Results The biopsies of the eight sequential patients had been reported by one of four centres within the West Midlands. All, except one, of these local reports were normal. However, subsequent review of all eight biopsies by the national expert identified pathological changes in all. Diagnoses established included two cases of polyglucosan body myopathy, confirmation of NSAID enteropathy and differing forms of inflammation (eg, lymphocytic plexitis). Establishing these diagnoses enabled accurate prognoses and implementation of subsequent management, including continuation of home parenteral nutrition (HPN, n=6) and consideration for small intestinal transplantation (SIT, n=3). Patients questioned reported additional benefits.

Conclusion Gut dysmotility can be highly symptomatic and debilitating leading to intestinal failure (IF), HPN and SIT. Clinical decisions for consideration for HPN and SIT are complex. Decisions must consider the potential for morbidity and mortality against the potential for improvement in nutritional status, quality of life and survival. A full thickness small bowel biopsy, while invasive, offers opportunity for a definitive diagnosis, and thus a prognosis. Published series report an 81% diagnostic yield for small bowel biopsies in patients with suspected gastrointestinal neuromuscular disorders, when using routine and immunohisto-chemical techniques.[1] However, standard histopathological reporting, which is often based on H&E staining alone, has less potential for achieving a diagnosis. This is shown by our study in which a diagnosis was achieved in only 13%. Thus, our study highlights the importance of expert review and demonstrates the importance of achieving a diagnosis for patient and clinician.

Competing interests None declared.

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PWE-048 GASTRIC VOLUME RESPONSE AND EMPTYING AFTER A LARGE LIQUID NUTRIENT MEAL IN FUNCTIONAL DYSPEPSIA AND HEALTH ASSESSED BY NON-INVASIVE GASTRIC SCINTIGRAPHY (GS) AND MRI: A PILOT STUDY TO IDENTIFY CANDIDATE BIOMARKERS

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Introduction Dyspeptic symptoms are common but investigations rarely explain them. This lack of information may be because: (1) Current test meals are small (~200 ml) and don't trigger symptoms (2) gastric emptying half time (T50) and/or retention at 2 or 4 h may not elicit underlying pathophysiology. By contrast, MRI studies suggest that gastric volume change after a meal may identify impaired accommodation in functional dyspepsia (FDs).

Aim GS and MRI with a 400 ml liquid test meal were applied to identify candidate biomarkers that distinguish FDs from healthy volunteers (HVs).

Methods FDs with postprandial distress by Rome III criteria and normal endoscopy or 24 h pH-studies were recruited. Results were compared to age and sex matched HVs. Sensation at 400 ml and Maximum Tolerated Volume (MTV) was assessed by nutrient drink test (0.75 kcal/ml@40 ml/min). Participants were then randomised to GS and MRI with 400 ml liquid test meal (0.75 kcal/ml@40 ml/min) on two separate days. Directly comparable measurements of gastric content volume were analysed: Gastric contents volume after meal ingestion (GCV0), GE half-time [T50], and GErate@T50 [ml/min].

Results FDs (n=8; 7 female) were each compared to those of three matched HVs (n=24). HVs weighed more than FDs ($p<0.018$) fullness at 400ml was similar ($p=0.21$) but dyspeptic sensations were lower (bloating, nausea, pain, $p<0.01$) and MTV was greater (median 960 (IQR 750–1330) vs 480 (±400–760) ml, $p=0.015$). With GS, HVs had higher GCV0 than FDs (345 (333–358) vs 325 (310–350) ml; $p=0.052$), T50 (48 (39–56) vs 52 (44–54) min; $p=0.710$) was similar but GErate@T50 was faster (3.5 (3.0–4.2) ml/min vs 2.7 (2.1–3.1) ml/min; $p=0.012$). With MRI, compared to GS, measurements of GCV and T50 were larger ($p<0.001$), and GErate was slower ($p=0.012$); but no significant differences between groups.

Conclusion FD patients are characterised by abnormal gastric sensorimotor response to a large, liquid nutrient meal. Rapid early emptying (reduced GCV0) is followed by slow late emptying (slow GErate@T50). These GS measurements, with dyspeptic symptoms at 400 ml, are biomarkers in FD. MRI measurements of GCV, residual volume, meal and secretions do not provide the same clarity. These findings are consistent with the hypothesis that impaired accommodation in gastric filling in FD leads to rapid nutrient delivery to small bowel triggering powerful neuro-hormonal feedback that slows subsequent emptying.

Competing interests None declared.

PWE-049 EFFECTS OF AGE, SEX AND OBESITY ON SATIATION ASSESSED BY NUTRIENT DRINK TEST AND GASTRIC EMPTYING (GE) ASSESSED BY NON-INVASIVE GASTRIC SCINTIGRAPHY (GS) AND MRI: ANALYSIS AND COMPARISON OF METHODS

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Introduction The relationship of demographic and anthropometric factors on satiation and gastric functions is incompletely understood. Optimal methodology to assess meal intake factors and postprandial GE has not been established. Current test meals are small and may not be sufficient to assess satiation and postprandial responses. GS measures gastric meal retention only. MRI measures gastric content volume (meal and secretions).

Aim This study assessed the effects of age, sex and obesity on maximum tolerated volume (MTV) assessed by nutrient drink test (NDT) in healthy volunteers (HVs). GS and MRI assessed gastric function and GE after ingestion of a 400 ml liquid test meal (same nutrient drink) that triggered sensation of fullness in >90% HVs.

Methods Adult HVs were recruited and stratified by sex and age aiming to study 10 men and women in age groups <40, 40–60, >60 yrs. Exclusions included history of GI surgery and obesity (BMI>30 kg/m^2). MTV was assessed at screening by NDT (0.75 kcal/ml at 40 ml/min), all HVs ingested >400 ml. Eligible participants were randomised to gastric imaging by GS and MRI on two separate days. HVs ingested 400 ml liquid nutrient at 40 ml/min. Gastric content volume was monitored over 4 h. GS and MRI measured GE half-time [T50], GErate maximum and GErate@T50 [ml/min]. Univariate and multiple linear regression models assessed the effects of demographic and anthropometric parameters on gastric function.

Results 53 HVs completed the study (6–10 in each group). MTV associated with male sex (R^2=20%, $p<0.001$), height (R^2=9%,

p=0.016) and weight (R^2=15%, p<0.003) but not age (R^2=4%, p>0.1) or obesity (WC or BMI, both p>0.1). On multivariate analysis GS T50 and GErate@T50 were negatively associated with male sex (R^2=12%, p<0.005), height (R^2=30%, p<0.001) and weight (R^2=23%, p<0.001) but not age (R^2=1%, p>0.1) or obesity (BMI or WC, both p>0.1). Similar associations were not present with MRI indicating gastric content by GS and MRI do not provide the same information.

Conclusion HVs that are male, tall and heavy ingest more before MTV is reached; but no independent association with obesity was seen. These factors were associated with slower gastric emptying assessed by GS. A simple explanation is that large individuals have larger stomachs that can accommodate large volumes. 400 ml achieves lower relative gastric filling in large than small stomachs and does account also for slower GE.

Competing interests None declared.

PWE-050 DOES SMALL INTESTINE BACTERIAL OVERGROWTH CAUSE NEURODYSMOTILITY IN IBS AND COELIAC DISEASE?

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Introduction Small intestine bacterial overgrowth (SIBO) has been proposed as a cause of altered small bowel motility both in irritable bowel syndrome (IBS) and coeliac disease. The glucose hydrogen breath test (GHBT) is most commonly used in practice to diagnose SIBO. The aim of this study was to assess the prevalence of SIBO using GHBT in coeliac disease and IBS.

Methods Group A comprised patients with biopsy-proven, untreated coeliac disease (n=44, 14 male, median age 47 y, range 18–75). Group B comprised patients with IBS (n=207, 55 male, median age 53 y, range 17–90). Group C comprised controls (n=47, 9 male, median age 58 years, range 20–74). All had GHBT performed on a normal, gluten containing diet. In the coeliac group this was repeated after a median of 180 days on a gluten-free diet (GFD). None had antibiotics in the 4 weeks prior to testing. A positive result was a rise in hydrogen of at least 20 ppm, or methane of 12 ppm, over the baseline for each gas.

Results 6/44 (13.6%) with coeliac disease had a positive result. 30/207 (14.5%) patients with IBS had a positive breath test. 1/47 (2.1%) controls tested positive. Patients with coeliac disease (p=0.05) and IBS (p=0.02) were significantly more likely than controls to have a positive GHBT. In the coeliac group positive GHBT was associated with male sex but no other features. There were no associated features in groups B and C. Patients with coeliac disease had lower baseline hydrogen levels (9.4 ppm±8) compared with IBS patients (13.4 ppm±13.7) (p=0.07) and controls (16.6 ppm±18.0) (p=0.025). In the coeliac group 4/6 with a positive result had a significant rise in methane but not hydrogen. At repeat testing all four were persistently methane positive but the absolute peak methane levels had fallen from a mean of 64 ppm to a mean of 49 ppm. Only one coeliac subject had a positive GHBT that normalised on GFD.

Conclusion The prevalence of SIBO diagnosed by GHBT is similar in IBS and coeliac disease. SIBO is significantly more common in IBS and coeliac disease than in controls. The prevalence of SIBO in coeliac disease may not vary between treated and untreated disease. Despite this increased prevalence of SIBO in coeliac disease and IBS, the failure of prevalence to fall following GFD may suggest that neurodysmotility is not the method for symptoms in these patients.

Competing interests None declared.

PWE-051 STUDIES OF THE PSYCHOPHYSIOLOGICAL MARKERS AND THE BRAIN PROCESSING OF NAUSEA IN HEALTHY HUMANS USING A NOVEL VIRTUAL REALITY VIDEO

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Introduction Nausea is a common and complex multi-system sensation. Objective psychophysiological markers of nausea that also predict nausea susceptibility in humans are lacking. The regions of the brain that process the sensation of nausea are also unknown. Using a novel model of motion sickness induced nausea, we aimed to study psychophysiological and brain responses during nausea in healthy human volunteers.

Methods A 10-min video of motion and a control video of a still image were presented to 98 healthy volunteers (age 26±8 years, 53 male). Validated questionnaires were used for anxiety and nausea assessment. We monitored sympathetic activity [heart rate (HR) and mean, systolic and diastolic blood pressure (MBP, SBP and DBP)]; parasympathetic activity [cardiac vagal tone (CVT), cardiac sensitivity to baroreceptor reflex (CSB)], electrogastrogram (EGG) and blood cortisol. Comparisons of these parameters were made in the 25 most susceptible and the 25 most resistant subjects (nausea VAS). 28 subjects of the 50 (aged 25±5 years, 16 males, 11 nausea resistant) repeated the experiments with Functional MRI to assess brain activity during nausea.

Results All subjects completed the studies without vomiting. *Comparison of motion video (MV) to control:* MV raised nausea scores (nausea VAS, +57%±11, pComparison of nausea susceptible (NS) with resistant subjects (NR): the NS subjects showed more parasympathetic withdrawal; larger sympathetic activation and higher cortisol release and trend for higher EGG activity in comparison to NR subjects (Abstract PWE-051 table 1). *Brain imaging data* (all results had corrected p: There was a positive correlation between brain activity and nausea level in the inferior frontal gyrus; and a negative correlation in declive, culmen, cuneus, and parahippocampal gyrus in NS subjects. Compared to NR subjects, NS volunteers showed increased activity in the substantia nigra; and decreased activity in declive and parahippocampal gyrus during nausea induction.

Table 1 Wilcoxon signed rank tests to compare responses during the motion video vs control that is paired and nonparametric. Mann-Whitney tests to compare responses during the motion video for NS vs NR. Results are means and standard error of means.

	CVT % change	CSB % change	HR % change	MBP % change	SBP % change	DBP % change	Cortisol % change	EGG (cycles per minute)
Motion video	-9.57 ± 2.74	-15.14 ± 3.11	6.76 ± 0.92	5.45 ± 0.89	4.13 ± 0.91	6.89 ± 1.04	7.64 ± 17.62	3.0±0.04
Neutral video	0.39 ± 2.33	-0.35 ± 3.28	1.36 ± 0.55	0.51 ± 0.66	0.76 ± 0.72	0.30 ± 0.68	-28.55 ± 5.12	2.8±0.05
Motion vs Neutral	-9.96	-14.79	5.40	4.94	3.37	6.60	36.19	0.2
Wilcoxon Signed Rank	p<0.01	p<0.01	p<0.01	p<0.01	p=0.09	p<0.01	p=0.09	p<0.02
Nausea susceptible	-20.63 ± 4.12	-27.64 ± 5.14	11.05 ± 2.36	7.73 ± 2.21	5.67 ± 2.10	9.94 ± 2.61	17.94 ± 22.61	3.1±0.05
Nausea Resistant	-5.03 ± 3.35	-7.08 ± 4.06	4.52 ± 1.30	2.69 ± 1.58	1.47 ± 1.70	4.12 ± 1.72	-21.93 ± 5.87	2.8±0.07
Susceptible vs Resistant	-15.60	-20.56	6.54	5.04	4.20	5.82	39.87	0.3
Mann-Whitney	p<0.01	p<0.01	p<0.03	p=0.10	p=0.17	p=0.09	p<0.05	p=0.06

Conclusion NS subjects decreased PNS tone and increased SNS tone, anxiety and cortisol suggesting these parameters could be markers of nausea susceptibility. The NS subjects also showed different brain processing patterns compared to NR subjects. Thus, this safe and