

$p=0.016$) 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 GRate@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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K Evans,* E Lunn, S Raza, D S Sanders, S Higham. *Sheffield teaching hospitals NHS Trust, Sheffield, UK*

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 ($9.4 \text{ ppm} \pm 8$) compared with IBS patients ($13.4 \text{ ppm} \pm 13.7$) ($p=0.07$) and controls ($16.6 \text{ ppm} \pm 18.0$) ($p=0.025$). 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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¹K S Ng,* ¹S J Coen, ¹Y C Chua, ¹V F Ban, ²M A Gresty, ¹G J Sanger, ³S C Williams, ³G J Barker, ⁴P L Andrews, ¹M Imran, ¹Q Aziz. ¹Wingate Institute of Neurogastroenterology, QMUL, London, UK; ²Division of Neurosciences and Mental Health, Imperial College, London, UK; ³Institute of Psychiatry, King's College, London, UK; ⁴Division Of Biomedical sciences, St George's University, London, UK

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, $+57\% \pm 11$, p Comparison 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 test 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 ± 4.05	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