MK-2206, A NOVEL AKT INHIBITOR, SUPPRESSES MEDULLARY THYROID CANCER PROLIFERATION

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Introduction: Development of targeted therapies for medullary thyroid cancer (MTC) has focused on inhibition of the RET proto-oncogene with minimal success. Akt is a downstream target of RET via the key mediator phosphoinositide-3-kinase. Targeting Akt in MTC may thus be more effective for anti-tumor treatments. MK-2206 is an orally administered allosteric Akt inhibitor that exhibited minimal toxicity in phase 1 trials. We therefore explored the anti-tumor effects of this novel compound in MTC.
Methods: Human MTC-TT cells were treated with MK-2206 (0–20 μM) for 2, 4, and 6 days. Assays for cell viability were performed at each time point with MTT. Western blot analysis was performed on protein lysates from TT cells treated with MK-2206 (0–10 μM) for 4 days to assess mechanism of action, mechanism of growth inhibition, and production of neuroendocrine tumor markers.
Results: MK-2206 suppressed MTC cell proliferation in a dose-dependent manner ($p \leq 0.02$). Levels of Akt phosphorylated at serine residue 473 declined with increasing doses of MK-2206, indicating successful Akt inhibition. The apoptotic proteins cleaved PARP and cleaved caspase 3 increased in a dose-dependent manner with MK-2206, while surviving, an apoptosis inhibitor, was markedly reduced. Importantly, the anti-tumor effects of MK-2206 were independent of RET, as the levels of RET protein were not blocked.
Conclusion: The Akt inhibitor MK-2206 significantly suppresses MTC proliferation independent of RET modulation. Given the high oral bioavailability and low toxicity profile, Phase II studies with this drug alone or in combination with RET inhibitors are warranted.

MICRORNA-9* TARGETS ATG5 TO BLOCK AUTOPHAGY AND INDUCE CELL DEATH IN MEDULLARY THYROID CARCINOMA

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Introduction: Medullary thyroid carcinoma (MTC) contributes disproportionately to thyroid cancer related mortality and management options beyond surgery remain limited. miR-9* reduces MTC cellular proliferation *in vitro*; an effect possibly mediated through altered autophagic flux.
Methods: TT cells were reverse transfected with miR-9* and the effect on markers of autophagy examined at 48 h. Untransfected cells were treated with an autophagy inducer (rapamycin) or inhibitor (3-methyladenine) and the effect on miR-9* quantified at 48h. Combined experiments involved reverse miR-9* transfection for 48h, followed by treatment with rapamycin or 3-MA for 24 h to examine changes in autophagic flux and cell viability. Additionally, RNA was extracted from 20 fresh frozen MTC tumours and qPCR was performed to quantify autophagy marker mRNA expression; comparing sporadic (n = 13) to hereditary cases of disease (n = 7) and associations with clinical outcome.
Results: miR-9* transfection reduced TT cell viability ($P < 0.05$) in association with immunoblotting evidence of autophagy inhibition and significantly reduced Atg5 mRNA expression ($P < 0.01$). Rapamycin autophagy induction resulted in elevated miR-9* expression ($P < 0.01$). Reduced cell viability was enhanced further when miR-9* transfected cells were challenged with rapamycin autophagy induction. Lastly, Beclin-1 expression was significantly elevated in sporadic versus hereditary cases of MTC and correlated with residual disease ($P < 0.05$).
Conclusions: miR-9* inhibits autophagy, sensitises cells to rapamycin treatment and reduces MTC cell viability through miR-9* inhibition of Atg5. Beclin-1 is elevated in sporadic cases and is a negative prognostic indicator. Taken together, these findings suggest that elevated autophagic flux is a tumour survival strategy that can be disarmed through miR-9* suppression of Atg5.

CALCIUM SUPPLEMENTS AND CARDIOVASCULAR RISK: A SUBGROUP ANALYSIS

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Background: Calcium supplements have been reported to increase the risk of myocardial infarction. We wished to determine whether the effects of calcium supplements on cardiovascular risk vary across different population groups.
Methods: We modelled the effect of calcium (with or without vitamin D) on the time to incident cardiovascular events in pre-specified subgroups for age, dietary calcium intake, body mass index (BMI), smoking history, history of hypertension, diabetes, and previous cardiovascular disease, using interaction terms in Cox proportional hazards models in two datasets – our re-analysis of the Women's Health Initiative Calcium and Vitamin D study (WHI CaD), and our pooled patient-level meta-analysis of trials of calcium supplements with or without vitamin D.
Results: For women in WHI CaD not taking calcium supplements at randomization (n = 16 718), we found no significant interactions between treatment allocation, the risk of myocardial infarction, stroke, or coronary revascularization, and any of the baseline variables. In the pooled patient level dataset of six trials of calcium with or without vitamin D (n = 24 869), there were also no significant interactions between treatment allocation, risk of myocardial infarction or stroke, and any of the baseline variables.
Conclusions: We found no evidence that the increased cardiovascular risk from calcium supplements differs across varying patient populations.

RANDOMISED CLINICAL TRIAL OF GOAL-DIRECTED FLUID THERAPY IN ELECTIVE COLECTOMY WITHIN AN ENHANCED RECOVERY PROTOCOL

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Introduction: Recent studies in colorectal surgery have demonstrated improvements in surgical outcomes either by restricting fluid administration or individualising fluid management – so called goal-directed fluid therapy (GDFT). However, there has been no evaluation of GDFT within an established Enhanced Recovery (ERAS) protocol incorporating fluid restriction – another competing proposed best-practice. Thus, a study was conducted to evaluate the role of GDFT in patients undergoing elective colectomy within an established ERAS protocol incorporating fluid restriction.
Methods: A randomized, blinded trial was conducted in consecutive patients undergoing elective colectomy within an established ERAS protocol. All patients received fluid restriction and were randomized to GDFT or no GDFT. The primary outcome of the study was a composite surgical recovery score, which has been shown to correlate with complications. Secondary outcomes included clinical outcomes, physiological measures of recovery and serum markers.
Results: Eighty-five patients were randomised and following exclusions, there were 37 patients in each arm. The patients were well matched at baseline. Patients in the GDFT arm received more colloid (mean: 591 mL vs. 297 mL) intraoperatively and had superior cardiac indices. However, no differences were observed between the groups with regards to surgical recovery or other physiological measures of recovery. No differences were observed with regard to serum electrolytes, vasoactive hormones or cytokines, administered fluid amounts outside of the intraoperative period, length of stay or complications.
Conclusion: GDFT did not provide any clinically significant benefits in patients undergoing elective colectomy within an ERAS protocol incorporating fluid restriction.

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ADAPTIVE RESISTANCE TO HYPOXIA-INDUCIBLE APOPTOSIS IN COLORECTAL CANCER CELLS IS MEDIATED BY HIF-1A-DEPENDENT GASTRIN GENE EXPRESSION

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Introduction: Understanding the molecular processes mediating colorectal cancer (CRC) tumorigenesis will enable the development of targeted therapies that selectively disrupt the pathways responsible for tumour growth. The gastrin family of growth factors promote CRC growth, invasion and angiogenesis. Hypoxic microenvironments, caused by tumours outgrowing their local blood supply, stimulate aggressive tumour behaviour. However, the effect of hypoxia on gastrin expression in CRC is unknown.
Methods: Understanding the molecular processes mediating colorectal cancer (CRC) tumorigenesis will enable the development of targeted therapies that selectively disrupt the pathways responsible for tumour growth. The gastrin family of growth factors promote CRC growth, invasion and angiogenesis. Hypoxic microenvironments, caused by tumours outgrowing their local blood supply, stimulate aggressive tumour behaviour. However, the effect of hypoxia on gastrin expression in CRC is unknown.
Results: Gastrin gene expression in CRC cells is stimulated by hypoxia by binding of HIF-1α to the gastrin promoter. The viability of gastrin knockdown CRC cells *in vitro* is diminished under hypoxic (1% O_2) conditions due to loss of resistance against hypoxia-inducible apoptosis. The growth of tumour xenografts in mice exposed to hypoxia (10% O_2) for 21 days is significantly reduced by knocking down gastrin expression.
Conclusions: This work provides evidence that gastrin expression is involved in the adaptation of CRCs to hypoxic microenvironments through resistance to apoptosis. Shrinkage of CRC liver metastases by the angiogenesis inhibitor bevacizumab is dependent on hypoxia-induced apoptosis. Therapies that target gastrin may enhance the therapeutic efficacy of bevacizumab and increase secondary resectability rates in patients with CRC liver metastases.

SUPERVISED EXERCISE TRAINING FOR INTERMITTENT CLAUDICATION: THE CLINICAL, SYSTEMIC AND LOCAL BIOLOGICAL EFFECT

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Background: Supervised exercise training (SET) is regarded as the gold-standard treatment for intermittent claudication (IC), however, the mechanism by which SET exerts beneficial effects has not been elucidated and little consideration has been given to potential detrimental effects. The clinical, systemic and local biological responses to exercise in this patient cohort are assessed in this study.
Methods: Participants were randomised to 12 weeks of treadmill based SET (Group 1) or a combination of treadmill and lower limb resistance exercise (Group 2). Data were collected before and after intervention and included pain free walking distance (PFWD), endothelial function, body composition, systemic inflammatory burden and skeletal muscle protein expression.
Results: Thirty-five patients (25 M, 10 F; mean age 71 years) were recruited. PFWD improved significantly for group 1 but not group 2, nor was there a difference between groups. Homocysteine and nitric oxide levels were negatively impacted for group 1 compared with group 2. Other markers of endothelial function were unchanged. Skeletal muscle mass decreased in group 1 and increased in group 2 with a significant difference between groups. Similarly a trend towards increased catabolic protein calpain in group 1 and reduced levels in group 2 was observed.
Conclusions: SET, specifically programs consisting of treadmill alone, may provide symptomatic improvement but are likely associated with detrimental systemic effects which may worsen health outcomes in patients with IC compared to a SET program incorporating lower limb resistance exercise.

Table 1. Outcome variables at baseline and after a 12-week supervised exercise intervention

Variable	Treadmill training alone (Group 1)				Treadmill training combined with lower limb resistance training (Group 2)				Between groups P-value
	Pre-exercise	Post-exercise	Change	P-value	Pre-exercise	Post-exercise	Change	P-value	
PFWD, m	164 (84)	211 (94)	47 (82)	0.031	174 (93)	182 (114)	8 (141)	0.819	0.437
Skeletal muscle mass, kg	24.8 (6.9)	24.6 (6.7)	0.20 (0.58)	0.281	25.2 (5.9)	25.6 (6.1)	0.40 (0.70)	0.09	0.042
Calpain activity, FU ($\times 10^5$)	1.35 (0.59)	2.11 (1.25)	0.76 (1.37)	0.058	1.61 (0.95)	1.36 (1.47)	0.26 (1.47)	0.557	0.081
Homocysteine, μmol/L	12.0 (2.5)	15.5 (4.3)	3.5 (3.0)	0.003	13.7 (4.0)	14.7 (4.7)	1.0 (3.1)	0.28	0.049
Nitric oxide, μM	15.4 (10.5)	8.2 (5.6)	7.2 (7.5)	0.002	10.1 (4.6)	7.4 (6.8)	2.7 (6.2)	0.139	0.049
FMD, %	2.4 (2.7)	2.9 (2.8)	0.5 (1.4)	0.286	3.0 (3.0)	2.7 (3.3)	0.3 (3.5)	0.822	0.231
RH-PAT	2.03 (0.98)	2.06 (0.57)	0.03 (0.56)	0.926	1.60 (0.62)	1.75 (0.65)	0.15 (0.76)	0.553	0.809

All values reported as mean (SD).

INTRA-TUMOUR GENOMIC HETEROGENEITY IN OESOPHAGEAL ADENOCARCINOMA

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Introduction: Oesophageal adenocarcinoma (OAC) poses a significant challenge to Western health care systems. Survival rates are poor, with an estimated 16% of patients (all stages) surviving beyond five years [1]. Worryingly, it also has the fastest rising incidence of any malignancy in the Western world; in the United States, incidence increased six-fold in the period 1975 to 2001, while mortality increased seven-fold [2]. Similar trends have been found in other populations, including Australia [3]. While morphological heterogeneity is a fundamental finding in cancer (in terms of both individual cells and tissue architecture), heterogeneity also exists at the molecular level [4]. Intra-tumour genomic heterogeneity (ITGH) presents some difficulties, particularly in terms of translational research, because of the potential for sampling error. The degree and clinical implications of ITGH have not been well studied in OAC.
Methods: Using single nucleotide polymorphism arrays, we compared the genome-wide copy number profiles generated from multiple, spatially-separated endoscopic biopsies of 18 primary OACs.
Results: We identified major differences between biopsies from the same tumour, both on a global and sample-specific basis. Further, we demonstrated that ITGH could interfere with higher-level analyses, such as the identification of 'driver' changes (using the **g**enomic **i**dentification of **s**ignificant **t**argets **i**n **c**ancer (GISTIC) algorithm [5]). Of clinical relevance, one third of samples exhibited ITGH in genes currently targetable with chemotherapy (e.g. HER-2). Finally, we identified that a key contributor to apparent ITGH is contamination with normal stroma, and that the centre of the visible surface of a tumour generally yields a biopsy with the highest tumour percentage.

References

1. Horner MJ RL, Krapcho M, Neyman N, Aminou R, Howlader N, Altekruse SF, Feuer EJ, Huang L, Mariotto A, Miller BA, Lewis DR, Eisner MP, Stinchcomb DG, Edwards BK. SEER Cancer Statistics Review. In: National Cancer Institute 2009.

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2. Pohl H, Welch HG. The role of overdiagnosis and reclassification in the marked increase of esophageal adenocarcinoma incidence. *J. Natl. Cancer Inst.* 2005; **97**: 142–6.
3. Vizcaino AP, Moreno V, Lambert R, Parkin DM. Time trends incidence of both major histologic types of esophageal carcinomas in selected countries, 1973–1995. *Int. J. Cancer* 2002; **99**: 860–8.
4. Gerlinger M, Rowan AJ, Horswell S et al. Intratumor heterogeneity and branched evolution revealed by multiregion sequencing. *N. Engl. J. Med.* 2012; **366**: 883–92.
5. Beroukhim R, Getz G, Nghiemphu L et al. Assessing the significance of chromosomal aberrations in cancer: methodology and application to glioma. *Proc. Natl. Acad. Sci. U. S. A.* 2007; **104**: 20007–12.

INTRA-OPERATIVE LANDMARKS FOR THE IDENTIFICATION OF THE FACIAL NERVE IN ANTEROGRADE PAROTIDECTOMY

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Introduction: Facial nerve trunk (FNT) identification during anterograde parotidectomy is paramount, because FNT injury causes substantial morbidity. Various landmarks are used intra-operatively. This study re-examines controversial landmarks and considers the importance of gender and dentition in landmark choice.
Methods: Distances from key landmarks to FNT were measured and compared by side, gender and dentition (92 specimens). Landmarks included posterior belly of digastric muscle (PBM), tragal pointer (TP), mastoid process (MP), external acoustic meatus (EAM) and transverse process of axis (TPA).
Results: 2-sample T tests showing longer distances from: PBM to FNT in superficial compared to deep dissections (22.3 ± 3.2 mm vs. 9.6 ± 3.4 mm, P < 0.001); MP/TPA to FNT in men than in women (14.8 ± 2.2 mm vs. 13.5 ± 1.6 mm, P = 0.004; 37.6 ± 4.4 mm vs. 32.7 ± 4.2 mm, P = 0.001); EAM to FNT on occlusive sides than on the counterparts (14.2 ± 1.8 mm vs. 16.0 ± 3.8 mm, P = 0.020). Paired T tests showing longer distances from: TP to FNT on right than on left side (21.4 ± 2.7 vs. 19.9 ± 2.9, P = 0.006); MP to FNT on the less dentulous maxillae than on the counterpart (14.4 ± 2.1 vs. 13.0 ± 1.6, P = 0.027); PBM/EAM to FNT on the less dentulous mandible than on the counterpart (9.8 ± 1.6 vs. 7.8 ± 2.5, P = 0.039; 16.4 ± 3.0 vs. 14.1 ± 1.5, P = 0.020).
Conclusions: Surgeons should be aware that distances of MP, PBM and EAM, to FNT, are lengthened in less dentulous patients, especially when maxilla and mandibles are non-occlusive. Overall, soft landmarks are less reliable than osseous landmarks, and TPA is the most reliable landmark for FNT identification.

PREVALENCE OF *KCNJ5* GENE MUTATIONS IS ASSOCIATED WITH AN EARLIER PRESENTATION OF CONN'S SYNDROME AND REQUIRES CLOSER LONG-TERM FOLLOW-UP

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Introduction: Patients with Conn's Syndrome (CS) can present with severe hypertension and hypokalaemia. Surgery is curative in most cases. Two recurrent somatic mutations on exon 2 of the potassium channel (*KCNJ5)* gene have been identified in CS (G151R and L168R). We hypothesise that patients with KCNJ5 mutations have a more resistant variant of the disease.
Methods: Eighty patients with banked tumour samples that underwent surgery for CS were included in the study. Relevant clinical data for these patients were obtained and the DNA extracted. The KCNJ5 gene was sequenced using the Sanger technique and the mutation status of these patients was correlated with their respective clinical data.
Results: Thirty-four patients (43%) in the cohort demonstrated mutations in the KCNJ5 gene. Patients who were mutation positive were found to be significantly younger (p < 0.008) on presentation albeit with lower preoperative BP than mutation-free patients. Patients with the mutation were more easily 'cured' with surgery, with normalisation of BP and not requiring any medications post-operatively. Interestingly, post-operatively, the mutation-positive patients had higher aldosterone/renin ratios (p < 0.031) compared to their mutation-free counterparts.
Conclusion: We demonstrate that patients with somatic mutations in the KCNJ5 gene present with features of CS at a younger age than those without. They seem to have a better initial outcome with lower BP post-operatively and less requirements for medications but this may only be a temporary effect as they have persistently elevated aldosterone/renin levels post-operatively, the implications of which remain unknown and dictates closer follow-up long-term.

SURGICAL ANATOMY OF THE PARAPHARYNGEAL COMPARTMENT

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Introduction: Surgical access to the parapharyngeal compartment (PPC) is technically challenging and traditional approaches are associated with significant morbidity.[1] As surgical technology advances to allow more precise access to the PPC[2] it becomes imperative to have a more thorough understanding of the anatomical relationships of the compartment to surrounding structures.
Methods: Cadaver dissection of 10 half heads was performed employing different approaches: lateral to medial; medial to lateral (transoral); and posterior to anterior, supplemented by histology. Magnetic resonance images (MRI) of all specimens were analysed blindly by a consultant head and neck radiologist before comparing fascial arrangements seen on MRI with dissection findings.
Results: The PPC is a well-defined fat filled area identifiable on MRI. The styloid muscles and their fascia form the posterolateral border superiorly and, as they course inferiorly and medially, delimit the inferior border giving its classic "inverted pyramid" shape. Inferiorly, the fascia is continuous over the styloglossus with that of the submandibular region in most cases. The parapharyngeal fat is well circumscribed and separated from the masticator compartment anterolaterally by the medial pterygoid and tensor veli palatini muscles and fascia. The deep lobe of the parotid gland passes superior to the posterior belly of digastric to lie medial to the styloglossus muscle forming the posterolateral border of the PPC. Medially, the compartment is separated from the retropharyngeal compartment by a robust layer of fascia. Medial and posterior to the styloid muscles is a well-defined layer of fascia, reliably visualised on MRI; it effectively separates the anteromedial fat filled PPC from the posterolateral carotid compartment.
Conclusions: The PPC has a complex fascial arrangement. There is a distinct, robust fascia separating the parapharyngeal and carotid compartments that can be visualised on MRI and may be a useful surgical landmark. A three-dimensional understanding of the medial pterygoid muscle, styloid muscles, and posterior belly of digastric is essential when considering parapharyngeal compartment surgery.

References

1. Raveh E, Segal K, Chaimoff M, Feinmesser R. Surgical approaches to the parapharyngeal space. *Oper. Tech. Otolaryngol. Head Neck Surg.* 1996; **7**(4): 327–32
2. O'Malley BW Jr, Quon H, Leonhardt FD, Chalian AA, Weinstein GS. Transoral robotic surgery for parapharyngeal space tumors. *ORL J. Otorhinolaryngol. Relat. Spec.* 2010; **72**(6): 332–6.

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AN EXAMINATION OF THE EPIDEMIOLOGY, METHODOLOGIC QUALITY, AND OUTCOME EFFECT EXAGGERATION IN PUBLISHED RANDOMISED TRIALS OF SURGICAL INTERVENTIONS

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Introduction: Randomized controlled trials (RCTs) provide clinicians with the best evidence for the effects of interventions, but little is known about their nature and characteristics. Specific scientific methods are used to reduce the risk of bias, but the effects of these on outcome estimates have not been explored empirically in surgery.
Aims: To explore the general characteristics and epidemiology of RCTs of surgical interventions, and to assess the extent of outcome exaggeration in trials where adequate methods were not reported.
Methods: In May 2009, three databases (MEDLINE, EMBASE and CENTRAL) were systematically searched for RCTs that assessed a surgical intervention. General author and study characteristics were extracted, as well as the reporting of methods to reduce the risk of bias: sequence generation, allocation concealment, blinding, attrition, and funding. Primary outcomes were extracted from each trial and standardised. Meta-regression was modelled to explore the effects of risk of bias domains on outcome estimation.
Results: 400 recently published RCTs were included. The most commonly represented surgical subspecialties were general, orthopaedic and cardiothoracic. Reporting quality was low with less than half of trials reporting adequate methods of sequence generation (42%), allocation concealment (43%), blinding (35%), and source of funding (42%). Meta-regression showed an exaggeration of outcomes by 37% with inadequate reporting of sequence generation, 33% with inadequate concealment, 43% with inadequate reporting of attrition, and 25% with industry funding.
Conclusions: Empirical evidence exists for the distortion of outcomes when quality domains are not reported. Authors, journals and the users of research must insist on clarifying these methods so that results of trials are interpreted correctly.

GENERAL SURGICAL INTERNS CONTRIBUTING TO THE CLERKSHIP LEARNING ENVIRONMENT OF MEDICAL STUDENTS

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Introduction: Residents and interns are increasingly promoted as clinical teachers but limited details are available describing their exact contributions to student clerkship learning. Hence, a study was conducted to explore the teaching contributions of interns in general surgery given that surgical disciplines place added emphasis on 'apprenticeship-style' teaching and supervision of students and residents.
Methods: This mixed-methods study involved two focus groups, attended separately by general surgical interns and Year 4 medical students, and the distribution of a questionnaire to Year 4 medical students. Incorporating a qualitative analysis system, coded responses from the focus groups were categorised into themes and used to construct the questionnaire.
Results: Focus groups were attended by six interns and five medical students and qualitative analysis revealed that contributions made by surgical interns fall into four distinct roles: *physician, supervisor, teacher, and person*. Data from 85 completed questionnaires (response rate 57%) showed that intern-student encounters occurred 5–6 times per week, lasting 1–2 hours per day, and took place largely in surgical wards. Interns typically demonstrated bedside procedures, interpretation of investigations (laboratory/radiological) and clerical administrative tasks. Students appreciated interns mostly for approachability, friendliness, and ability to relate to students. Interns had a crucial role in integrating students into surgical teams and relieving their anxieties. This significantly correlated to student clerkship enjoyment.
Conclusions: Surgical interns can significantly improve student clerkship learning environments by demonstrating 'personal' skills such as friendliness, approachability, relatedness, and creation of belongingness. This has important implications for the preparation of surgical interns as student preceptors.

AN IN VITRO HUMAN MODEL FOR ANALYSIS OF SMALL BOWEL AND COLONIC MOTOR ACTIVITY

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Introduction: Very few studies measure motor activity of whole segments of human small or large bowel in vitro. The aim of this study was to establish a technique of characterising contractions in isolated human colon using high-resolution fibre-optic manometry.
Methods: Segments of human colon collected from laparotomies for non-obstructing colonic cancers are placed in organ baths. Alligator clips were attached to full thickness colon in 10 mm intervals and connected to fibre-optic gratings on a high-resolution fibre optic catheter. Motor behaviour was recorded for an hour. Colectomies are divided into left and right anatomical groups. Propagating sequences are determined as contiguous contractions detected across 3 or more sensors, and divided into antegrade (oral-anal) and retrograde (anal-oral) events for analysis.
Results: 21 specimens (14 left hemicolons, 7 right hemicolons) were studied. 10/14 (of left and 6/7 right hemicolons showed propagating sequences. Single, complex and repetitive contractions were seen. Frequency of propagating events remained constant over time. There were 24.3 +/– 4 antegrade and 14.3 +/– 6 retrograde events per hour in left colons, and 19.5 +/– 2.7 antegrade and 18.5 +/– 9.2 retrograde events per hour in right colons. There were 3.5 +/– 1.1 antegrade events to every retrograde event in left colons, and 2.2 +/– 1 in the right colons (p: 0.68).
Discussion: In this study contractile behaviour was recorded from resected colon specimens in vitro. The isolated colon records differently from in vivo experiments, possibly reflecting the state of extrinsic denervation. The trend towards more retrograde contractions in the right hemicolon compared to left hemicolon, may relate to mixing function in the right hemicolon. This enables future interventions to study contractile behaviour in human colon.

LAPAROSCOPIC ANTERIOR 180° VERSUS NISSEN FUNDOPLICATION FOR GASTROESOPHAGEAL REFLUX DISEASE: SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CLINICAL TRIALS

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Introduction: LNF is currently the most frequently performed surgical therapy for GORD. Alternatively, 180° LAF has been alleged to reduce troublesome dysphagia and gas-related symptoms, with similar reflux control.
Methods: MEDLINE, EMBASE, Cochrane Library and ISI web of Knowledge CPCI-S were searched for randomized clinical trials (RCTs) comparing primary 180° LAF *versus* LNF. The methodological quality was evaluated to assess bias risk. Primary outcomes were esophageal acid exposure, esophagitis, heartburn score, dilatation for dysphagia, modified Dakkak

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dysphagia score [0–45] and reoperation rate. Meta-analysis was conducted at one and 5 years.
Results: Five distinct RCTs comparing 180° LAF (n = 227) *versus* LNF (n = 231) were identified. At one year, the Dakkak dysphagia score (2.8 vs 4.8; weighted mean difference (WMD) −2.25; 95% CI [−2.66, −1.83]; P < 0.001), gas bloating (11% vs 18%; relative risk (RR) 0.59; 95% CI [0.36, 0.97]; P = 0.04), flatulence (14% vs 25%; RR 0.57; 95% CI [0.35, 0.91]; P = 0.02), inability to belch (19% vs 31%; RR0.63 ;95% CI [0.40, 0.99]; P = 0.05) and inability to relieve bloating (34% vs 44%; RR 0.74; 95% CI [0.55, 0.99]; P = 0.04) were lower after 180° LAF. Esophageal acid exposure (standardized mean difference (SMD) 0.19; 95% CI [−0.07, 0.46]; P = 0.15), esophagitis (19% vs 13%; RR 1.42; 95% CI [0.69, 2.91]; P = 0.34), heartburn score (SMD 1.27; 95% CI [−0.36, 2.90]; P = 0.13), dilatation rate (1.4% vs 2.8%; RR 0.60; 95% CI [0.19, 1.91]; P = 0.39), reoperation rate (5.7% vs 2.8%; RR 2.08; 95% CI [0.80, 5.41]; *P* = 0.13), perioperative outcome, regurgitation, PPI use, LES pressure and patient satisfaction were similar after 180° LAF and LNF. At 5 years, the Dakkak dysphagia score, flatulence, inability to belch and inability to relieve bloating remained lower after 180° LAF. The 5-year heartburn score, dilatation rate, reoperation rate, PPI use and patient satisfaction were similar.
Conclusions: At one and 5 years, dysphagia and gas-related symptoms are lower after 180° LAF compared with LNF, and esophageal acid exposure and esophagitis are similar, with no differences in heartburn scores, patient satisfaction, dilatations and reoperation rate. These results lend level 1a support for the use of 180° LAF for the surgical treatment of GERD.

SYSTEMATIC REVIEW OF ROBOTIC LIVER RESECTION

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Introduction: In the past decade, robotic surgery system has been used increasingly in abdominal surgery. Scarce data is however available for its utilization in liver surgery. This systematic review was undertaken to collate and evaluate the published evidence for robotic liver resection.
Methods: Searches of the Medline and Embase databases were undertaken to identify studies of robotic liver resection focusing on the patient selection, operative strategy, morbidity, technical success and survival outcomes.
Results: Six observational studies and two cohort studies were reviewed. A total of 188 patients underwent robotic liver resection. Mean age of patients was 58.8 (range, 21–85). The most common indications for liver resection were colorectal liver metastases (31.9%), hepatocellular carcinoma (28.3%) and cholangiocarcinoma (5.35%). The most common procedures were segmentectomies (24.2%), left lateral sectionectomies (19.1%), and right hepatectomies (18%). The major liver resection rate was 34%. The mean operative time was 373.0 minutes and mean estimated blood loss 305.5 mL. 5.9% of the operations were converted to either laparoscopic or open operations. There was no postoperative mortality and the perioperative morbidity rate was 23.4%. The mean hospital stay was 9.0 days (range, 4–46).
Conclusions: Robotic liver resection is feasible and safe in selected patients when carried out by trained surgeons. Future studies are required to further define the role and added advantages of robotic liver resection in the laparoscopic era.

SCREENING FOR COLORECTAL PREMALIGNANT AND MALIGNANT PATHOLOGIES FOLLOWING AN EPISODE OF ACUTE DIVERTICULITIS – WOULD A FLEXIBLE SIGMOIDOSCOPY DO THE JOB?

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Introduction: Diverticulosis and colorectal cancer are common conditions encountered in the Western countries. It is common practice to perform a colonoscopy in patients following an episode of acute diverticulitis to exclude colorectal cancer, although the evidence in the literature for such a practice is not robust. The aim of this research is to retrospectively determine the yield of colorectal neoplastic lesions during colonoscopy performed following acute diverticulitis in a consecutive cohort of patients.
Methods: A prospectively maintained electronic database of a public teaching hospital was searched for International Classification of Diseases codes for acute diverticulitis from July 2007 to June 2011, and the medical records of each patient were reviewed.
Results: 219 patients were diagnosed with acute diverticulitis with a median age of 60 years (range 24–93). 139 patients (63.5%) had follow-up screening colonoscopy which revealed polyps in 21 patients (15%) and no cases of colorectal cancer. Of the 21 patients with polyps, there were 14 patients (10%) with tubular/villous adenomas (13 in rectosigmoid region and 1 in descending colon).
Conclusion: The detection of colorectal cancer in patients undergoing routine colonoscopy following an acute episode of diverticulitis is rare. However, colonic polyps in the left colon are noted. A flexible sigmoidoscopy may be an adequate screening tool in such patients. A complete colonoscopy may be performed in patients with a family history of colorectal cancer or with polyps detected on the flexible sigmoidoscopy so as to evaluate the rest of the colon.

Table 1. Colorectal polyps and cancer detection in 139 patients who had screening colonoscopy polyps

Yes	21 (15%)
No	116 (84%)
Not available	2 (1%)
Histology	
Tubular adenoma	4 (2.9%)
Tubular adenoma with low grade dysplasia	7 (5%)
Tubulovillous adenoma	2 (1.4%)
Sessile serrated adenoma	1 (0.7%)
Others including benign polyps	3 (2.2%)
Not available	4 (2.9%)
Cancer, n (%)	
Yes	0 (0%)
No	139 (100%)

A NOVEL THERAPY TARGETING FLIGHTLESS PROTEIN (FLII) REDUCES HYPERTROPHIC SCARRING

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Introduction: Hypertrophic scarring remains a major surgical challenge which carries a considerable burden of disease. Flightless (Flii) is a gelsolin like protein that has been shown to be a negative regulator of normal wound healing. We aimed to investigate the role of Flii in scar formation and its potential as a target for a novel therapy to prevent or reduce scarring.
Methods: A validated model of bleomycin induced scarring was applied to wildtype, Flii heterozygous and Flii overexpressing mice over 28 days and 56 days. Resulting scars were assessed and compared using immunohistochemical and biochemical techniques.
A monoclonal antibody targeting Flii was developed and used to treat scarring in the bleomycin model. Treated scars were compared IgG treated controls using immunohistochemical and biochemical techniques. A series of human burn wounds and scars were collected and analysed for Flii levels. *In vitro* studies were carried out using primary fibroblast cultures from human and murine skin.
Results: Flii is increased after wounding and remains elevated in human and murine scars. In the mouse model, scarring was significantly reduced in Flii heterozygous mice and increased in Flii overexpressing mice at both 28 days and 56 days. Scarring was significantly reduced in wild type mice treated with monoclonal antibody targeting Flii.
Conclusion: Flii appears to be a key regulator of hypertrophic scarring. Reducing Flii by using a monoclonal antibody therapy led to a significant improvement in scarring. This may represent a novel therapy to prevent or reduce hypertrophic scarring in the clinical setting.

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A POSITIVE DISTAL RESECTION MARGIN FOLLOWING RECTAL CANCER SURGERY DOES NOT PREDICT LOCAL RELAPSE OR OVERALL SURVIVAL

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Introduction: Management of rectal cancer has improved dramatically over the past 30 years. From a surgical perspective, the extent of distal clearance is important when deciding whether reconstruction is possible. However, its relevance on oncological outcome remains debated. This study aimed to assess risk factors for local and distant relapse following rectal cancer surgery, and to explore the oncological implications of the distal resection margin (DRM).
Method: Patients undergoing rectal cancer surgery between 1995 and 2011 at Concord Hospital, Sydney, were prospectively studied. Outcome measures included local and distant relapse and survival. These outcome measures were modelled against patient and surgical factors, including age, tumour stage, tumour height, DRM, and circumferential resection margin (CRM). The DRM and CRM were judged to be positive when clearance was <10 mm and <1 mm, respectively.
Results: Of 935 patients undergoing surgery, 32% and 16% were staged as N-positive and M-positive, respectively. Local and distant relapse occurred in 12% and 16% of patients, respectively. A positive DRM was identified in 3% of patients, whilst 13% of patients had a positive CRM. Whilst patients with positive CRM demonstrated increased rates of local and distant relapse and higher mortality, a positive DRM did not increase local relapse or worsen survival. Increased tumour stage and lower tumour height were associated with disease relapse.
Conclusion: Positive DRM following rectal cancer surgery is *not* associated with increased local relapse or worsened overall survival. However, positive CRM and increased tumour stage remain strongly predictive of disease relapse as well as increased mortality.

TRANSCUTANEOUS ELECTRICAL STIMULATION (TES) AND INTRACTABLE CHRONIC CONSTIPATION

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Background: Intractable chronic constipation in the form of slow-transit constipation (STC) is often resistant to medical treatment. Some children required appendicostomy for antegrade enemas to improve symptoms. Transcutaneous electrical stimulation (TES) was used by physiotherapists to overcome STC in children successfully. This study aimed to examine the effectiveness of home-based TES when STC children were trained by a naïve clinician. We hypothesized TES would improve symptoms with reduce laxative use.
Methods: A prospective study (2009–2011) whereby a surgeon was trained to deliver TES method to STC children/parents, who then self-administered TES at home (1 hr/day × 6 months) using a battery-powered interferential stimulator. Daily continence diary (including laxative use) was recorded before and throughout TES; PedsQL4.0 questionnaires and gastrointestinal nuclear transit scintigraphy (NTS) were completed before and after TES. Appendicostomy for antegrade enemas was offered if TES failed to improve symptoms. Statistical analyses performed with paired t-test and chi-square test; $p < 0.05$ considered significant.
Results: Sixty-two children (34 female, ages: 2–16 years, mean: 7 years) completed home-based TES successfully. Symptoms improved significantly in 56/62 (90%) STC children with gastrointestinal transit index improved after TES (Table 1). The 2 children who stopped laxative prior to TES had symptom improvement without further laxative use. Only 6 children (10%) required appendicostomy for antegrade enemas.
Conclusion: Home-based TES is non-invasive. It is a promising treatment for STC children with avoidance of surgery and reduced laxative use with improved symptoms in most children. Success required clinician training and close patient contact.

Parameters	Pre-TES	Post-TES	p-value
Soiling (days/week)	4.6 ± 2.4	0.7 ± 1.1	<0.0001 (paired t-test)
Defecation (bowel action/week)	1.6 ± 1.6	3.5 ± 1.9	
Abdominal pain (days/week)	1.7 ± 1.9	0.2 ± 0.5	
Laxative use	No laxative – 2 On laxative – 60	Stopped laxative – 15 Reduced laxative – 30 Same laxative – 15 Remained with no laxative – 2	<0.01 (Pearson chi-square)
Gastrointestinal transit index	10.8 ± 1.6	11.6 ± 1.6	<0.002 (paired t-test)

OUTCOME MEASURES OF PATIENTS WHO HAVE UNDERGONE SURGERY FOR ORAL CANCER: A PRELIMINARY REPORT

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Introduction: The outcome of management strategies for the treatment of oral cancer has always been in terms of disease-specific survival. Modern assessment of outcome now also includes assessment of quality of life (QoL). Little has been done previously in Australia to assess the QoL of patients treated primarily by surgery for oral cancer.
Methods: Cross-sectional study on patients who had undergone primary surgical management for oral cancer underwent assessment of QoL using the European Organisation for Research and Treatment of Cancer QoL questionnaire (EORTC QlQ-C30) and the University of Washington Head and Neck QoL questionnaire (UWQOL). Similar emotional domains were compared and factors affecting QoL were determined
Results: Good QoL scores were experienced by most patients. A new addition to the UWQOL was the mood and anxiety domains, and these correlated well with the emotional domains of the EORTC QLQ-C30 using Spearman rank correlations. Factors significantly affecting survival include age, overall stage, neck dissection, free flap, and postoperative radiotherapy using Mann–Whitney tests ($p < 0.05$)
Conclusions: This study confirms previous reports in the literature. It has provided us with the foundation for further investigation of QoL in patients who have been and who will be treated for oral cancer. It also gives us a new measure of outcome to compare against survival rates.

SURVEILLANCE OF SMALL RECTAL CARCINOID TUMORS IN THE ABSENCE OF METASTATIC DISEASE

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Background: The incidence of rectal carcinoids is rapidly increasing, typically presenting as small (<1.0 cm) localized tumors. While the evaluation of rectal carcinoids on presentation is well standardized, surveillance following resection has not been well established.
Methods: A prospective database documented patients with rectal carcinoids at our institution between January 1995 and September 2011. Information collected included patient and tumor characteristics, treatment method, surveillance schedule, recurrence, and survival.
Results: Twenty-eight patients with rectal carcinoid were identified. Ten patients were excluded for tumors >1 cm, known metastases, <6 months follow-up, or previous resection. The mean age of the remaining patients was 56 ± 3 years and 61% were female. All patients were diagnosed on endoscopy, with 50% diagnosed incidentally on screening endoscopy. Treatment methods

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included endoscopic therapy (n = 13, 72%), transanal excision (n = 3, 17%), and transanal endoscopic microsurgery (n = 1, 5.5%). One patient (5.5%) received no additional invasive therapy after diagnostic endoscopy. The mean tumor diameter was 4.6 ± 0.5 mm. The average length of follow-up was 5.4 ± 0.9 years, with a median number of 2 follow-up endoscopies (range 0–6). Two patients (11%) died within the follow-up period from non-carcinoid causes. Importantly, no surviving patients developed local or distant recurrence with up to 12.3 years of follow-up.
Conclusion: Based on this experience, patients presenting with small (≤1.0 cm), non-metastatic rectal carcinoids are unlikely to develop local or distant recurrence after resection. Aggressive surveillance with repeat endoscopies or other imaging studies after resection may be unnecessary in this patient population.

OUTCOMES AND COMPLICATIONS AFTER LAPAROSCOPIC COLORECTAL SURGERY WITH MECHANICAL BOWEL PREPARATION

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Introduction: Recently, the use of routine mechanical bowel preparation (MBP) in colorectal surgery has come under scrutiny due to a possible increase in postoperative complications [1]. Currently, there is no international consensus on its use. Indeed, there are certain instances during planned laparoscopic resections where formal preparation of the colon is still desirable. Accordingly, surgical societies around the world have failed to recommend omission of MBP from perioperative protocols [2,3]. Therefore, appreciation of the impact of MBP on postoperative outcome is important. This study examined the perioperative outcomes of patients undergoing laparoscopic colorectal resections with routine MBP at a tertiary teaching hospital.
Methods: Relevant perioperative data in 527 consecutive patients who underwent laparoscopic colorectal procedures between 2006 and 2011 were recorded prospectively, to determine the nature and prevalence of postoperative complications.
Results: Overall, 162 patients (30.7%) suffered postoperative complications. There were 5 deaths (0.9%), 21 cases requiring reoperation (4.0%), 17 cases of intra-abdominal infection (3.2%) and 28 wound infections (5.3%). Of the 444 patients in whom intestinal continuity was restored, there were 4 cases of anastomotic leak (0.9%).
Conclusions: The major complication rates observed in this study are comparable with those in the published literature [2,4]. Laparoscopic colorectal surgery with routine MBP does not appear to compromise postoperative outcome. It can be safely used to facilitate on-table colonoscopy to locate diseased segments in inflammatory conditions or small neoplastic lesions that have not been marked pre-operatively. Further RCTs specific to laparoscopic procedures are desirable.

References

1. Bucher P et al. Mechanical bowel preparation for elective colorectal surgery: a meta-analysis. *Arch. Surg.* 2004; **139**:1359–64
2. Guenaga KF et al. Mechanical bowel preparation for elective colorectal surgery. *Cochrane Database Syst. Rev.* 2011; (9): CD001544
3. Slieker J et al. Bowel preparation prior to laparoscopic colorectal resection: what is the current practice? *JLAST* 2011; **21**(10): 899–903
4. Zmora O et al. Laparoscopic colectomy without mechanical bowel preparation. *Int. J. Colorectal Dis.* 2006; **21**: 683–7

ACHIEVING BREAST SYMMETRY IN PATIENTS WITH DEVELOPMENTAL BREAST ASYMMETRY USING A 3D LASER SCAN

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Introduction: Most women have some degree of breast asymmetry. However, a small number of adolescent patients present with developmental breast asymmetry and they are often affected psychosocially. It is often challenging to attempt to achieve symmetry in these patients by correction of breast volume, shape, nipple areolar complex location and size. As such, a significant number of patients undergo primary and secondary reconstructive operations to achieve desired symmetry. At the Flinders Medical Centre, a method for breast volume assessment has been developed using a 3D laser scanner with pre-operative land marking.
Methods: This is a retrospective audit of developmental breast asymmetry cases between 2008 and 2012. Post operative clinical photographs, 3D scans and reports from patients were analysed.
Results: 11 patients were audited, of which nine patients had completed surgery. One patient had significant complication which required surgical revision. One was complicated by haematoma requiring surgical evacuation. Post operative clinical photography, 3D scans with volume measurements and reports from patients indicate that 3D laser scanning has been helpful in achieving volume symmetry. However, breast shape symmetry remains more of a challenge and further experience with 3D laser scanning will allow us to develop a better picture of its role in these patients.
Conclusions: Early results of use of 3D laser scanning in developmental breast asymmetry suggests it may aid in achieving symmetry for these patients but further studies are needed to confirm this.

Reference

Yip JM, Mouratova N et al. Accurate assessment of breast volume. *Ann. Plast. Surg.* 2008; **68**(2): 135–41

CERVICAL FASCIA AND ITS COMPARTMENTS: A TERMINOLOGICAL HEADACHE

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Introduction: Understanding the cervical fascia is necessary for accurate radiological differential diagnosis and safe head and neck surgery. There are disagreements in the naming of this fascia reflecting both international and interdisciplinary differences in terminology.[1,2] We reviewed the recommended textbooks for Australasian surgical and radiological trainees to identify areas of agreement and controversy.
Methods: Textbooks from the recommended reading lists of the Radiology, Otolaryngology, Head and Neck Surgery, Plastic and Reconstructive Surgery and General Surgery specialist training schemes in Australasia were compared with a landmark anatomical study[3] and two contemporary anatomical reference texts.
Results: Twenty-six textbooks were reviewed; twenty-three described cervical fascia within thirty-five chapters. The description of the superficial cervical fascia varies greatly. Deep fascial layers are more consistently described but with a variable nomenclature. There is inconsistency in the naming and arrangement of the fascia related to the cervical viscera and the submandibular, parapharyngeal and retropharyngeal "spaces". The descriptions of the associated potential spaces were variable and differed according to the understanding of the related fasciae.
Conclusions: Reference texts for anatomists and surgical and radiological trainees show major inconsistencies in the terminology and descriptions of cervical fascia. This is a barrier to education and interdisciplinary communication. An evidence-based classification acceptable to surgeons and radiologists is needed to provide a common language and understanding of fascial planes and compartments in the head and neck.

References

1. Wendell-Smith CP. Fascia: an illustrative problem in international terminology. *Surg. Radiol. Anat.* 1997; **19**: 273–7
2. Davidge KM, van Furth WR, Agur A, Cusimano M. Naming the soft tissue layers of the temporoparietal region: unifying anatomic terminology across surgical disciplines. *Oper. Neurosurg.* 2010; **67**: 120–30
3. Grodinsky M, Holyoke EA. The fasciae and fascial spaces of the head, neck and adjacent regions. *Am. J. Anat.* 1938; **63**: 367–408

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EARLY CHOLECYSTECTOMY IN GRADE II AND III ACUTE CALCULOUS CHOLECYSTITIS IS FEASIBLE AND SAFE

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Introduction: Despite the inception of Tokyo guidelines for the management of acute cholecystitis, the management of patients with moderate and severe acute cholecystitis still remains controversial. The aim of this study is to determine the safety, efficacy and outcome of cholecystectomy in moderate and severe acute calculous cholecystitis.
Methods: A retrospective study of 229 consecutive patients with diagnosis of acute calculous cholecystitis between June 2011 and August 2012 was performed. The severity of acute cholecystitis was classified based on the Tokyo guidelines. Their management and outcomes were evaluated.
Results: There were 60 patients with grade II and 24 patients with grade III cholecystitis. Fifty-three (88%) grade II patients underwent surgical interventions with 52/53 (98%) being laparoscopic cholecystectomy. Twenty-one (88%) of grade III patients underwent surgical interventions, with 16/21 (76%) being laparoscopic cholecystectomy. The open conversion rate was significantly higher in patients with grade III cholecystitis when compared to grade II (4/21 vs. 1/53; $p < 0.05$). Three patients underwent percutaneous cholecystostomy. There was no perioperative mortality. One grade II patient and two grade III patient required ERCP for bile leak.
Conclusion: This study demonstrated that index laparoscopic cholecystectomy is safe and feasible in patients with grade II and III acute cholecystitis.

PREVALENCE OF FUNCTIONAL BOWEL DISORDERS AND FAECAL INCONTINENCE: A PRIMARY-CARE SURVEY

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Introduction: Faecal incontinence (FI) and functional bowel disorders (FBDs), including constipation and irritable bowel syndrome (IBS), are chronic and debilitating and present a significant management problem for surgeons. However, epidemiological studies are lacking in Australian populations. The aim of this study was to measure the prevalence of FI and FBDs among primary health-care seekers using objective criteria.
Methods: A cross-sectional survey was conducted amongst primary health-care seekers in Sydney, Australia. A self-administered questionnaire was used to diagnose FI and FBDs using objective, symptom-based Rome-III criteria. Data was modelled to identify associations with medical and surgical histories and health-care utilisation.
Results: 396 of 596 subjects (66.4%) approached agreed to participate. FI, constipation and IBS were diagnosed in 12.1%, 8.1 and 11.1%, of subjects, respectively. Subjects with FI were 4 times more likely to have had previous anal surgery (OR 3.80, 95% CI 1.55–9.33) and to have IBS (OR 3.80, 95% CI 1.82–7.93) and 3 times more likely to have urinary incontinence (OR 3.24, 95% CI 1.73–6.08). Subjects with IBS were 9 times more likely to have had a previous colonoscopy (OR 9.32, 95% CI 3.10–28.04) and 3 times more likely to report anxiety or depression (OR 3.42, 95% CI 1.78–6.58) and to have had a previous cholecystectomy (OR 3.11, 95% CI 1.16–8.37).
Conclusions: FI and FBDs appear to be prevalent conditions amongst primary health-care seekers. Furthermore, patients with these conditions suffer with co-existing symptoms and conditions, suggesting that detailed assessment is required to adequately address their needs. These findings have implications for health service planning/provision.

DELAYS IN THE COLORECTAL CANCER REFERRAL PATHWAY IN A TERTIARY REFERRAL CENTRE

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Introduction: Prompt access to diagnosis and treatment is important if survival from colorectal cancer (CRC) is to be improved, since 90% are potentially curable if detected at an early stage. However, the referral and diagnostic pathway is complex and potentially subject to delays.[1–3] The aim of this study was to evaluate the pathway of patients with CRC in a tertiary unit by measuring time intervals from referral to treatment.
Methods: The case notes of patients with CRC were reviewed with stratification into (i) emergency presentations; (ii) elective presentations – subdivided into (a) direct referrals from GP to colorectal surgeons (b) indirect referrals via secondary care. The following were measured in each: overall time from referral to commencement of treatment, time from referral to colorectal appointment and then colorectal appointment to primary treatment.
Results: Of the 101 patients (53 F, age 74 years), 25% presented as emergencies and 55 of 76 (72%) were indirect referrals. The median time from presentation to commencement of treatment was significantly shorter for emergency presentations (10 vs 71 days; $p < 0.0001$). For elective presentations, the overall time from presentation to start of treatment was significantly longer in patients referred indirectly (91 vs 40 days; $p = 0.0005$) due to increased time from initial presentation to colorectal surgeon appointment (63 vs 5 days; $p < 0.0001$).
Conclusions: Emergency presentations of CRC are managed promptly and direct elective presentations in a timely manner. However, indirect referrals present a challenge due to the delay that occurs with the inclusion of an additional secondary care provider.

References

1. Torring ML, Frydenberg M, Hansen RP et al. Time to diagnosis and mortality in colorectal cancer: a cohort study in primary care. *Br. J. Cancer* 2010; **104**: 934–40.
2. Goldsbury D, Harris MF Pascoe S et al. Socio-demographic and other patient characteristics associated with time between colonoscopy and surgery, and choice of treatment centre for colorectal cancer: a retrospective cohort study. *BMJ Open* 2012; **2**(3).
3. Mitchell E, Macdonald S, Campbell NC et al. Influences on pre-hospital delay in the diagnosis of colorectal cancer: a systematic review. *Br. J. Cancer* 2008; **98**: 60–70.

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MEDICO-LEGAL IMPLICATIONS OF PATEL V THE QUEEN [2012]

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The incident involving Dr Jayant Patel at Bundaberg Base Hospital has been linked in the media and the specialist literature with the establishment of mandatory reporting laws for health professionals in Australia, as embodied in the *Health Practitioner Regulation National Law Act 2009*.
The High Court of Australia decision of *Patel v The Queen* [2012] HCA 29 (August 24 2012), quashed Patel's conviction for killing and maiming patients and ordered a retrial. The original prosecution case had initially been that Patel was incompetent and grossly negligent in the conduct of his surgical procedures and post-operative treatment which he supervised. However, on day 43 of the trial, the prosecution case was revised to be that the surgical procedures should not have been undertaken in the first place. The High Court rejected the argument that Patel was prosecuted under a wrong provision of the Queensland *Criminal Code*, but held that a miscarriage of justice had still occurred.
This poster presentation will deal with the legal issues created by the High Court not overturning the expanded definition of medical treatment. There is now a clear precedent that the act of performing a medical treatment is more than just the surgical manipulation of instruments, but includes "all that is

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provided in the course of such treatment, from the giving of an opinion relating to surgery to the aftermath of surgery."

WARM HUMIDIFIED CARBON DIOXIDE GAS INSUFFLATION FOR LAPAROSCOPIC APPENDICECTOMY IN CHILDREN: A DOUBLE-BLINDED RANDOMISED CONTROLLED TRIAL

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Introduction: Pneumoperitoneum during laparoscopy is typically created with dry, room temperature carbon dioxide (CO_2) gas which leads to desiccation-related structural and inflammatory alterations to the peritoneal mesothelial lining. Clinically, this has been linked to additional postoperative pain and delayed recovery. Warm humidified insufflation gas prevents peritoneal desiccation and is hypothesised to improve patient outcomes in children after laparoscopic appendicectomy.

Methods: A double-blinded, randomised controlled trial was implemented. Participants in the intervention group received warmed (37°C) humidified (98% relative humidity) insufflation gas while control participants received standard room temperature (20°C) gas with 0% relative humidity. Perioperative analgesia and anaesthesia was standardised and intraoperative core body temperature was monitored at ten-minute intervals. At the conclusion of surgery, severity of laparoscopic camera lens fogging was rated by the primary surgeon. Postoperative opiate usage was expressed as Morphine Equivalent Daily Dosages (MEDD) and pain intensity at rest and on moving was rated using visual analogue scales. Postoperative recovery and return to normal activities on day 10 were assessed using a questionnaire.

Results: Between February 2010 and March 2011, 190 participants were randomised. Intervention (N = 95) and Control (N = 95) groups were matched at baseline and intraoperative core body temperature variation was statistically similar. There were no statistically significant differences in postoperative MEDD and pain intensity scores. Postoperative recovery parameters and the severity of camera lens fogging were also found to be statistically similar.

Conclusion: Warm humidified CO_2 gas insufflation for laparoscopic appendicectomy has no short-term clinical benefits in paediatric patients.

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