented delayed function, but so did the contralateral kidney transplanted by the normal open surgery. Both kidneys started functioning within the first postoperative week. As we write this abstract, the patient is leaving hospital with an excellent outcome.
Conclusions: This is the first clinical case of laparoscopic kidney transplant by extraperitoneal approach. This technique is safe and feasible. The advantages in comparison to the laparoscopic intraperitoneal approach are less risk of ileus and internal herniation, no small bowel adhesion to graft or anastomoses.
Acknowledgement: We acknowledge the staff from large animal facility and CETC for their great contribution.

CIRCULATING ENDOTHELIAL PROGENITOR CELLS CORRELATE WITH $RCBV_{LOAD}$, A NOVEL PERFUSION MRI PARAMETRIC, IN GLIOBLASTOMA MULTIFORME

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Introduction: Despite the increasing use of anti-angiogenic agents within neuro-oncology, there are still no validated, clinically useful biomarkers to monitor for treatment response or relapse. We investigated the utility of biomarkers of tumour vascularity and angiogenesis in a cohort of glioblastoma multiforme (GBM) patients.
Methods: Pre- and post-operative circulating endothelial cell (CEC) and circulating endothelial progenitor (CEP) cell levels were assessed in patients presenting with GBM. Pre-operative perfusion-weighted MR imaging (PWI) was also undertaken and the relative cerebral blood volume (rCBV) histogram statistics of the tumour were recorded. These biomarkers were then assessed for correlations with patient outcome. Eight healthy volunteers were recruited as controls for endothelial cell analysis. We also developed a novel PWI parametric – $rCBV_{load}$ – that estimates the total volume of perfused tumour vessels, and hypothesized that this would correlate with levels of endothelial cell biomarkers.
Results: Nineteen patients with GBM were recruited. Mean pre-operative CEC concentration was significantly higher than the control group (p = 0.0114). Pre-operative CEP concentrations showed a significant and strong positive correlation with $rCBV_{load}$ (r_s = 0.846; p = 0.0003). None of the biomarkers investigated showed any significant correlation with progression-free or overall survival.
Conclusions: CECs are elevated in GBM patients prior to treatment. Endothelial cells and PWI are potentially useful biomarkers of tumour vascularity, a view that is supported by a significant correlation between CEPs and our novel PWI parametric, $rCBV_{load}$. Biomarkers of tumour vascularity were not shown to have any prognostic value in this cohort of GBM patients however.

ACCELERATING LIQUEFACTION OF PANCREATIC NECROSIS

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Introduction: Current treatment of necrotizing pancreatitis favours minimally invasive approaches with the use of percutaneous drains, however, a large proportion of patients require conversion to open surgery.[1] The ability to accelerate liquefaction of necrotic tissue using both commercially available and novel enzymes to enhance drainage is one method of improvement.[2] The aim of this study was to firstly determine the components of human pancreatic necrosum and subsequently evaluate specific enzymes to accelerate liquefaction of the necrosum.
Methods: Human pancreatic necrosum was collected and evaluated using histological evaluation, immunohistochemistry and Fourier transform infrared spectroscopy (FTIR). A range of known and novel proteolytic agents were tested on the necrosum, and their effects evaluated using biochemical assays and radiographic imaging with CT and MRI.
Results: Human pancreatic necrosum showed a complete absence of normal parenchyma and a dominance of irregularly arranged collagen fibres. The addition of bromelain and collagenase as well as other potential agents, reduced the total protein content of pancreatic necrosum and increased its liquefactive profile. CT and MRI imaging confirmed changes to the tissue structure and composition with these agents.

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Conclusions: Collagen dominates the composition of human pancreatic necrosum. There are several proteolytic compounds now identified as candidates for on-going evaluation as agents to assist removal of necrosum and to prevent percutaneous drain blockage.

References

1. Santvoort HV et al. A step-up approach or open necrosectomy for necrotizing pancreatitis. *N. Engl. J. Med.* 2010; **362**: 1491–1502.
2. Windsor J. Infected pancreatic necrosis: drain first, but do it better. *HPB* 2011; **13**:367–68.

PHENOTYPIC VARIATION OF BOWEL DYSFUNCTION FOLLOWING ANTERIOR RESECTION: MORE THAN A SYNDROME

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Introduction: The symptom-complex of bowel symptoms following anterior resection is loosely termed 'anterior resection syndrome' (ARS), but this syndrome remains sub-optimally defined. This study aimed to comprehensively describe symptoms and characterise phenotypic variability of bowel dysfunction following anterior resection.
Methods: A cross-sectional study of consecutive patients who underwent anterior resection at a tertiary centre (2002–2012) was performed. Outcome measures included: (i) subjective satisfaction and (ii) objective assessment of bowel function using standardised criteria to document individual symptoms of dysfunction and identify patients with evacuation dysfunction, storage dysfunction, or both. Multivariable regression analysis was performed to assess the association between individual symptoms and satisfaction.
Results: Of 476 eligible patients, 338 (71%) participated (199M, 69yrs). Subjectively, one-quarter (26%) of patients were dissatisfied with their bowel function. Objectively, 93% of patients reported at least one symptom of dysfunction. One-half (51%) of patients met criteria for coexisting evacuation and storage dysfunction, 23% described evacuation dysfunction alone and 11% described storage dysfunction alone. Patients with coexisting evacuation and storage dysfunction had lower satisfaction scores compared to patients with no dysfunction ($P < 0.001$). Symptoms of bowel dysfunction associated with dissatisfaction included: toilet revisiting ($P < 0.001$), unsuccessful evacuation attempts ($P < 0.01$), straining ($P < 0.05$), urgency ($P < 0.001$), use of constipating medications ($P < 0.01$) and the need to wear pad/plug ($P < 0.05$).
Conclusions: Individual symptoms of bowel dysfunction are ubiquitous following anterior resection. Phenotypes of dysfunction are identifiable within this heterogeneous entity, with evacuation dysfunction being more prevalent than storage dysfunction. However, the combination of evacuation and storage dysfunction has greatest impact on satisfaction.

CAN RSA, GAIT ANALYSIS AND ACTIVITY MONITORING HELP REDEFINE REHABILITATION PROTOCOLS AFTER INTRA-ARTICULAR LOWER LIMB TRAUMA?

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Introduction: To determine the feasibility and role of RSA, gait analyses and activity monitoring in monitoring fracture patients.

Methods: Two patients with similar 41 B3 tibial plateau fractures were treated by ORIF augmented with impaction bone grafting and instructed to partial weight bear to 10 kg for the first 6 weeks. Fracture reduction and fixation were assessed by CT. Both patients had tantalum markers inserted intraoperatively to monitor their fracture stability during healing, using RSA. Gait analyses were performed at 1, 2, 6, and 12 weeks postoperatively. Activity monitors were worn for 4 weeks between the 2- and 6-week appointments.
Results: There were no complications. CT demonstrated that both fractures were reduced anatomically. Gait analysis indicated that Patient 1 bore weight to 60% of body weight at two weeks postoperative and 100% at 6 weeks. Patient 2 bore weight at 10% of body weight to 6 weeks and had very low joint contact forces to that time. At 12 weeks however, there was no difference between the gait patterns in the two patients. Patient 1 increased activities of moderate-vigorous intensity from 20 to 60 minutes/day between 2 and 6 postoperative weeks, whereas Patient 2 remained more stable at 20–30 minutes/day. RSA examination at 12 weeks showed that patients were comfortable to weight bear to 80 kg and under this weight the fractures displaced less than 0.4 mm. RSA measurements demonstrated over time fracture migrations of less than 2 mm in both cases. However, Patient 2, who followed the postoperative weight bearing instructions most closely, displaced less (0.3 mm compared to 1.6 mm).
Conclusions: This study demonstrates the potential of using a combination of RSA, gait analysis and activity monitoring to obtain an evidence base for postoperative weight bearing schedules during fracture healing.

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