

Data from adult-onset to paediatric-onset CVS were included. Data were extracted into a standardised form.

Results The systematic search yielded 33 papers with 1141 cases of cyclic vomiting syndrome. All but one paper were retrospective studies. Both adult-onset and paediatric-onset CVS had a high association with headaches/migraines and psychiatric conditions such as anxiety/depression. Furthermore, in children travel sickness was noted in 28.3%. The mean duration and frequency of attacks were higher in adult-onset CVS compared to paediatric-CVS. Overall remission was achieved in 73.2% of cases. When tricyclic antidepressants were used, 75.5% of adult-onset CVS patients had a response (n=237) and 67.6% of paediatric onset-CVS patients (n=244). In adult-onset CVS, 37 patients had been treated with sumatriptan with a response rate of 56.8%. In paediatric-onset CVS, 91 patients had been treated with propranolol and amitriptyline resulting in a response rate of 86.8%. There were no studies focusing on the acute management of CVS.

Conclusion CVS is an intractable illness with a major impact on patient's quality of life. There is a long duration between symptom onset and diagnosis of the condition. There is a high association with headaches/migraines and anxiety/depression. Symptoms are more severe in adult-onset CVS. Tricyclic antidepressants have the most evidence and have high efficacy at reducing the frequency/duration or intensity of attacks. There is limited evidence on the acute management of CVS.

Abstract PWE-054 Table 1

	Adult-onset CVS (n = 446)	Paediatric-onset CVS (n = 695)
Age (mean years)	34.0	8.3
Age of onset (mean years)	25.4	5.2
Prevalence of headaches/migraines (%)	56.0	40.5
Family history of headache/migraine (%)	56.0	27.8
Co-existent anxiety/depression	39.7	26.7
Duration of CVS episode (mean days)	5.9	3.4
Frequency of CVS (episodes/month)	1.2	0.8

Competing interests None declared.

PWE-055

THE PREVALENCE, CLINICAL RELEVANCE AND IMPACT ON DIET OF LACTOSE INTOLERANCE IN A POPULATION WITH LACTASE DEFICIENCY: A RANDOMISED, DOUBLE-BLIND, DOSE RESPONSE STUDY IN HEALTHY SUBJECTS AND PATIENTS WITH DIARRHOEA PREDOMINANT IRRITABLE BOWEL SYNDROME

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^{1,2}M R Fox, *³J Yang, ³Y Deng, ³Y Cong, ²M Fried, ³N Dai. ¹NIHR Biomedical Research Unit, Nottingham Digestive Diseases Centre, Nottingham, UK; ²Division of Gastroenterology, University Hospital Zurich, Zurich, Switzerland; ³Department of Gastroenterology, Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University, Hangzhou, China

Introduction Lactose Intolerance (LI) is a common clinical syndrome; however there is a lack of high quality evidence about its epidemiology, diagnosis and clinical relevance in health and patients with functional gastrointestinal disease. Additionally the impact of LI on intake of dairy produce is uncertain because previous studies have often tested tolerance only at very high doses and/or failed to assess both self perceived and objective lactose tolerance.

Aim To assess the prevalence of LI in a population with lactose malabsorption and the effect of LI on intake of dairy products in healthy volunteers (HVs) and patients with diarrhoea predominant irritable bowel syndrome (D-IBS).

Methods A Chinese population known to have a high prevalence of lactase deficiency was studied. 60 D-IBS patients and 60 HVs underwent hydrogen breath test (HBT) at 10 g, 20 g, 40 g lactose on three test days in a randomised, double-blind three way cross-over study. Lactose Malabsorption (LM; H₂ rise >20 ppm) and intolerance (LI ≥2 point rise on validated symptom score) were assessed at each dose. Genetic sequencing of the lactase gene promoter region was also performed. The impact of LI (both self-reported and from HBT) on lactose intake was assessed by dietary questionnaire.

Results LM was prevalent in HVs and D-IBS patients (93% vs 92% at 40 g lactose, p=0.73). LI prevalence was lower in HVs than D-IBS patients at 10 g (3% vs 18%, OR 6.51 (CI 1.38 to 30.8), p=0.008), 20 g (22% vs 47%, OR 3.16 (CI 1.43 to 7.02), p=0.004) and 40 g (68% vs 85%, OR 2.63 (CI 1.08 to 6.42), p=0.03). The genotype in all participants was C/C-13910 and no other SNP was identified on gene sequencing of the lactase gene regulatory sequence. Most participants (83/120 (69%)) included milk and dairy products in their diet; however D-IBS patients reported less frequent intake of dairy products than HVs and a smaller amount of lactose in the diet (D-IBS: 9.0 g (4.5–17.3) vs HVs: 19.5 g (6.0–36.4); p=0.040). D-IBS patients also self-reported LI more frequently than HVs (63% vs 22%, OR 6.25 (CI 2.78 to 14.0), p<0.001); however, self-reports of LI did not predict results of objective HBT.

Conclusion The likelihood of LI is increased in patients with D-IBS, especially at low lactose doses. Self reported lactose intolerance, but not objective LI on HBT, was associated with avoidance of dairy products.

Competing interests M Fox Grant/Research Support from: Nestle International, J Yang: None declared, Y Deng: None declared, Y Cong: None declared, M Fried: None declared, N Dai: None declared.

PWE-056

PROSPECTIVE EVALUATION OF 403 PATIENTS WITH DIARRHOEA PREDOMINANT IRRITABLE BOWEL SYNDROME (D-IBS) FULFILLING ROME II CRITERIA

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S Lin, M Kurien,* J S Leeds, D S Sanders. *Department of Gastroenterology, Royal Hallamshire Hospital, Sheffield, UK*

Introduction Irritable bowel syndrome (IBS) has a high prevalence with established diagnostic criteria (ROME) used to aid diagnosis. Despite increasing drives to make a positive diagnosis of IBS, patients may still require some investigations to exclude other organic conditions that may present with IBS type symptoms. There has been limited work evaluating diagnostic outcomes in this group of patients. We therefore investigated unselected patients presenting with D-IBS symptoms fulfilling ROME II criteria.

Methods Data were prospectively collected from consecutive patients meeting Rome II criteria for D-IBS in a university hospital. Demographic data, subsequent investigations and diagnostic yields of these tests were collected. All patients underwent haematologic, biochemical and immunologic testing prior to subsequent

Abstract PWE-056 Table 1 Final diagnoses in those fulfilling Rome II criteria for D-IBS

Diagnosis (total n = 403, lost to follow follow-up n = 14)	Patients (%)
Irritable bowel syndrome	301 (75)
Pancreatic insufficiency	28 (7)
Celiac disease	23 (5)
Diverticular disease (endoscopic/radiological finding)	19 (5)
Lactose intolerance	8 (2)
Inflammatory bowel disease	4 (1)
Small bowel bacterial overgrowth	3 (0.7)
Carcinoid	2 (0.5)
Bile acid malabsorption	1 (0.2)

investigations. The further tests undertaken were at the discretion of the investigating clinician. Statistical analysis was performed using SPSS with Fisher's exact test used to compare categorical data.

Results 403 patients (277 female, median age 52 years) who met Rome II criteria for D-IBS were followed-up during the study period. Investigations undertaken in this cohort of patients were as follows: faecal pancreatic elastase (313) gastroscopy (208), colonoscopy (188), glucose or lactose hydrogen breath tests (62), CT/MRI scan (40), barium enema (38), SeHCAT (18) and small bowel capsule endoscopy (18). Final diagnoses are shown in Abstract PWE-056 table 1. 88 patients (22%) were subsequently identified to have an alternative diagnosis than D-IBS with pancreatic insufficiency and coeliac disease being the most common. When comparing diagnostic yields of individual tests, a lactose-hydrogen breath test had the highest positive yield of 28.6% (8/28), which was significantly higher than any other diagnostic test undertaken ($p < 0.01$).

Conclusion This study highlights the frequency of investigations undertaken in patients with D-IBS symptoms. While the majority of patients have negative tests, there remains a significant number of patients in whom underlying pathology is identified accounting for their D-IBS symptoms. Although NICE guidelines advocate testing for coeliac disease, our study also demonstrates the importance of testing for pancreatic insufficiency in patients presenting with D-IBS symptoms.

Competing interests None declared.

PWE-057 BILATERAL REVERSAL OF A VIRTUAL LESION TO HUMAN PHARYNGEAL MOTOR CORTEX BY CARBONATED WATER SWALLOWING

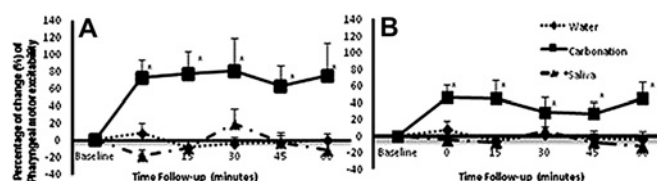
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O Elshukri,* H Mentz, S Hamdy, S Mistry, E Michou. *Inflammation Sciences, University of Manchester (part of the Manchester Academic Health Sciences Centre (MAHSC)), Manchester, UK*

Introduction Anecdotal clinical evidence supports the use of carbonated liquids in reducing the likelihood of aspiration in dysphagic patients (Bulow *et al. Acta Radiol* 2003; Sdravou *et al. Dysphagia* 2011). Repetitive transcranial magnetic stimulation (rTMS) delivered at 1-Hz can induce transient focal suppression of pharyngeal motor cortex (Mistry S, *et al. J Physiol* 2007). Here we investigated whether swallowing of carbonated water can reverse the inhibitory effects of a virtual lesion to pharyngeal motor cortex, compared to still water and saliva swallowing.

Methods In 14 healthy subjects (7 male, mean age 34 ± 15 (SD)) pharyngeal electromyographic responses were recorded using an intraluminal catheter after the application of Transcranial Magnetic Stimulation (TMS) over pharyngeal motor cortex, as a measure of cortico-bulbar excitability. On three randomised visits, subjects were cued by a visual feedback software to perform a total of 40 swallows over 10 min (swallows every 15 s) of either carbonated water or still water vs 10 min of saliva swallowing ad libitum (control), before and after an unilateral 1-Hz virtual lesion of the pharyngeal motor cortex. Cortical excitability (presented as mean \pm SEM) was then reassessed bilaterally for 60 min post-interventions and analysed with repeated measures ANOVA (SPSS V.14).

Results A three-way ANOVA showed a significant interaction of Hemisphere \times Intervention \times Time [$F(1,13)=5.82$, $p=0.03$]. Compared to saliva swallowing (control), there was significant increase in cortical excitability bilaterally following swallowing of carbonated water (lesioned pharyngeal motor cortex [$F(1,13)=7.5$, $p=0.017$], with a maximum increase of $81 \pm 38\%$ at 30 min post intervention (Abstract PWE-057 figure 1A); unlesioned [$F(1,13)=4.75$, $p=0.04$], with a maximum of $46 \pm 16\%$, immediately post intervention, Abstract PWE-057 figure 1B), not seen with still water swallowing.



Abstract PWE-057 Figure 1 The effects of carbonation, still water and saliva swallowing to the lesioned (A) and contralateral (non-stimulated) pharyngeal motor cortex, (B) with 1-Hz rTMS in 14 healthy volunteers, * $p < 0.05$.

Conclusion Carbonation reverses the effects of a unilateral virtual lesion with significant increases in cortical excitability not limited to the lesioned hemisphere. These data support the notion that chemesthetic stimuli of carbonation may provide the required peripheral sensory information that can influence brain swallowing activity compared to still water swallowing. These data provides the platform for considering the use of carbonation as facilitating stimuli in dysphagic patients who aspirate thin liquids.

Competing interests None declared.

PWE-058 POSTPRANDIAL SUPPRESSION OF REFLUX BY A RAFT FORMING ALGINATE (GAVISCON ADVANCE) COMPARED TO A SIMPLE ANTACID: TECHNICAL ASSESSMENT OF PH-IMPEDANCE MONITORING AND CLINICAL FEASIBILITY STUDY IN GASTRO-OESOPHAGEAL REFLUX DISEASE (GORD) PATIENTS

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¹R Sweis,* ¹A Anggiansah, ¹T Wong, ²M R Fox. ¹Oesophageal Lab, Guys and St Thomas NHS Foundation Trust, London, UK; ²NIHR Biomedical Research Unit, Nottingham Digestive Diseases Centre, Nottingham, UK

Introduction Proton Pump Inhibitors (PPI) reduce acid reflux but not the frequency or proximal extent of reflux events that are a cause for persistent symptoms on PPI. Alginate preparations containing bicarbonate are effective for short-term control of reflux symptoms by formation of a viscous raft above the meal and acid neutralisation. However mechanistic studies have found equivocal effects of alginates on reflux suppression. It is unclear whether this was due to lack of effect, study power or technical issues.

Aim (i) technical assessment of pH-impedance equipment (Sandhill) in patients taking acid and reflux suppressants (ii) in vivo assessment of mechanistic effects of Gaviscon Advance (GA; Reckitt Benckiser) and Milk of Magnesia (MM; Boots) on postprandial reflux.

Methods (i) To assess effects on signal detection 10 patients took 10 ml GA or MM followed by repeated, single 10 ml swallows of orange juice (pH 4) until chemical and volume clearance was detected (ii) A randomised, controlled, double-blind, cross-over clinical study in 20 GORD patients (9 male: 11female; age 25–63) referred for investigation of reflux symptoms. On subsequent days at the beginning and end of a 24 h monitoring period, patients were randomised to receive either 10 ml GA or MM (both mint flavoured) after a mixed test meal (600 kcal). Postprandial distal and proximal reflux events (acid and non-acid) were documented over 4 h by pH-impedance with the patient in the upright, seated position.

Results (i) Technical: After intake of 10 ml GA or MM the pH and impedance signal fully recovered after median 6 (2–12) and 4 (2–10) swallows of orange juice. (ii) Clinical: During the 4 h postprandial observation acid exposure time (mean 2.3% (SD 3.3%) vs 3.4% (4.2%), $p=0.296$) and number of distal reflux events (20.5 (13.6) vs 22.5 (9.4), $p=0.500$) was similar after ingestion of GA and MM.