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**PTU-153 CAN A 10 YEAR FRACTURE RISK SCORE (FRAX) BE USED TO AVOID DUAL ENERGY X-RAY ABSORPTIOMETRY (DEXA) SCANS IN PATIENTS WITH COELIAC DISEASE?**

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**Introduction** The BSG Guidelines for Osteoporosis in Inflammatory Bowel Disease and Coeliac state there is a definite increased risk of fracture in these conditions and recommend DEXA scanning after introduction of gluten free diet in subgroups of patients where the risk of osteoporotic fracture is high. A 10-year risk of major osteoporotic and hip fracture using the WHO Fracture Risk Assessment Score (FRAX) can be calculated in patients with coeliac disease and this score mapped to the National Osteoporosis Guideline Group (NOGG) assessment tool may be better to decide the need for a DEXA scan.

**Methods** The aim of this study was to determine if the WHO FRAX can be used to screen patients with Coeliac disease to decide who needed a DEXA scan, and make pathways more cost effective. A retrospective analysis of all duodenal biopsies in our Trust between June 2010 and April 2011 was undertaken and 50 definitive pathological diagnoses of coeliac disease that is, Marsh stage 1 to 4 were identified. The notes of these patients were reviewed to see if a DEXA scan had been requested and to calculate their FRAX score with and without a BMD measurement.

**Results** Of 50 patients with a definitive pathological diagnosis of coeliac disease, 33 were female and 17 male. The median age at diagnosis was 45, with 30 (60%) of patients aged between 42 and 71 yrs, making them eligible for the FRAX score. Documentation of smoking status, alcohol history, use of corticosteroids, past medical history and family history of fracture was done for most patients. Of the 30 patients, 13 had already had a DEXA scan; in two pts a FRAX score was unable to be calculated due to information not being documented. 17 had not had a DEXA scan; seven of these were unable to be FRAX scored due to information not being documented. 11 patients had both FRAX scores and DEXA scores: 4 had T scores  $< -2.5$ , indicating eligibility for treatment of osteoporosis. In these patients FRAX scores, without a BMD measurement, ranged from 6.1% to 13% for a major osteoporotic fracture and 0.9% to 6.6% for a hip fracture. In the seven patients with T scores  $> -2.5$ , FRAX scores, without a BMD measurement, ranged from 3.1%  $> 9.5%$  for a major osteoporotic fracture and 0.2%  $> 1.8%$  for a hip fracture.

**Conclusion** The majority of coeliac patients in this study were females, over the age of 40. Coeliac patients, over the age of 40, with FRAX scores for a major osteoporotic fracture  $> 9.5%$  and for a hip fracture  $> 1.8%$  may need DEXA scans and be offered osteoporosis treatment. A cost effectiveness analysis of this strategy is needed to change the current guidance.

**Competing interests** E Derbyshire: None Declared, A Dhar Speaker bureau with: Several Pharmaceutical Companies. Conflict with: Honoraria from Pharmaceutical and endoscopy industry.

## REFERENCES

1. <http://www.shef.ac.uk/FRAX>
2. Scott EM, Gaywood I, Scott BB, et al. *BSG Guidelines for Osteoporosis in Coeliac Disease and Inflammatory Bowel Disease*. 2000.

**PTU-154 INVESTIGATION OF THE OPTIMAL DURATION OF THE GLUCOSE HYDROGEN METHANE BREATH TEST**

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**Introduction** Historically, the glucose hydrogen breath test has been popular for diagnosing small intestinal bacterial overgrowth (SIBO). Lately the glucose hydrogen methane breath test has become available. It is non-invasive and simple to carry out. This test is used as a part of standard clinical practice in patients suspected of having SIBO in our hospital. There are limited published data on the optimal test duration, with 3 h being the longest reported. This study aimed to determine if there is a significant difference in the number of patients who would be considered positive for SIBO depending on test duration.

**Methods** Patients in whom the gastroenterologist suspected SIBO underwent a breath test performed by endoscopy nurses using the QuinTron BreathTracker DP Digital Microlyzer that measures hydrogen (H<sub>2</sub>) and methane (CH<sub>4</sub>) concentrations in parts per million (ppm). Pre-test preparation included avoiding slowly absorbed carbohydrates, fibre and large meals and limiting dairy intake and carbonated drinks for 24 h, a 12 h fast and avoiding exercise and cigarette smoking for 2 h. Breath H<sub>2</sub> and CH<sub>4</sub> concentrations were noted at baseline. Subjects then consumed 75 g (or 50 g if weight was  $< 50$  kg) in 100 ml of water. Thereafter, breath H<sub>2</sub> and CH<sub>4</sub> values were recorded every 20 min for 3 h (or less if positive). Positive test was defined as fasting H<sub>2</sub>  $\geq 20$  or CH<sub>4</sub>  $\geq 10$  ppm or a rise in H<sub>2</sub>  $\geq 12$  or CH<sub>4</sub>  $\geq 6$  ppm.

**Results** 98 males and 95 females, median age 63 years (range 28–86) underwent a breath test. Of these, 67 (35%) had a positive result for one or both gases: 18 (32%) at baseline, 39 (60%) by 40 min, 56 (84%) by 100 min, 60 (90%) by 140 min, 67 (100%) by 160 min. 126 patients had negative breath tests; n=75 had the test performed for a full 3 h, 26 (20%) had the test performed for 100 min only. In patients where the test was performed for 3 h the 95% CI for a false negative result at 100 min is 0.003 to 0.10.

**Conclusion** Most patients with SIBO will have a positive result by 100 min. This suggests that a reduction in the duration of the test can be achieved without compromising the number of true positives being diagnosed with SIBO.

**Competing interests** None declared.

**PTU-155 IS THE GLUCOSE HYDROGEN METHANE BREATH TEST AN ACCURATE DIAGNOSTIC TOOL FOR SMALL INTESTINAL BACTERIAL OVERGROWTH?**

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**Introduction** Small intestinal bacterial overgrowth (SIBO) is probably the most common cause for chronic gastrointestinal (GI) symptoms following cancer treatments. There is no diagnostic gold standard. We assessed whether the glucose hydrogen methane breath test has greater value than the hydrogen breath test alone and whether a duodenal (D2) aspirate improves the diagnostic yield.

**Methods** Patients in a cancer centre referred for potential SIBO. Breath hydrogen (H<sub>2</sub>) and methane (CH<sub>4</sub>) were measured in parts/

million (ppm) using a QuinTron BreathTracker DP at baseline, then—after 75 g oral glucose—at 20 min time points up to 3 h or until positive. Positive test: fasting H<sub>2</sub> ≥20 or CH<sub>4</sub> ≥10 ppm or a rise in H<sub>2</sub> ≥12 or CH<sub>4</sub> ≥6 ppm. Some patients also had duodenal aspirates collected endoscopically. Positive result: >10<sup>4</sup> colony forming units/ml. Patients with positive tests were treated with antibiotics. Results were assessed retrospectively.

**Results** 126 patients, 66 males and 60 females, median group age 61 years (range 35–86), treated for gynaecological (30%), upper GI (25%), lower GI (9%), urological (28%), other cancers (10%—myeloma, ependymoma, bronchial, breast and lymphoma) were referred. Daily troublesome GI symptoms included flatulence (85%), borborygmi (63%), belching (54%), bloating (52%), abdominal pain (50%), steatorrhoea (38%), nausea/vomiting (23%) and diarrhoea (19%). 60 (48%) had a positive breath test—5% H<sub>2</sub>, 10% CH<sub>4</sub> and 33% both gases. 21 (17%) of 86 patients with D2 aspirates tested positive for *Streptococcus* (n=6), *E. Coli* (3), *Candida* (3), *Klebsiella* (2), *Enterococcus* (2), *Pseudomonas* (2), *Neisseria* (1), *Aeromonas* (1) and *Stenotrophomonas* (1). 17 (33%) had negative breath tests. Six of these had positive D2 aspirates with 3 (50%) responsive to antibiotics, 11 had negative aspirates but a 73% antibiotic response rate. 24 (46%) tested positive for both gases. 33% of these had a positive D2 aspirate with a 75% response rate to antibiotics and 67% negative aspirates but 81% response. Six patients (12%) were positive only for H<sub>2</sub> (all had negative aspirates), 1 responded to antibiotics. 5 (10%) tested positive for CH<sub>4</sub> only, of which 1 had a positive D2 aspirate with a response to antibiotics and 4 (80%) had negative aspirate but 2 responded.

**Conclusion** Methane breath testing identifies 10% more patients with SIBO compared to the glucose hydrogen breath test alone. D2 aspirate increases the detection rate by 12%. A trial of antibiotics, with other tests negative, benefits 15% of patients. All current diagnostic methods are flawed. Better diagnostic tests for SIBO are required.

**Competing interests** None declared.

### PTU-156 DIETARY RESPONSE IN COELIAC DISEASE SHOULD BE ASSESSED BY REPEAT DUODENAL BIOPSY

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**Introduction** Therapeutic goals in coeliac disease (CD) are poorly defined. Emerging evidence reports worse outcomes with lack of mucosal recovery, suggesting histological normalisation as the aim of treatment. However, few centres routinely re-biopsy and many clinicians depend on serology or symptoms for follow-up. This retrospective study evaluates the role of the follow-up biopsy compared to serology in treated coeliacs and is the largest study of paired biopsies reported.

**Methods** Details of patients attending the Addenbrookes Adult CD Clinic are entered onto a database. Patients undergo repeat duodenal biopsy 9–12 months after commencing dietary therapy. Serum Anti-TTG antibodies and total IgA are measured at clinic visits. From the database of around 600 adult patients (30% male, 70% female, average age at diagnosis 48 and 44 yrs respectively) follow-up biopsy results were available for 433 patients and compared using a paired t-test.

**Results** Paired initial and follow-up biopsies were available for 368/433 patients (no information about index biopsy in 65). 239 (65%) were re-biopsied within 12 months, 311 (85%) within 24 months. The proportion achieving normalisation of duodenal mucosa (Marsh 0) at

12 months, 12–24 months or after 24 months is 27%, 25% (p=0.61) and 25% (p=0.1) respectively. Those without villous atrophy (VA) (Marsh 0, 1 or 2) is 58%, 58% (p=0.98) and 52% (p=0.24) respectively. Excluding the 2.5% of patients with IgA deficiency, 13% of patients had negative anti-TTG antibody titres at the time of diagnostic biopsy. In the group of patients with positive serology at first biopsy, only 43% with VA on follow-up biopsy were positive for anti-TTG antibodies. Conversely, 13% without VA on follow-up had positive serology. The sensitivity, positive predictive and negative predictive values for serology compared to biopsy at follow-up are 43.4%, 68.8% and 70.5% respectively.

**Conclusion** Response to diet in CD might be monitored by symptoms, serology or histology. Many patients diagnosed in adulthood report minimal or no symptoms at diagnosis and this is therefore not a credible marker of response. Here we show that:

- ▶ Anti-TTG antibody serology has a sensitivity of 87% at diagnosis
- ▶ Anti-TTG serology has a poor sensitivity (43%) on follow-up and is therefore unreliable
- ▶ Histological response rates are not increased after 1 year on diet
- ▶ Approximately 28% of patients achieve normal duodenal mucosa, 58% show no or minimal signs of coeliac disease on follow-up biopsy.

We suggest that follow-up biopsy on diet is the only reliable form of assessing response to treatment, and that the proportion of patients achieving histological response could be used as a means of auditing quality of care in coeliac clinics.

**Competing interests** None declared.

### PTU-157 A PROSPECTIVE STUDY OF SERUM VITAMIN A AND D LEVELS IN PRIMARY BILE ACID DIARRHOEA

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**Introduction** There is evidence that primary bile acid diarrhoea (BAD) is caused by disruption of the homeostatic mechanism controlling bile acid synthesis, with an overproduction of bile acids leading to chronic watery diarrhoea. Fibroblast Growth Factor 19 (FGF19) has been shown to be central to this homeostatic mechanism, providing negative feedback on CYP7A1, the rate limiting enzyme in bile acid synthesis. Median serum FGF19 levels have been shown to be lower in BAD patients than in diarrhoea controls. In mouse models, it has also been shown that expression of FGF15, the orthologue of FGF19, is induced by the active forms of vitamins A and D. The aim of this study was to investigate a possible causal relationship between low serum levels of vitamins A and D and BAD.

**Methods** Patients with chronic diarrhoea were recruited prospectively. All patients underwent routine testing to exclude other causes of diarrhoea and had SeHCAT tests. Patients were classified as having primary BAD, secondary BAD, or unexplained chronic diarrhoea (CD). Serum 25OH-vitamin D was measured by LC-MS using standard procedures. Serum Vitamin A was calculated by HPLC. Results are expressed as medians. Mann–Whitney and Spearman rank correlation tests were used in analyses.

**Results** Serum vitamin A levels were available in 145 subjects (primary BAD 46; secondary 29; CD 70). Serum vitamin D levels were available in 150 subjects (primary BAD 50; secondary 29; CD 71). There were no significant differences in the level of vitamin A between the groups with primary or secondary BAD or CD (2.10,