Welcome

Welcome to the February edition of NewWave.

If you have any relevant articles or papers that you would like to be included in future editions, please email them to steve.perring@poole.nhs.uk

Highlights

You will find the new AGIP recommendations of best practice in hydrogen/ methane breath testing for SIBO and carbohydrate malabsorption on page 7

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Forthcoming Events 2019:

1st March 2019  
AGIP Masterclass in Upper GI Physiology. Manchester.

14th March 2019  
Impedance/pH Reflux Testing Clinical Seminar  
http://www.synmed.co.uk/index.htm

17th May 2019  
“Esophageal order and disorder“ Pre-DDW meeting.  
Sanford Consortium at the University of California, San Diego  
Program http://www.ucsdgimotility.com/program.html  
Registration http://www.ucsdgimotility.com/

18-21 May 2019  
Digestive Diseases Week  
San Diego Convention Center  
San Diego, CA  
http://www.ddw.org/home

17-20 June 2019  
BSG Annual Meeting  
Glasgow  

3-6 September 2019  
ICS 2019, Gothenburg, Sweden  
https://www.ics.org/2019

11 September 2019  
HRM and Impedance/pH Study Day  
Hamilton House, King’s Cross, London  
Contact rachel@ardmorehealthcare.com

8-10 September 2019  
GESA Australian Gastroenterology Week (AGW), Adelaide South Australia  

19-23 October 2019  
United European Gastroenterology (UEG) Week  
Barcelona, Spain  

25-28 March 2020  
The Federation of Neurogastroenterology and Motility  
Adelaide Convention Centre, Adelaide, South Australia  

Early 2020  
Ascona III Meeting on Advances in Clinical Measurement of GI Motility and Function
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HRM & Impedance/pH Study Day

Hamilton House, King’s Cross, London

Wednesday 11th September 2019

Speakers include;
Professor Stephen Attwood, Dr Arjan Bredenoord & Mr Warren Jackson

This day will provide a comprehensive guide interpreting the results of your HRM and pH/impedance studies. The course is ideal for physicians & surgeons interested in upper GI conditions, GI physiologists including trainees and nurse practitioners.

Please contact us on 01494 721820 or email rachel@ardmorehealthcare.com for further information. Please note that places are limited so don’t delay, contact us today for a registration form.

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– Senior Gastro Intestinal Physiologist

Galway University Hospitals located in the beautiful West of Ireland is recruiting an ambitious and motivated Senior Gastro Intestinal Physiologist. This is a whole-time post within the Upper Gastro Intestinal Department, Perioperative Directorate, and Department of Surgery.

The post holder will be responsible for the administration of the Gastro-intestinal Physiology Service within Galway University Hospitals and will provide support to the Upper GI Surgery Department. University Hospital, Galway is a tertiary referral centre for upper gastro intestinal surgery across the entire West and North West of Ireland.

Galway is a dynamic and vibrant city and the hospital has close links with its academic partner NUI Galway. There is significant opportunity to develop the GI Physiology Service as well as develop a significant academic output.

Informal enquiries to Mr Chris Collins, Consultant General Surgeon, Galway University Hospitals, via Email: chris.collins@hse.ie or Tel: +353 (0)91 893903.

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Introduction

Hydrogen and methane gases are not produced by the human body directly but both are produced as a by-product of microbial fermentation of undigested food within the gut. A proportion of the produced gas passes through the gut wall into the blood and is then excreted via the lungs. Detection of these gases in samples of excreted breath is possible using various techniques and this forms the basis of hydrogen and methane breath testing (HMBT). HMBT is used as a diagnostic tool to detect small intestinal bacterial overgrowth (SIBO) and carbohydrate malabsorption (CM).

Despite HMBT being a well-established diagnostic test (1) it is performed by a broad range of healthcare professionals using various methodologies and the interpretation of the results is inconsistent between centres. This has led to some controversy about the use and interpretation of breath testing in the UK (2, 3). A similar situation was apparent in the North America and to address this a panel of expert Gastroenterologists from the region reviewed the scientific literature and developed a consensus document based on best evidence to try and standardise HMBT methods and, to an extent, interpretation (4).

Following publication of this North American consensus statement, The Association of Gastrointestinal Physiology (AGIP) committee of the British Society of Gastroenterology has reviewed the scientific evidence and proposed the following ‘Standardised Testing Protocol’ which should act as a starting point to standardise how HMBT is performed in the UK. Once technical standardisation is adopted, this will allow acquired data to be directly comparable across UK HMBT testing centres. This will represent a considerable advancement in the area of HMBT testing, bringing it in line with other modalities of commonly used GI physiological tests. Once data are obtained in a standardised manner, objective outcomes data can be used to further assess the clinical utility of these techniques.

Objective of AGIP Guidance

The purpose of this guidance is to provide a standardised methodology for the assessment of HMBT, so that clinical studies can be correctly compared with available literature and interpreted within internationally accepted standards. AGIP encourage the use of these standards within clinical research in order to provide objective evidence of the clinical utility of HMBT.

HMBT Do’s and Don’ts

- Breath gas measurement equipment should be regularly calibrated and maintained as per manufacturer’s instructions and a log kept of this
- Methane should be measured as well as hydrogen throughout the test. Additional measurement of methane significantly increases the likelihood of a positive result and reduces the risk of a false negative result. Approximately 20% of patients will be methane producers, and this proportion is further raised in patients with chronic constipation (5)
- A means of assessing quality of breath sample by measurement of oxygen or carbon dioxide levels should be used to confirm the adequacy of the breath sampling
**Preparation**

- Patients should prepare for a HMBT in the following way:
- Antibiotics should be avoided for 4 weeks
- Patients should not have had colonoscopy or any full bowel cleansing preparation, including colonic lavage, for at least 1 week
- Patients should ideally have refrained from motility enhancing drugs or laxatives for a week
- Administration of a suppository prior to testing to ensure recent bowel motion at the time of the test is acceptable
- Patients should refrain from fermentable foods e.g. complex carbohydrates for at least 24 hours. A suggested menu and list of foodstuffs to avoid should be provided for the patient to follow. Only the following foods are permitted during the 12-hour preparatory diet period:
  - Baked or grilled seafood, chicken, turkey, lean beef, or pork
  - Eggs
  - Plain white rice
  - Plain coffee or tea or water
  - Minimal oils for cooking, salt and pepper
- All other foods not listed above are not allowed during the 12-hour preparatory diet. Foods such as, but not limited to: alcohol, dairy, beans, wheat, grains, fruits and vegetables, and high-fibre containing foods are not allowed. If patients have special dietary requirements they should contact the Physiology Unit to discuss.
- Patients should fast for 12 hours. Drinking of some water is acceptable in the 12 hours preceding the HMBT
- Patients should not smoke tobacco products or e-cigarettes on the day of the test
- There is no clear guidance on stopping PPI’s prior to HMBT, so at present studies can be performed on PPI therapy
- There is no clear guidance on stopping probiotics before breath testing. However, as taking probiotics introduces bacteria into the upper gut we suggest stopping probiotics at least 1-week prior to testing
- Patients should be warned of the potential for increased symptoms resulting from the substances being administered
- Written consent is recommended

**Performance of the Investigation**

- Assessment for SIBO is recommended before assessment of carbohydrate malabsorption as the presence of SIBO will lead to false positive results for malabsorption testing
- Whilst there are arguments for the use of glucose or lactulose as a first line assessment in SIBO the fact that lactulose will give a full bowel assessment and identify non-hydrogen producers means that we recommend Lactulose in preference to glucose for SIBO assessment as a first assessment. Glucose is absorbed in the proximal small bowel and therefore is unlikely to provoke a positive breath result in the presence of bacterial colonisation of the distal small bowel. Glucose is highly sensitive if positive and should be used if a lactulose study is equivocal e.g. unable to distinguish between small bowel overgrowth or rapid transit and colonic fermentation (a large rise in gas production in the second half of the study) in the large bowel. Glucose may also be used in patients with short small bowel (for example following bariatric surgery)
- The recommended dose for lactulose (SIBO assessment) is 10g with or in 300ml water
- The recommended dose for glucose (SIBO assessment) is 75g with or in 300ml water Rapilsoe OGTT solution is a 300ml solution containing 75g glucose in a ready-to-drink pouch and could be used as the test solution for SIBO assessment
- The recommended dose for lactose is 25g with or in approximately 300ml water
- The recommended dose for fructose is 25g with or in approximately 300ml water
Patients may clean their teeth and/or rinse with a mouth wash prior to baseline breath measurement and following ingestion of the provocation dose, but the toothpaste or mouthwash should not be swallowed and the mouth should be rinsed with water as both products can contain artificial sweetener.

Baseline hydrogen and methane levels prior to ingestion of the provocation dose should be <10ppm. The investigation may still be considered with higher baseline measures if these are stable on multiple measurements.

Breath sampling should be performed at least every 15 minutes for the first 90 minutes of an investigation.

In SIBO studies the investigation should last for at least 2 hours following ingestion. The investigation should then continue until either unequivocal evidence of fermentation of lactulose in the large bowel has been observed or 3 hours has elapsed following ingestion.

Carbohydrate malabsorption studies should continue for at least 3 hours following ingestion.

Patients should refrain from physical activity during the investigation or sleeping.

Baseline symptoms should be recorded before substrate ingestion using a visual analogue scale (0-10) so that the development of symptoms during the test can be accurately recorded.

Interpretation of the Investigation

The recent North American Consensus document on breath testing (2) suggests that a rise above the baseline hydrogen level of >=20ppm of hydrogen within the first 90 minutes following ingestion of the provocation dose (lactulose or glucose) is normally considered positive for assessment of SIBO.

As mentioned earlier, AGIP recommends lactulose as a first line assessment as it will give a full bowel assessment. However, there are concerns that a 90-minute cut off may increase the incidence of false positive results (i.e. the lactulose arriving in the proximal colon within 90-minutes) which could then lead to an increase in inappropriate antibiotic use. Some centres define a shorter time period and use the Ledochowski cut off values of a rise of >=10ppm within 60-minutes as positive for SIBO (6) which is a more conservative value but conversely increases the risk of a false negative result. Therefore clinical judgement by an experienced Clinician and/or discussion within a multi-disciplinary team should be used with borderline positive results (i.e. a rise seen between 60-90 minutes) and a glucose HMBT could be undertaken to provide more confidence in a SIBO positive diagnosis. Further advice will be given as data emerge in this area in terms of the positive predictive value of cut offs in terms of treatment outcomes.

A methane level >=10ppm at baseline or at any point during the test should be considered positive for methanogenesis. As methane may affect transit times it is difficult to say with certainty whether the methanogenic organisms are in the small bowel or colon so no comment on SIBO should be made in the absence of a concomitant rise in hydrogen.

Methane levels are often >10ppm at baseline despite adherence to the pre-study diet so high baseline methane is not an indication to stop the test and a full study should still be performed with the substrate administered. This is more common in patients with bloating and constipation.

The time from ingestion to the rise in breath levels associated with large bowel fermentation should not be used as a diagnostic tool for estimating small bowel transit. However, it may be used to give some indication of the minimum required time for measurement of subsequent carbohydrate malabsorption studies.

A rise above the baseline hydrogen or methane level of >=20ppm of hydrogen or methane at any time during the assessment is considered positive for carbohydrate malabsorption in the absence of SIBO.

In the presence of confounding factors such as partial small bowel resection, gastroparesis or bariatric surgery, clinical judgement should be used to interpret the findings of the HMBT procedure and glucose used as a first line investigation.
A flat-line response may be associated with patients that predominantly produce hydrogen sulphide. Whilst current equipment cannot detect hydrogen sulphide, if a flat line response is seen in patients that predominantly present with diarrhoea and symptoms of mal-odorous flatulence this may be a contributing factor.

Preparation and Procedure for Patients who are Diabetic

Diabetic patients are at risk of poor glycaemic control before and during HMBT due to the challenging requirements of preparation for and undertaking HMBT. The patient preparations and the procedure should be modified following a specific local protocol written for this situation. Such a protocol would be expected to include the following:

- Regular blood sugar sampling should be performed to ensure blood sugar levels are acceptable
- The patient should not be left unaccompanied during this assessment

Further Steps

AGIP would encourage further research and audit to improve the evidence base for HMBT for SIBO and carbohydrate malabsorption, and expect recommendations to change in the light of further evidence. A next logical step would be to establish a UK HMBT user group to gather data and make further recommendations when appropriate AGIP hopes to create a UK HMBT user group imminently to hopefully address some of the concerns surrounding test validity and clinical relevance.

Acknowledgements

AGIP are grateful for the input from the Neurogastroenterology and Motility Committee of the British Society of Gastroenterology.

References:

Case Study

HRM can spring the occasional surprise!

By Emma Jones
Southampton University Hospitals

History

- 65 year old man
- Over 2 year history of progressive dysphagia and weight loss.
- Has a sensation of food bolus lodging mid sternum that is spontaneously regurgitated. Often manages only a couple of mouthfuls before this occurs and cannot manage to continue his meal after.
- Manages by eating small and more frequent meals. Any food type will lodge, fluids may also be a problem. No symptoms of GORD.
- No improvement in symptoms with omeprazole 20mg od.
- OGD: 26/11/17: slight Schatzki ring at 39cm.
- Barium swallow 29/11/17: hold up distal oesophagus with intra oesophageal reflux and tertiary contractions, small sliding hiatus hernia.
- Medications: Omeprazole 20mg od (at lunchtime). No known drug allergies.

Manometry Report—Wet Swallows
Manometry Report—Solid Swallows

Comment:

- The LOS was weak (7mmHg) and relaxed appropriately on swallowing. IRP values were within normal limits. There was a 2cm hiatus hernia noted.
- Motility of the oesophageal body was characterised by normal propagating peristalsis with an average DCI score within normal limits during wet swallows. Solid swallows propagated normally although the patient refused any more than 3 bread swallows citing that it felt like it was sticking high up. There was no hold up or pressurisation and the UOS relaxed appropriately. The volume swallows cleared effectively.
- No evidence of any significant motility disorder. UOS and LOS appear to be coordinated.

What Happened Next:

- Patient re-referred after less than one month
- The patient did not think the catheter was put in far enough
- Queried if this should be repeated

Reply from referring gastroenterologist:

- I know it sounds a bit odd but I think we have to repeat the test to prove to him and ourselves that his oesophagus is actually normal. I do not think this a functional dysphagia & in order to remain fully clear with him I think we should repeat it. If it is totally normal again, at least we couldn't do any more.
- Ultimately, up to you. In some ways we are treating the individual here by repeating the test, but I do believe that he is not making the symptoms up & I think that a repeat is the right thing

Telephone consultation with the patient:

- Very good historian
- Very sensible sounding chap with very convincing symptoms
- Claimed the bread swallows not enough of a provocation first time around
- Decided rather than cancel, repeat it on the basis he brought in some challenging food
Repeat study performed ~ 1 month after first study
Ham and cheese sandwich used for solid swallows
No change in medication or symptoms since the last assessment

After 5 minutes familiarisation and some relatively normal wet swallows, the patient started eating the sandwich.

Soon after starting the sandwich, peristalsis became more disordered, with spasm type features.

This became more pronounced with continuing swallowing of the sandwich.

Eventually on further sandwich swallowing all evidence of propagation was lost.

Eating was abandoned. Eventually after approximately 15 minutes normal peristalsis returned.
Further Steps

- The patient was prescribed GTN spray
- Agreed with gastroenterologist that the further study was of worth

Response from gastroenterologist:
- Suspicion of greater significance of Schatski Ring
- Further OGD with potential dilatation of Schatski Ring/ LOS proposed

Take-Home Messages

- Don't judge a patient by their previously normal manometry
  (Sometimes the patients are not mad and do have abnormal motility if you look hard enough)

- The value of adjuvant challenges on top of the wet swallows required for Chicago Classification is emphasised.
- A few solid (bread) swallows is not necessarily enough to provoke an aberrant motility pattern
- The value of the patient eating a symptom-provocation meal is illustrated
- Such testing does require commitment and it can take a long and unpredictable time to observe a response

Budding Reviewers

If you would like to review a meeting for a future edition of NewWave or have an interesting case study that you would like to share with the GI Physiology Community, please contact Steve Perring at steve.perring@poole.nhs.uk
Report

Results of Breath Testing Audit looking at Results of Breath testing for Small Bowel Bacterial Overgrowth (SBBO) and Subsequent Treatment

By Hannah Dicker
STP Trainee
Southampton University Hospitals

**Introduction**

The aims of the audit were to:

- Study if there was any relationship between reported symptoms and the likelihood of a positive test for SBBO
- Establish what treatments are employed in Southampton for eradication of SBBO following a positive outcome of a breath test and assess the effectiveness of such treatments employed.

We followed-up 100 patients referred for lactulose hydrogen and methane breath testing (HMBT) to diagnose SBBO from October 2017 – April 2018. Breath testing and interpretation was in-line with the recommendations of the Proposed Standardised Testing Protocol detailed elsewhere in this edition of NewWave

**Results**

The number of patients who tested positive and negative for SBBO are listed below:

<table>
<thead>
<tr>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
</tr>
<tr>
<td>Positive H2</td>
</tr>
<tr>
<td>Positive CH4</td>
</tr>
<tr>
<td>Positive H2 &amp; CH4</td>
</tr>
</tbody>
</table>

The dominant symptoms reported by the patients identified as positive for SBBO are displayed below:
11 out of 52 positive investigations were identified with methane (21%)

In only 36 out of 52 patients confirmed positive for SBBO was there any record of treatment being provided for SBBO

Of those 36, 25 were given Rifaximin as first-line treatment for SBBO

Follow-up and outcome data for these patients was disappointingly scant:

- In only 9 patients treated were there any reports as to the treatment having a beneficial effect on symptoms. The remaining 27 patients who had received antibiotic treatment for SBBO had no records of any follow-up to assess efficacy of treatment.
- In 8 of those 9 patients the symptoms recurred shortly after completion of the antibiotic therapy.

Discussion

- The rate of positive investigations identified using methane is consistent with other published reports and confirmation of the efficacy of combined hydrogen/methane testing for identification of SBBO
- It does not appear that there is any particular symptom or small set of symptoms more likely to be associated with a positive study for SBBO
- Follow-up data for patients identified as positive for SBBO was disappointingly poor
- We suspect a reporting bias on outcomes in that patients who are successfully treated for SBBO are much less likely to return for further follow-up
- There has been no attempt by referring clinicians to establish a symptom scoring system to objectively assess response to treatment
- A high proportion of patients identified as SBBO positive were given Rifaximin as first-line treatment, in spite of the Southampton University Hospitals Treatment Guidelines stating that “the patient must fail treatment with both oral Ciprofloxacin and Co-amoxiclav before receiving oral Rifaximin”. This suggests that the hospital’s guidelines are redundant as clinicians are not following them

Take-Home Messages

- A larger, longer study is needed and better record keeping is necessary to identify any pattern of symptom association with SBBO and association between a specific antibiotic and response to treatment.
- Such a larger study would be better performed prospectively, with agreed standards for treatment, follow-up and metrics for scoring symptomatic responses to treatment
- With agreed standards for performance and analysis of breath testing we are at a point where we can as a community start providing good quality science to answer questions such as this audit was asking
Message from Lesley Murphy
CEO of the Registration Council for Clinical Physiologists

Dear New Wave subscribers, thank you for the opportunity to tell you what has been happening in the world of the RCCP in the last year. It has been a very busy time since I joined in February 2018 with a number of key initiatives in progress.

First of all, I am pleased to announce we have moved into our new offices in Droitwich, Worcestershire, and have brought our outsourced administration services in house. Now our team are all based together and can comprehensively support our registrants in all aspects of the work of a registration body. We are confident that this move will enable us to provide an unrivalled service to all of our stakeholders as we aim to improve the quality of service to both our registrants and the patients that rely on us to ensure patient safety through effective regulation.

The new team is also enjoying building upon Professional Standards Authority (PSA) accreditation gained in 2018, embedding the newly acquired status as a Community Interest Company (CIC) and consolidating our new team structure. We have recently begun the PSA renewal process and this has given us the opportunity to revisit our systems and processes and seek to improve them further.

In addition, at the recent board development day, the senior team made some important decisions about the future direction of the RCCP and launched #Vision 2022.

What does it mean for our registrants?

It means that in our new form as a CIC we can move forward in a way that supports our future aspirations over the next 3 years. It provides us with greater financial freedom, increased accountability for registrants and patients, and improved governance arrangements.

In order to provide greater transparency and accountability the decision was also taken to formally recruit new members to the new CIC board. Members of the CIC Board would include the Chair, Treasurer, CEO, lay members (maximum three in the first instance) and advisory board member.

All posts will be advertised in RCCP newsletters, Linked In, Twitter and Indeed and we would like to encourage applications from your members who feel they can make a valuable contribution to our progressive organisation.
New projects and partnerships

The RCCP are also pleased to announce an exciting new project in association with The UK Public Health Register (UKPHR) and The British Association of Sports Rehabilitators and Trainers (BASRaT). As members of the Professional Standards Authority (PSA) collaborative, we have joined forces to actively promote the Make every contact count (MECC) initiative, conceptualized by Health Education England and the introduction and development of Social prescribing as promoted by NHS England.

Our aim is to facilitate the provision of information and training to all registrants in the collaborative with a potential reach to the 85,000 health care professionals on PSA accredited registers. This will allow us to make a valuable and sizeable contribution into the promotion of positive behavioural change through both MECC and Social Prescribing. As an RCCP registrant this new initiative will be beneficial to you in a number of ways, including the chance to receive free MECC/Social prescribing training representing a valuable CPD opportunity. As a result, the training will provide the tools for our professional group to be influential in improving the health and wellbeing of the population, helping raise the profile of Physiologists and enhance their already valuable contributions to positive change in health outcomes in both the NHS and private practice.

#Vision 2022

The RCCP recently conducted a survey of its registrants and has used this as the launch pad for its development plans for the next 3 years. We aim to engage more pro-actively and consistently with all of our stakeholders and to look for opportunities to develop our services and to generate funds to re-invest in registrant benefits. If you would like to play a part in our future plans, we would be really pleased to hear from you.

Please contact me on chiefexec@rccp.co.uk