Food intolerance may cause intractable constipation with rapid proximal colonic transit

YI YIK, TM CAIN, DJ COOK, JM HUTSON, BR SOUTHWELL

1Douglas Stephens Surgical Research Laboratory, Murdoch Children’s Research Institute, Melbourne, 2Department of Paediatrics, University of Melbourne, 3University of Malaya, Malaysia, 4Department of Medical Imaging, Royal Children’s Hospital, 5Urology Department, Royal Children’s Hospital, Melbourne

Radio-nuclear transit studies (NTS) are performed by taking a milk drink containing a radioisotope and taking gamma camera images to follow the movement through the stomach, small intestine and large intestine. While sit (plastic) markers are the common method for studying colonic transit, NTS provide more information and are the gold standard for studies in adults. In children, NTS are performed in research and advanced imaging settings. Food intolerance causes chronic constipation in some children. Using NTS, we identified children with chronic constipation with rapid proximal colonic transit and characterised their clinical features.

Methods We reviewed NTS from 1998 to 2009 to identify patients with chronic constipation, and then identified a subgroup with rapid proximal colonic transit (defined as >25% of tracer beyond hepatic flexure at 6 hour, and/or >25% of tracer beyond end of descending colon at 24 hour). This was correlated with clinical symptoms and outcome from patient records.

Results Five hundred and twenty (520) children with chronic constipation underwent investigation by NTS, and 64/520 (12%) were identified with rapid proximal colonic transit. The clinical history, symptoms and outcome in 55/64 available for analysis frequently showed symptoms associated with food allergy/intolerance: abdominal pain (80%), anal fissure (27.3%), other allergic symptoms (43.6%); family history of allergy (10.9%). Eighteen children were treated with dietary exclusion, with resolution of symptoms in 9/18 (50%).

Conclusions Some children with intractable chronic constipation have rapid proximal colonic transit and symptoms consistent with food allergy/intolerance, and respond to dietary exclusion. NTS can identify the patients with chronic constipation and rapid proximal colonic transit that is likely secondary to food intolerance. Exclusion diets can then be tested.


Do changes in anxiety and depression levels over time predict the development and exacerbation of functional gastrointestinal disorders (FGIDs) in the general population?

NA KOLOSKI, TM JONES, J KALANTAR, M WELTMAN, J ZAGUIRRE, NJ TALLEY

1University of Queensland, 2Macquarie University, 3Nepean Hospital, 4University of Newcastle

Background Although FGIDs are common lifelong conditions, it is still not yet clear what factors may be responsible for the development and persistence of these disorders over time. Emerging prospective evidence suggests psychological distress may be important but it is unknown whether changes in anxiety and depression levels over time also drive the development and persistence of FGIDs. In a 12-year longitudinal, prospective, population-based follow-up cohort study, we aimed to determine if changes in anxiety and depression levels over time are associated with the development and/or persistence of FGIDs.

Methods Participants (n = 1775) were a random population sample from Penrith, Australia who responded to a valid survey in 1997 and agreed to be contacted for future research (response rate = 64%). Among those followed 355 met Rome II criteria for a FGID diagnosis at baseline, while 626 did not. The original and follow-up surveys included standardized questions allowing a Rome II diagnosis to be made for 18 FGIDs. Psychological distress (anxiety and depression) was measured with the valid Delusions Symptom States Inventory (DSSI).

Results Increases in anxiety (OR = 2.06; 95%CI 1.03–4.12, P = 0.041) and depression (OR = 2.25; 95%CI 1.06–4.79, P = 0.035) from baseline to follow-up were significantly associated with an increased risk for the development of any FGID, even after controlling for age, gender and medication usage for stomach and bowel problems over the past 12 years. This was also true for increases in anxiety and depression over time and the development of IBS, functional dyspepsia, functional abdominal bloating and functional aerophagia. Changes in anxiety and depression levels over time however were not significantly associated with the continuation of any FGIDs.

Conclusions In a longitudinal cohort study, we found strong evidence that increases in psychological distress levels over time may be an important risk factor for the development but not exacerbation of FGIDs.

Relationship between plasma motilin and proximal gastric motility during small intestinal nutrient stimulation in critically ill patients

NQ NGUYEN, LK BRYANT, CM BURGSTAD, S CLARKE, RH FRASER

1Department of Gastroenterology and Hepatology, Royal Adelaide Hospital, 2Investigation and Procedures Unit, Repatriation General Hospital, 3CPR Pharma Services Pty Ltd

Introduction Impaired gastrointestinal motility is common during critical illness, characterised by a persistence of phase III like motor activity during feeding and impaired motor function in both proximal (Nguyen et al., 2007) and distal stomach (Nguyen et al., 2008). Although there is a close relationship between plasma motilin and phase III activity and exogenous motilin impairs proximal gastric relaxation (Cuomo et al., 2006) in health, there is no data about plasma motilin in response to intestinal nutrient stimulation during critical illness.

Aim To examine the relationship between plasma motilin and proximal gastric motility in response to intestinal nutrients during critical illness.

Methods Concurrent measurements of proximal gastric motility (barostat technique) and plasma motilin concentrations (radioimmunoassay) in response to 60-min duodenal infusions of Ensure, randomised at either 1 or 2 kcal min⁻¹, separated by 2 hours, were performed in 21 medical, mechanically-ventilated critically ill patients (13M: 49.3 ± 4.2 years) and 18 healthy volunteers (10M: 27.7 ± 2.9 years). Ten critically ill patients had feed intolerance (defined as gastric residue volume >250 ml during enteral feeding).

Results At baseline, critically ill patients had similar plasma motilin concentrations and proximal gastric volume but lower fundic wave frequency than those of healthy volunteers. During both 1 and 2 kcal min⁻¹ infusions, plasma motilin concentrations in patients were significantly
higher than those of healthy volunteers. Compared to healthy subjects, both proximal gastric relaxation and fundic wave frequency during nutrient stimulation was significantly lower in patients. There was an inverse relationship between the peak increase in plasma motilin concentrations and the peak change in proximal gastric volume induced by duodenal nutrient stimulation in both healthy ($r = -0.37, P = 0.03$) and critically ill ($r = -0.39, P = 0.01$) subjects. In feed intolerant patients, fundic wave frequency was lower than those who tolerated feed and there was a trend of higher plasma motilin concentrations in the feed-intolerant patients during 2 kcal min$^{-1}$ ($P = 0.093$) but not after 1 kcal min$^{-1}$ infusion.

**Conclusions** During critical illness, plasma motilin concentrations are significantly higher in response to intestinal nutrient stimulation and negatively correlated with the changes in proximal gastric volume. These findings may explain the persistent of inter-digestive gastrointestinal contractile (phase III-like) activity during nutrient infusion and the impaired proximal gastric relaxation in response to nutrient in these patients.

### Laxative use, pain, stool form and frequency, is there any correlation between them in patients with severe constipation?

**PG DINNING,**$^1$ **L HUNT,**$^1$ **DZ LUBOWSKI,**$^1$

**J KALANTAR,**$^2$ **IJ COOK,**$^1$ **M JONES**$^3$

$^1$St. George Clinical School, St George Hospital, UNSW, $^2$Nepean Hospital, $^3$Macquarie University, NSW, Australia

Slow transit constipation is commonly associated with hard stools and a reduced stool frequency. The presence of pain is typically associated with constipation pre-dominant irritable bowel syndrome. For the most part patients’ constipation symptoms are based upon responses to questionnaires or interviews by doctors. The potential impact of laxative use upon symptoms is rarely commented upon. Our Aim, in patients with severe constipation, was to detail symptoms on a day-to-day basis in the presence of laxative use and determine if increased laxative use correlated with increased stool frequency, pain symptoms and loose stool.

**Methods** 170 patients were referred to a tertiary referral centre for inclusion in a clinical trial for the treatment of severe constipation. Each of these patients completed a 3-week stool diary and 105 completed colonic transit study measured scintigraphically (normal 9% retention at 72 hours). On a daily basis the dairy detailed stool frequency and form (Bristol stool scale), laxative use (type and dose) and pain scores (0 = none; 3 = prevent normal activity). Three week stool diaries have been summarised as mean scores (pain, stool form and frequency) or proportion of days (laxative use). Pearson correlation has been used to assess the association between these four parameter.

**Results** Daily laxative use demonstrated a bimodal distribution with 22% rarely using laxatives and 38% using laxatives on a daily basis. The remainder were evenly distribution between two extremes. 73% of patients reported a bowel motion at least once every 2 days with 20% reporting loose stool on a daily basis. Only 12% commonly reporting hard stool. Pain impacting upon day-to-day life was reported by 35%. Increased laxative use was positively correlated with increased stool frequency ($r = 0.3; P < 0.001$), loose stool ($r = 0.3; P < 0.001$) and increased pain scores ($r = 0.2; P = 0.04$). 94 patients had delayed transit (retention at 72 hours; 73 ± 23%). When dealt with as a separate entity these patients with demonstrable slow transit demonstrated the similar characteristics as those described above.

**Conclusion** These data demonstrate that in the normal day-to-day life of patients with severe constipation frequent, loose stools and pain are all commonly reported. Laxative use may be one factor driving these symptoms. Supported by NHMRC.
3D visualisation of colonic manometry data
JB DAVIDSON,1 G O’GRADY,1 AJ PULLAN,1 PG DINNING2
1Auckland Bioengineering Institute/Dept. Eng. Sci., University of Auckland, New Zealand, 2St. George Clinical School, UNSW, Australia

Colonic propagating sequences (PS) are important for the movement of colonic content and defecation, and aberrant PS patterning has been associated with slow-transit constipation. However, because these motor patterns are typically recorded over long periods (24 hours+), the analysis and visualisation of PS spatiotemporal patterning is difficult. This study aimed to develop a novel method for displaying PSs in 24 hours+ pancreatic manometric recordings, to allow ready distinction between normal and abnormal motility patterns.

Methods A 3D mesh representing the geometry of the human colon was created as follows: i) Human colon images from the Visible Human Dataset were digitised to create a 3D data cloud; ii) A surface mesh was fitted to the cloud using a least-squares minimisation technique. Colonic manometry data was collected over a 24 hour period from a slow-transit constipation patient and a healthy control (16 sensors; inter-sensor spacing 7.5 cm). The colonic manometry data was interpolated and mapped to the model according to the following anatomical landmarks: caecum, hepatic flexure, splenic flexure, sigmoid-descending junction, and anus.

Results Pressure data was readily mapped to the model, allowing plotting and visualisation of the cumulative frequency of propagating pressure waves across the whole colon (Fig). In the healthy control, the splenic flexure and proximal descending colon demonstrated peak activity. In contrast, the patient with slow-transit constipation displayed very little propagating data at the splenic flexure, with the majority of activity present at the hepatic flexure and sigmoid colon.

Conclusion A novel method for the 3D visualisation of colonic propagating sequences is presented, providing an intuitive method for representing and analysing a large volume of physiological data. These techniques can be used to display frequency, amplitude or velocity data, and will help to convey regions of abnormally in patient populations.

Validation of a novel catheter for measurement of longitudinal luminal wall motion
MM SZCZESNIAK,1 JW ARKWRIGHT,2 M COSTA,3 SE FUENTEALBA,1 SJ BROOKS,3 NJ SPENCER,3 PG DINNING1
1School of Medicine, UNSW, 2CSIRO Materials Science and Engineering, Lindfield, NSW, 3Department of Human Physiology, Flinders University, SA

Recent studies in the human oesophagus have demonstrated that the circular and longitudinal muscle layers contract in a precise synchronous fashion during peristalsis. These data have been largely derived from combined manometry and ultrasonography studies and are limited in that they can only assess muscle activity at one or two sites along the lumen at any given time. Utilising fibre-optic sensing technology we have developed a catheter capable of recording longitudinal and circumferential motor activity across multiple sites simultaneously.

Methods The catheters were fabricated from multiple fibre Bragg grating elements written into a continuous length of single mode fibre. The catheter contained 5 pressure sensors and 5 longitudinal sensors spaced alternately every 15 mm from the catheter tip. Segments of rabbit ileum (30 cm; n = 7) were placed in an organ bath with Krebs at 36°C. The catheter was inserted into the ileum. Pendulum movement of the rabbit ileum occurred spontaneously. Motor activity recorded by the optical catheter was temporally correlated with simultaneous video clips taken of the luminal wall movements.

Results During a 160s segment 141 gross gut movements were observed and 127(90%) were correctly identified by the catheter signal. Total time the gut was in motion was 83s in the oral and 72.5s in caudal direction. The gut motion inferred from the catheter was confirmed by video 81% and 88% of the time in the oral and caudal direction respectively.

Conclusion Fibre optic catheters can be used to monitor changes in both longitudinal and circular contraction from multiple sites within isolated segments of intestine. In the human oesophagus this ability could dramatically enhance our understanding of the normal physiology in health and subsequently the abnormalities in patients.

Spatiotemporal distribution of motor complexes throughout the entire colon in health and constipation
MBURGERS,1 SM SCOTT,2 PG DINNING3
1University of Amsterdam, The Netherlands, 2Queen Mary University London, Barts and The London School of Medicine and Dentistry, The Royal London Hospital, London, UK, 3StGeorge Clinical School, UNSW, Australia

In most mammalian species including humans, periodic bursts of contractions predominate in the sigmoid colon and rectum. In constipation these rectal motor complexes have been have been shown to be upregulated, and
therefore they may be of pathophysiological importance. The frequency and periodicity of motor complexes throughout the entire colon in patients with constipation has not been described.

**Methods** In 9 patients with slow transit constipation (STC) and 6 healthy controls, 24-hours pancolonic manometry was performed with 16 recording sites spaced at 7.5 cm intervals, spanning the caecum to rectum. Motor complexes (MC) were defined as the occurrence of a set of pressure waves with an amplitude ≥±2 mmHg, ≥1.5 pressure waves/min, a total complex duration of ≥180 s and a quiescent period between complexes of ≥60 s. Validated automated detection software developed by Medical Measurement Systems (MMS) was used to detect these events. This automatic detection was then followed by a visual control examination to remove artefact. The colon was divided into 4 regions ascending, transverse, descending and recto/sigmoid. Frequency, periodicity and amplitude of the motor complexes were compared per region within and between patients and controls.

**Results** Motor complexes were detected throughout the entire colon in both patients with STC and healthy controls. While the overall frequency of these events did not differ between the groups (STC: 154 ± 62 vs 174 ± 121 MCs/24 hours), there were regional differences. In comparison to controls, patients displayed an increased frequency of MCs in the recto/sigmoid (STC: 34 ± 13 vs 18 ± 8 MCs/24 hours; P = 0.05) and a decreased frequency in the transverse colon (STC: 11 ± 8 vs 23 ± 9 MCs/24 hours; P = 0.04). There were no significant differences between the periodicity and amplitude of MCs between regions within or between patients and controls.

**Conclusion** Colonic motor complexes are not a unique feature of the recto-sigmoid regions. While regional differences in the frequency of these events are apparent between patients and control the pathophysiological significance, if any, remains unclear.

**Improved cognition predicts complete mucosal healing in newly diagnosed coeliac disease (CD)**

**ED NEWNHAM, G YELLAND, SJ SHEPHERD, S ROBINSON**

1Eastern Health Clinical School, 2School of Psychology and Psychiatry, Monash University, Victoria

**Background** Mucosal healing rates in coeliac disease is reputedly as low as 60% after 5 years on a gluten-free diet (GFD). Current clinical indices (e.g., symptoms and tissue transglutaminase [tTG] concentrations) may reflect reduced gluten exposure but are insensitive predictors of intestinal healing. We hypothesised that cognitive function, mediated by CD-related inflammatory pathways, may improve commensurately with intestinal healing. The Subtle Cognitive Impairment Test (SCIT) is a novel computer-based visual discrimination task that sensitively measures changes in cognitive function over time and is not subject to practice effects.

**Aims** To assess the SCIT’s utility in newly diagnosed patients with CD and compare to changes in tTG, symptoms and small bowel histology after the first 3 months of GFD.

**Methods** Patients with newly diagnosed CD (on duodenal biopsy plus appropriate DQ haplotype) were recruited if they had been on a GFD for less than 4 weeks. Those with age >40 years or co-morbidities known to impair cognition were excluded. Patients were seen at weeks 0, 4 and 12 and underwent the SCIT and assessment of tTG and symptoms (100 mm visual analogue scale). Baseline and 12 week histology were obtained via endoscopy, and compared using Marsh grading.

**Results** Of 8 patients (age 21–36 years; 6 female) thus far, 2 had IIIC, 2 IIIB, 2 IIIA, and 2 Marsh I lesions at baseline. All were compliant with GFD as assessed by 7-day food diaries at each visit. Histology improved in all patients (8/8) and 4 (50%, baseline IIIA in 2, 1 in 2) achieved complete healing (Marsh 0) at 12 weeks. Over 12 weeks of GFD, symptoms (mean 46 [SD 20] vs 17 [12] mm for overall gut symptoms, p = 0.002), and tTG concentrations (60 [64] vs 32 [31]) U/ml, p = 0.04) improved, but SCIT reaction time did not (588 vs 563 ms (p = 0.18)). However, SCIT reaction times improved in all with complete healing (599 [222] vs 514 [99] ms) but in none of those with continuing villous lesions (599 [99] vs 608 [103] ms; p = 0.02 healed vs non-healed).

**Conclusion** A GFD leads to continuing improvement in symptoms and serology in newly diagnosed CD but cognitive function only improves in association with complete intestinal healing. Using the SCIT, the link between intestinal lesions and cognitive (dys)function implies hitherto unknown factors may be released from these lesions, with central effects. The findings strongly argue for intestinal healing being the goal of therapy.

**Discordant absorption of mannitol and sorbitol in patients with irritable bowel syndrome— a reflection of possible epithelial abnormalities?**

**CK YAO, HL TAN, PR GIBSON, JS BARRETT, JG MUIR**

Department of Medicine, Box Hill Hospital, Victoria

**Background** Sorbitol and mannitol, polyols that are 6-carbon isomers, are widely distributed in food. They are partly absorbed by passive diffusion in the healthy gut, but in coeliac disease, absorption of sorbitol is increased. Polyol absorption in irritable bowel syndrome (IBS) is poorly studied and, although subclinical mucosal inflammation and increased permeability may be present in some patients with IBS, we hypothesized that absorption of polyols would be similar to that in healthy controls.

**Aims** To define the absorption of patterns and capacity of sorbitol and mannitol in a cross-section of IBS patients and to compare the results with those of healthy controls.

**Methods** A randomized, double-blinded, placebo-controlled, crossover study was conducted in 15 healthy individuals and 15 IBS patients (Rome III criteria). All produced adequate breath hydrogen after 15 g lactulose. Subjects were randomly challenged with a 100 ml solution of 10 g sorbitol, mannitol or glucose (as a control). Breath hydrogen was measured at baseline and at 15 min intervals for 4 h. Responses were expressed qualitatively and quantitatively as area-under-the-curve (AUC) for breath hydrogen expressed as grams of test sugar relative to AUC after lactulose.

**Results** A similar proportion of healthy (60%) and IBS (53%) subjects had sorbitol malabsorption. In contrast, fewer IBS patients (13%) malabsorbed mannitol compared to healthy controls (53%, p = 0.02, Fisher’s Exact). Quantitatively, the amount of mannitol malabsorbed was significantly lower in the IBS group (median [IQR] 0 [0–2.0] g) compared to healthy controls (3.4 [0.5–9.9] g, p = 0.008; Mann–Whitney U test) whilst there were no significant differences in the amount of sorbitol malabsorbed in the two subject groups (IBS 1.1 [0.7–5.3] vs healthy 2.9 [0.0–6.3], p = 0.87). The degree of malabsorption of sorbitol and mannitol correlated significantly in the healthy subjects (Spearman’s r = 0.70; p = 0.005), but, in the IBS patients, no correlation was evident (r = −0.18; p = 0.52).

**Conclusions** Discordant absorption of mannitol and sorbitol occurs in patients with IBS in contrast to healthy controls. This selective absorption of mannitol is not readily explained on the basis of known absorption pathways. It may reflect abnormalities in epithelial function in IBS or selective increase in paracellular permeability due to the difference in isomeric chemical configuration. Mechanisms warrant further investigation.
Type-I IFN system is activated in patients with irritable bowel syndrome

S HAAG, M TRIPPLER, L POGGENPOHL, C LECHTERMANN, G GERKEN, JF SCHLAAK
Department of Gastroenterology and Hepatology, University Hospital Essen, Essen, Germany

A significant proportion of patients with irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD) suffer from psychological co-morbidities, i.e. depression. We have recently identified 16 Interferon (IFN)-responsive genes (ISGs) that were associated with IFN-α induced depression and severe endogenous depression. We thus aimed to assess whether these “depression ISGs” may play a role in patients with IBS and IBD.

Methods 11 consecutive IBS-Constipation, 12 IBD patients (7 Ulcerative Colitis, 5 Crohn’s Disease) and 14 healthy controls were included. Basal expression of ISGs and the internal expression of IFN-α, -β, and -γ was analyzed in whole blood (PAXgene blood RNA tubes) using quantitative real-time RT-PCR. Additionally, PBMC were isolated from each patient by density gradient centrifugation and were stimulated in vitro with IFN-α (0, 100, and 1000 IU/mL for 16 h). The upregulation of ISGs was analyzed by real-time RT-PCR. HRQOL (SF-36, physical [PCS] and mental component score [MCS]) and affective disorders (Hospital Anxiety and Depression Scale) were also assessed.

Results We found highly significant differences in the basal expression of 11 out of 14 tested ISGs (p < 0.001 for 10 genes) in IBS and IBD patients vs. healthy controls. Basal expression of ISGs associated with depression and of “classical” ISGs (IFIT1, ISG15, and MX1) was significantly lower in 13/14 genes in IBS and IBD patients compared to healthy controls. Basal expression of IFN-β was significantly upregulated in IBS and IBD patients (p < 0.001), while there was no difference in basal expression of IFN-α and IFN-γ. Comparing IBS and IBD patients, no significant differences in basal gene expression were detected. PBMC of IBS and IBD patients were hyper-responsive to exogenous stimulation with IFN-α compared to healthy controls leading to significantly higher induction of selected ISGs.

Summary In patients with refractory IBS and chronic IBD a marked activation of the type I IFN system and a hyper-responsiveness to stimulation with type I IFNs can be observed. This is associated with a response pattern that is also found in patients with depressive disorders and may thus explain at least some of the psychopathological abnormalities in these patients.

Effects of sweet preloads on gastric emptying and postprandial glycaemia in healthy subjects

T WU,1 B ZHAO,1 M BOUND,1 HL CHECKLIN,1 M BELLON,2 T LITTLE,3 R YOUNG,3 KL JONES,1 M HOROWITZ,1 CK RAYNER1
1Discipline of Medicine, University of Adelaide, 2Department of Nuclear Medicine, 3Nerve Gut Laboratory, Royal Adelaide Hospital, Adelaide, Australia

Background and aims Gastric emptying (GE) is regulated by small intestinal nutrient feedback, and is a key determinant of postprandial blood glucose. Feedback from sweet nutrients could be signaled by sweet taste receptor (STR) and/or sodium glucose co-transporter-1 (SGLT1) pathways. We reported that STR stimulation alone (by sucralose) does not slow GE, and hypothesize that sweet substances that are also SGLT1 substrates, even if not metabolized (such as 3-O-methylglucose (3OMG)), will generate feedback to regulate GE, and improve glycaemia after a subsequent meal.

Materials and methods 10 healthy subjects were studied on 3 days each. Subjects drank a 400 mL “preload” containing either 40 g glucose, 40 g 3OMG, or 60 mg sucralose (equivalent sweetness) in water. 15 min later, they ate a potato meal labeled with 13C octanoic acid. Blood glucose, GE (breath test) and gastrointestinal sensations (100 mm visual analogue questionnaires) were evaluated at frequent intervals. Data are mean ± SEM.

Results GE was slower after 3OMG than sucrose (half-emptying time 207.3 ± 16.9 min vs 165.2 ± 11.6 min, P < 0.005), and tended to be slower after glucose than sucralose (244.6 ± 58.8 min v 165.2 ± 11.6 min, P = 0.15), without any difference between 3OMG and glucose. Blood glucose in the first 30 min after the meal (incremental area under the curve) was greater after glucose than sucralose or 3OMG, but less after 3OMG than sucrose (P < 0.05 for each). Fullness tended to increase more after glucose and 3OMG than sucralose (P < 0.06 for each).

Conclusion SGLT-1 substrates, regardless of whether they are metabolized, generate feedback to slow gastric emptying, improve early postprandial glycaemia after a subsequent meal, and induce fullness.

Pre and post-operative manometry findings in massive hiatus hernia

C WON, G FALK
Department of Surgery Concord Repatriation General Hospital, Sydney Australia

Massive hiatus hernia is uncommon. We reviewed a single surgeon’s experience in laparoscopic repair of massive hiatus hernia and report pre-operative and post-operative manometry results.

Methods We performed a retrospective review of 421 patients undergoing laparoscopic repair of massive hiatus hernia from Jan 1993 to Feb 2010. The massive hiatus hernia was defined as greater than 50% of stomach in the chest.

Results 421 patients underwent laparoscopic repair of massive hiatus hernia. 268 patients had pre-operative manometry. 149 patients had normal oesophageal motility. 29, 29 and 51 patients had mild, moderate and severe oesophageal dysmotility respectively. 26 out of 268 patients had post-operative manometry. Out of 26 patients, 1, 2 and 9 patients had mild, moderate and severe dysmotility respectively. 9 out 26 patients demonstrated significant improvement in the oesophageal motility.
Post-operatively. One out of these nine patients reported worsening dysphagia despite improved oesophageal motility. 21 patients had pre-operative and post-operative manometry and dysphagia assessed. Only 2 patients reported worsening dysphagia post-operatively.

**Summary/conclusions** Significant proportion of massive hiatus hernia patients have oesophageal dysmotility. More patients report symptomatic improvement of dysphagia than it can be demonstrated from the improvement in manometry.

**Efficacy and safety of pneumatic dilatation for symptom relapse in patients with achalasia previously treated with Heller myotomy**

V KUMBHARI, M SZCZESNIAK, S FUENTEALBA, IJ COOK

**Department of Gastroenterology and Hepatology, St George Hospital, Kogarah, University of NSW, Sydney, Australia**

**Background and aims** Idiopathic achalasia is a chronic relapsing condition, irrespective of primary treatment modality. Little efficacy data exists to guide the clinician on how to treat symptom recurrence following primary therapy with Heller myotomy. Our aim was to evaluate the safety, short and long term efficacy of graded pneumatic dilatation to ‘save’ symptomatic recurrence in patients treated initially with Heller myotomy for idiopathic achalasia.

**Methods** A retrospective, single centre, cross sectional study identified 27 patients (10 M; 17 F) treated with pneumatic dilatation (PD) for symptom recurrence from 1995 to 2010, following prior Heller myotomy (HM). The institutional protocol is to perform sequential, graded (Rigiflex balloon: 30–35–40 mm) dilatations until a good or excellent therapeutic response is achieved. Initial (2–6 months), post-dilatation response, defined as ‘excellent,’ ‘good,’ or ‘marginal’ was derived from case notes as assessed by one experienced clinician (IJC). Symptom relapses thereafter were treated ‘as required’ over subsequent years. In May 2010, patients were posted a validated 10 item symptom questionnaire, to quantify long term outcome. Additionally, the time to relapse (defined by either need for repeat PD or symptom score >20) was determined.

**Results** All 27 patients commenced PD with a 30 mm balloon; 12 required a second (35 mm) dilatation; and 3 required a third (40 mm) dilatation. Despite suboptimal clinical response to initial PD in these 12 patients, 3 did not wish to proceed. Hence, patient compliance with the graded dilatation protocol was achieved in 24 patients; of whom 23 (96%) had a good or excellent short term response (2–6 months). At the time of abstract submission, 78% of questionnaires were retrieved. Long term remission was achieved in 16 of the 23 (70%) patients with a mean follow-up of 36 months. The mean time until relapse amongst the 7 patients who did so was 32 months. Of these 7 patients, 6 had undergone ‘as required’ PD and only 1 did not subsequently achieve a good or excellent response. Of a total of 48 dilatations in 27 patients, there were no perforations.

**Conclusions** Graded pneumatic dilatation, together with ‘on demand’ dilatation thereafter, is a safe and effective treatment for post-Heller myotomy symptom relapse in idiopathic achalasia.