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BRITISH SOCIETY OF GASTROENTEROLOGY

New Wave

The Official e-Newsletter of the Association of GI Physiologists

AGIP Council 2024

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July 2024

Welcome

Welcome to the **July 2024** edition of NewWave!
If you have any relevant articles or papers that you would like to be included in future editions, please email gemma.norris@sthk.nhs.uk

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Upcoming Events: 2024

September 2024	Laborie Study Day Advanced HRM & Impedance/pH 11th September 2024 Double Tree by Hilton, Manchester Piccadilly
	SYNMED Clinical Training Seminar: Impedance/pH Reflux Testing & High Resolution Manometry 12th & 13th September 2024 The Clermont, London
	ISDE World Congress for Oesophageal Diseases 2024 Edinburgh ISDE 22nd—24th September 2024
October 2024	**UEG Week 2024** Vienna UEG 12th—15th October 2024
	ICS 2024 Madrid ICS 23rd—25th October 2024

STP Vacancy: Glasgow Royal Infirmary

NHS Greater Glasgow and Clyde and NHS Education for Scotland are delighted to announce the above post which provides an excellent opportunity for a recent science graduate to train as a Clinical Scientist in Gastrointestinal Physiology.

This three-year training post includes work-based learning at Glasgow Royal Infirmary and rotational attachments to other hospitals in the board area and at times beyond. The post is supernumerary and paid at AfC Band 6 level.

It is supported by a fully funded place on the Clinical Science MSc at Newcastle University. Block release learning at Newcastle University is required as part of this role. The applicant should hold a recent undergraduate degree (2:1 or 1:1) in Physiology or a relevant/related life science degree.

At completion, the trainee will be able to register as a Clinical Scientist with the Health and Care Professions Council (HCPC).

For further information, please click here, and for all enquiries, please contact: Kirsty Wright, Clinical Scientist on Kirsty.Wright2@ggc.scot.nhs.uk.

From the Editor

Hello, and welcome to the summer issue of NewWave! I hope that you have all been having a lovely summer and have been enjoying some of the recent sunshine! In this issue, we have covered a lot of interesting material following the attendance of many AGIP delegates at the BSG Live conference in Birmingham last month, (although I'm disappointed to be missing the PopWorld review that I was so hoping for).

This issue comes with the exciting news that the AGIP Council have appointed a new Chair! We sadly said goodbye to Prof. Anthony Hobson, who has resigned from the Council after many years of hard work and wonderful service. Anthony did a fantastic job during his time as Chair, increasing our visibility and representing our profession to such a high standard. We are now equally as lucky, to have appointed the lovely Samantha Scott, whose impressive experience at both a clinical and operational level will be so beneficial in helping us to push our GI Physiology agendas forward! Sam has given us a lovely introduction on Page 5, and I already want to know more about this cider farm!

The Council also recently bid farewell to Elisabeth Kirton and Kumud Solanki , who have stepped down from their roles after years of AGIP service; and to Jennifer Morgan, who is due to have a baby very soon! I'm sure you will all join me in sending our sincere thanks for their commitment and contributions to AGIP and wish them the very best in their future endeavours!

On Page 6, we have a final reminder about the opportunity to apply for the European Bursary, to attend UEG week in Vienna. There are just a couple of days left until this deadline passes, so please be quick if you don't want to miss out!

To our Scottish colleagues, please head over to Page 7, where Kirsty Wright has provided some important information relating to the development of a Scottish GI Physiology Network, which will be extremely beneficial, particularly to small departments and lone workers.

Getting into our BSG content, Gemma Renwick has provided an interesting overview of a presentation on the lived experiences of functional bowel disorders. You can find this on Page 8. Following this, on Page 10, John Gallagher gives a thorough outline of the detailed Prokinetics talk, given by Andres Vales at the AGIP Symposium. Kendra Hall and John Hayman, also both provide interesting perspectives on Capsule Sponge services from the point of view of clinical efficacy and sustainability in comparison to endoscopic assessment, and these articles can be found on Page 12 and Page 14.

Samantha Scott gives a thought-provoking overview of a presentation on wireless pH monitoring, and the importance of study duration (Page 16), whilst on Page 18, Josephine McLachlan describes an interesting 'meet the expert session,' for which the topic was oesophageal manometry and pH studies. Tanya Miller gives an overview of an engaging and relevant presentation delivered at the AGIP Symposium by Samantha Scott (Page 23), and our issue concludes with a fascinating breakdown of the gut microbiome, as reviewed by Naomi Rune (Page 26).

Once again, I would like to thank all of our colleagues who took the time to put these articles together and share them with us. For contributions to future issues, in the form of articles, announcements or important news, please don't hesitate to get in touch (gemma.norris@sthk.nhs.uk). Happy Reading!

Gemma Norris

AGIP News

Meet the new AGIP Chair, Samantha Scott

Hello everyone. My name is Sam and I am honoured to introduce myself as the newly appointed Chair of AGIP. My professional journey so far within GI Physiology has been both varied and extremely fulfilling, and I feel enthusiastic about the opportunity to lead AGIP, and to work closely with all of you, in the process.

Over the past 15 years, I have gained extensive experience in gastrointestinal diagnostics, currently serving as the Lead Clinical Scientist for GI Physiology at University Hospitals Bristol and Weston NHS Foundation Trust. My role has involved spearheading improvements in diagnostic accuracy, patient care, and research initiatives, with the overall aim of enhancing departmental standards and aligning with national benchmarks.

Within my role as Chair for the Accreditation Clinical Advisory Group (ACAG), I have been able to work closely with NHS England and the Deputy Chief Scientific Officer, collaborating with representatives from all eight Physiological Science specialties. Together, we have influenced and implemented policies that are critical to maintaining high standards of accreditation and quality assurance across the UK. This involvement includes developing webinars and e-learning programmes, which have been essential in providing ongoing education and support to professionals within our field.

Working with the Improving Quality in Physiological Services (IQIPS) scheme has been particularly important to me. As a Technical Assessor for UKAS, I have focused on quality assurance and accreditation processes, ensuring that departments meet the stringent standards required to obtain IQIPS accreditation. I have enjoyed supporting various departments and Trusts through their accreditation journeys, and am passionate about promoting excellence and consistency within healthcare science services.

As an NHS England Specialty Advisor and member of the Professional Bodies Council within the AHCS, I have had the privilege of contributing to national initiatives that promote quality and accreditation in a range of healthcare science specialisms. In addition to my professional roles, I am a STEM Ambassador. I am extremely passionate about inspiring the next generation of scientists and healthcare professionals, actively engaging with students to promote STEM education at the grassroots level.

On a personal level, I live in Somerset with my husband, George, who is a cider farmer - how typical! We were married in the stunning Cilento area of Italy in July 2022. Unfortunately, COVID disrupted our initial wedding plans for New Year's Eve 2020 at his family farm. Our family includes our delightful 3-year-old daughter, who already aspires to be a doctor. Perhaps I can inspire her to pursue a career in science! In my free time, I enjoy walking, skiing, and playing cricket with the ladies' team in our nearby local village, Lympsham.

I look forward to working hard alongside all of you, to elevate the standards of GI physiology, improve patient experiences, and inspire the next generation of healthcare scientists. Thank you for your support and for trusting me within this position.

Samantha Scott

Remaining Conference Bursaries:
The European Bursary—Last Chance to Apply

In order to support a high level of training and education within our discipline, the AGIP committee are delighted to announce that accredited AGIP members (or STP/ASP trainee AGIP members) will be eligible to apply for the following bursary to fund expenses related to conference attendance:

- **'European Bursary'** (up to £750, 1 bursary available) to attend United European Gastroenterology (UEG) Week (12-15th October 2024, Vienna)

Applicants will be **required to have an abstract accepted and prepare a short report on the conference for publication in New Wave.** If more than one application is made, the bursary will be awarded by a random ballot.

The closing date for application is as follows:

Friday 2nd August 2024

In order to apply for a bursary, please send the following information to Joanne Hayes

- Name
- Organisation
- The bursary you are applying for
- AGIP membership (Accredited AGIP Member / STP or ASP Trainee AGIP Member)
- Job Title
- Accepted Abstract Title (if applicable)

Payment of the bursary will be given via BACS payment, following:

1. The submission of appropriate receipts for the meeting expenses
2. The submission of the report/abstract for inclusion in NewWave

Expanding the Scottish GI Physiology Network: We would like you to join us!!

Kirsty Wright, Clinical Scientist
Glasgow Royal Infirmary

Hi everyone, my name is Kirsty and I'm a Clinical Scientist based at Glasgow Royal Infirmary. I am chairperson of a small group of practitioners from across Scotland who perform GI physiology investigations. I am posting this announcement in NewWave in the hope that it will reach readers in Scotland and to also promote our intention to increase our representation and involvement in the wider GI physiology scene.

A little bit about us. Our current group, set up a few years ago, consists of a Physiologist, a Nurse Specialist and some Clinical Scientists, all working in GI physiology. Since then, we have met virtually every four months to discuss our individual services, any challenges we have and just generally enjoy a catch up with our like-minded comrades. Having heard about the community driven benefits of networks in England, we decided it was time to expand our group north of the border. We appreciate the value of connecting with others, particularly in a specialism which often features sole working. Our aim is to bring together our small but important workforce and create a supportive and productive community whereby we can also share news, concerns and practices. Furthermore, we hope that a more established network will help attract future colleagues, particularly given we are soon to lose a proportion of our experienced workforce to retirement.

Whatever your background, experience and involvement in GI Physiology, we would like to hear from you. Your input can be as much or as little as suits you. If you work in Scotland and wish to be part of the Scottish GI Physiology Network or would like more information, please contact Kirsty Wright. Thank you!

“The Lived Experience of Functional Bowel Disorders: A Machine Learning Approach.”

BSG Presentation Review by Gemma Renwick, Clinical Scientist
Sheffield Teaching Hospitals NHS Foundation Trust

Dr. James Ruffle is a neuroradiologist, with a keen interest in Neurogastroenterology and Motility (NGM). During the NGM free papers session, he presented findings from his latest research project titled “The Lived Experience of Functional Bowel Disorders: A Machine Learning Approach.”

The concept of artificial intelligence (AI) is not new; in fact, it has been around for a few decades. However, it has gained prominence in recent years and was the underlying theme of a few talks at the BSG this year. During his presentation, Dr. Ruffle explained the findings of a prospective AI study on functional bowel disorders. It was thought-provoking and showed promise for enhancing clinical care within this group of patients.

Functional bowel disorders (FBDs) are an array of complex conditions that affect various parts of the GI tract. Like most healthcare conditions, FBDs are diagnosed based on the patient’s symptom profile. Dr. Ruffle believes the landscape is changing, and there is an ever-increasing interest in also considering the patient’s wider experience of the condition, i.e., “the lived experience.”

Fig. 1: *Dr James Ruffle presenting “ The Lived Experience of Functional Bowel Disorders: A Machine Learning Approach.” Image captured by Gemma Renwick.*

A staggering 5,000 individuals were invited to take part in this study, with 1,175 being eligible. Using questionnaires, they collected as much data as possible regarding 59 “features” of this heterogeneous group of patients, e.g., clinical features, demographics, mental wellbeing, employment status, etc. Computing machine models were then used to quantify the predictive fidelity of one feature from the remainder, as depicted in the heat map (Fig. 2).

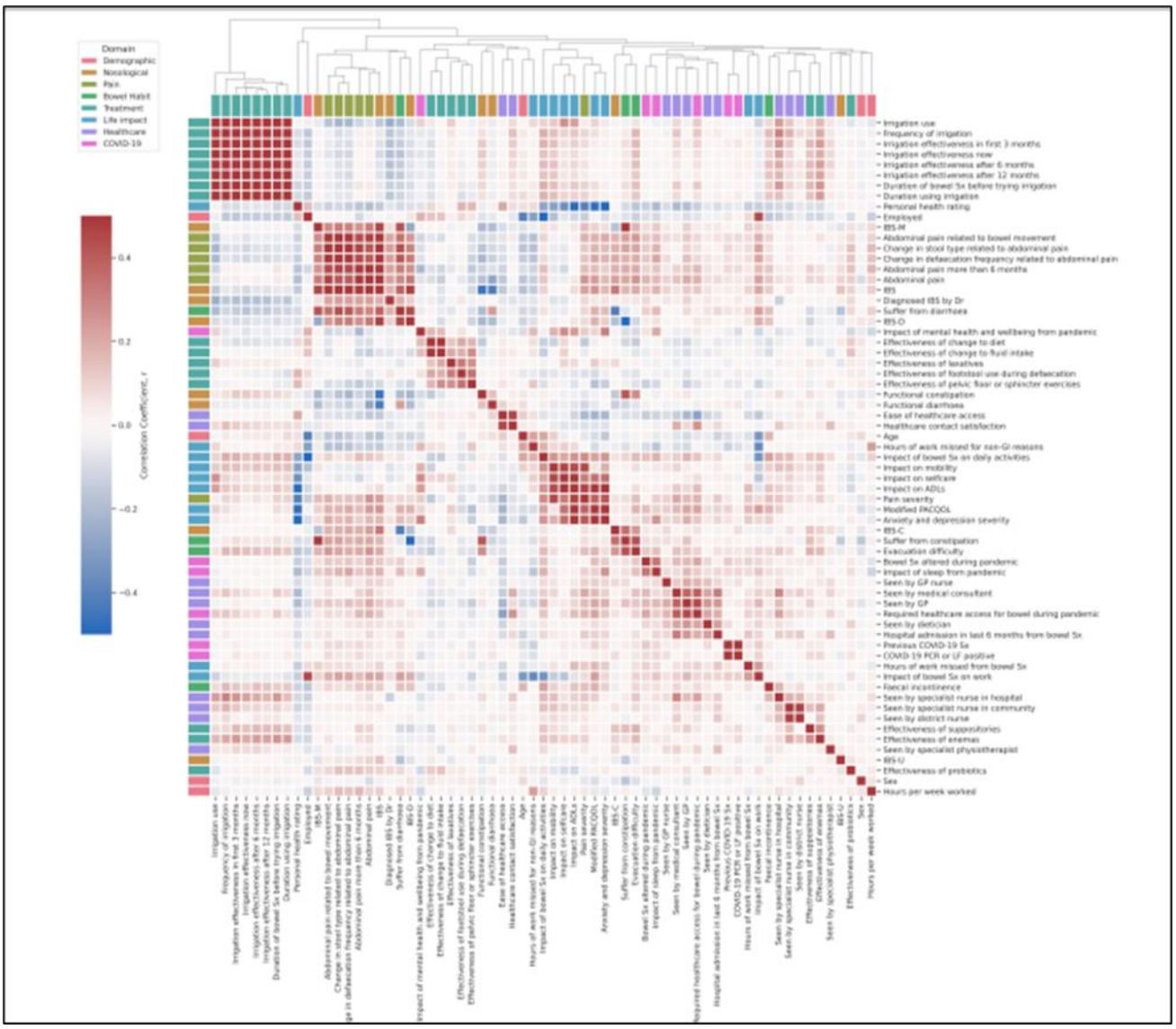


Fig. 2: *Feature correlation matrix of 59 patient features (listed on x & y-axis). The colour scale on the left depicts the extent of the correlation between paired features. Cooler colours at the bottom of the scale equate to a weaker correlation than warmer colours towards the top of the scale.*

Following pairwise modelling, network models were used to study how these various features interact and link up to form a network structure. To simplify, Dr. Ruffle likened this to the London Underground network, which is comprised of lots of nodes (stations) and edges (lines between two stations).

A key finding from this study was that contrary to the view of many healthcare professionals, the greatest determinants of patient-reported health and quality of life were life impact, mental wellbeing, employment status, and age, rather than diagnostic group and symptom severity. Patients responsive to one treatment were more likely to respond to another. In summary, the assessment of patients with FBDs should be less concerned with diagnostic classification and more with the wider life impact of illness.

“Prokinetics Revisited”

BSG Presentation Review by John Gallagher, Clinical Scientist
Sheffield Teaching Hospitals NHS Foundation Trust

Midway through the AGIP symposium of the 2024 BSG annual meeting, Andres Vales presented a thought-provoking talk on the utility of prokinetics in the treatment of GI physiology disorders.

He opened his talk by discussing a common problem familiar to most healthcare professionals working in gastroenterology: to treat the patient, we need to define the problem. However, the problem is often non-specific, multifactorial, and ever-changing, making it very difficult to pin the tail on the proverbial GI donkey. This can impact the level of trust patients have in clinicians, further hindering progress. Andres introduced the idea that prokinetics are likely involved in this to-and-fro process, explaining that the purpose of his talk was to provide an overview of the mode of action of different prokinetics, explain the safety concerns and recent findings regarding prokinetics, discuss the importance of treating the patient holistically and understanding how GI physiology may be involved within this process.

Andres began the main body of the presentation by discussing the short oesophageal reflex, explaining how oesophageal distension triggers stretch receptors. These stretch receptors feed into a network of ascending and descending interneurons, which coordinate oesophageal contraction. The ascending interneurons induce contraction above the area of distension, mediated by neurotransmitters such as acetylcholine and substance P. The descending interneurons work via VIP, NO, and ATP to induce relaxation of the smooth muscle below the area of distension. This ascending contraction and descending relaxation propels the food bolus along the GI tract.

Andres explained that stimulating the receptors that directly mediate the ascending contraction and descending relaxation generally has little effect; more success can be found by stimulating receptors earlier in the pathway. Targets can include the stimulation of the excitatory muscarinic, nicotinic, and serotonin receptors, and the blocking of inhibitory dopamine receptors.

Andres stated that the dopamine receptors D2 and D3 are inhibitory and can be targeted with antagonists to improve contractility. He also explained that the 5-HT4 receptor stimulates ascending contraction, while the 5-HT3 receptor stimulates descending relaxation; therefore, stimulating these with a 5-HT agonist can improve contractility. Andres discussed some of the limitations of the prokinetic approach, primarily the lack of success stories. This was due to a myriad of reasons, including medications being withdrawn due to concerns about risks and side effects, and the lack of availability of these medications. He detailed that prucalopride (a 5-HT4 receptor agonist) is the only true success story, demonstrated to relieve constipation, improve oesophageal contractions, and enhance gastric emptying, all with a lower risk of cardiac side effects.

Andres explained that the use of dopamine antagonists such as metoclopramide and domperidone is restricted due to their ability to cross the blood-brain barrier, causing central nervous system side effects and cardiac side effects such as Long QT Syndrome. However, new studies suggest that these effects are rare and that the use of these drugs at a low dose alongside ECG assessment may be viable.

A review found that clebopride and domperidone are the only prokinetics to perform better than placebo for symptoms of gastroparesis. However, clebopride is not widely available and has a worse side-effect and adverse event profile than metoclopramide. Additionally, the review found that while the drug classes of dopamine antagonists and tachykinin antagonists both perform superior to placebo, the individual drugs themselves were not.
Andres summarized this section of the talk by explaining that there is little appetite from the industry to develop new prokinetic drugs. He suggested that clinicians and other healthcare professionals may need to push more for this by improving patient selection and possibly changing the way outcomes are measured.

Following this, Andres discussed the role of GI physiology investigations such as high-resolution oesophageal manometry in assessing motility and directing treatment using techniques such as biofeedback and diaphragmatic breathing. There is potential for further study to reveal the benefits of guided prokinetic therapies using motilin agonists such as azithromycin. However, he noted that while oesophageal motility can be effectively measured, other areas of the GI tract are more difficult to assess. As an example, he highlighted the limitations of gastric emptying studies; there can be large variations in the outcomes despite little change in reported symptoms.

Andres discussed emerging technologies that may help assess motility beyond the oesophagus, including the wireless motility capsule, which measures contractility while simultaneously measuring pH to determine progress along the GI tract. He also mentioned the gas-sensing capsule, which determines progress using the proportions of different gases. Finally, he discussed Electrogastrogram (EGG) and emerging technologies in this field, such as high-resolution EGG, which has been shown to be effective in assessing gastric neuropathies and other functional disorders of the stomach.

Andres concluded his talk by hypothesizing about the future of prokinetics and suggesting that GI physiologists could play a role in providing diaphragmatic breathing techniques, stomach retraining, and mindfulness techniques. He emphasized that complex patients should be discussed at MDT meetings, as these patients are unlikely to respond to a single form of treatment and may need more than one type of solution.

This talk was of particular interest to me due to research I am currently involved with, looking into the effect of azithromycin on oesophageal motility and chronic cough. It was enlightening to learn about the many other prokinetics withdrawn due to their side effect profiles. I also found the section discussing the utility of high-resolution EGG very helpful. In our day-to-day roles, it is easy to get caught up in what we know and forget to scan the horizon for new and emerging technologies that may be beneficial.

Going forward, I intend to use diaphragmatic breathing more frequently when indicated and look forward to seeing whether this benefits my patients.

"A Capsule Sponge Pathway can be Safely Used in Patients with Reflux and Reduces Unnecessary Gastroscopy"

BSG Presentation Review by Kendra Hall, Clinical Scientist
Sandwell & West Birmingham NHS Trust

The early detection of oesophageal cancer is vital, as later detection can commonly lead to poorer patient outcomes. Barrett's oesophagus (BO) is a known precursor for oesophageal cancer, caused by chronic gastroesophageal reflux disease. Reflux is a common problem within the Western population, with many symptomatic patients experiencing functional heartburn. From a reflux point of view, gastroscopy is indicated in patients aged >55 years, often when other symptoms present concurrently.

Dr Dylan Angel used data from the National Endoscopy Database (NED) to argue that gastroscopy may not be the best tool for the assessment of patients presenting with reflux symptoms. Data showed that almost 90% of gastroscopies result in either normal or minor pathology with <1% of patients with typical reflux symptoms having cancer (Fig. 1).

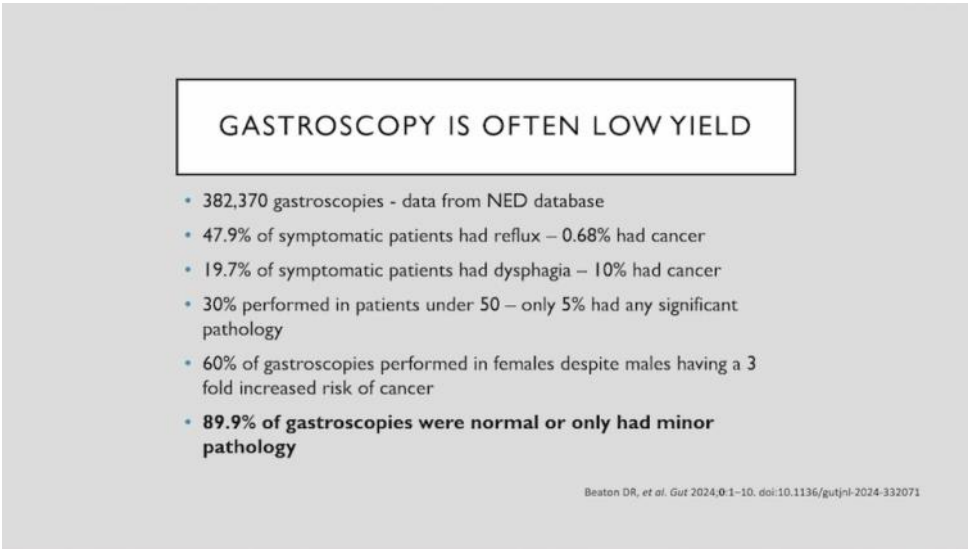


Fig. 1: *NED data to suggest the low diagnostic yield of gastroscopy in the assessment of GORD. Image taken from Dr Angel's presentation.*

Is there a better option than gastroscopy for patients with reflux symptoms?
Capsule sponge collects cells from the proximal stomach and along the length of the oesophagus, to identify the presence of TFF3 (a biomarker to indicate the presence of intestinal metaplasia), or P53, (a biomarker to indicate the presence of cellular atypia/ dysplasia. Recent DELTA and NHSE pilot studies recruited >1500 participants from across the UK to assess the efficacy of capsule sponge in BO surveillance.

Those in the NHSE pilot with a capsule sponge result positive for TFF3 or p53 were referred for gastroscopy, however, it was the negative cohort that was the focus of this presentation. Dr Angel presented 2-year outcomes from this negative cohort, to answer the question **will capsule sponge miss any significant pathology?**

This can be answered by looking at the small number of negative sponge patients who went on to have a follow up gastroscopy. In those the most common finding was normal endoscopy and no patients had BO. Fig. 2 indicates that capsule sponge is a safe and sensitive tool which could play an important role in the management of routine gastroscopy referrals, and for triaging those prior to pH/manometry testing. Additionally, capsule sponge is considerably cheaper and less invasive than gastroscopy, with lots of patients showing a preference for it. Dr Angel used this data to propose a future pathway for incorporation of capsule sponge Fig. 3.

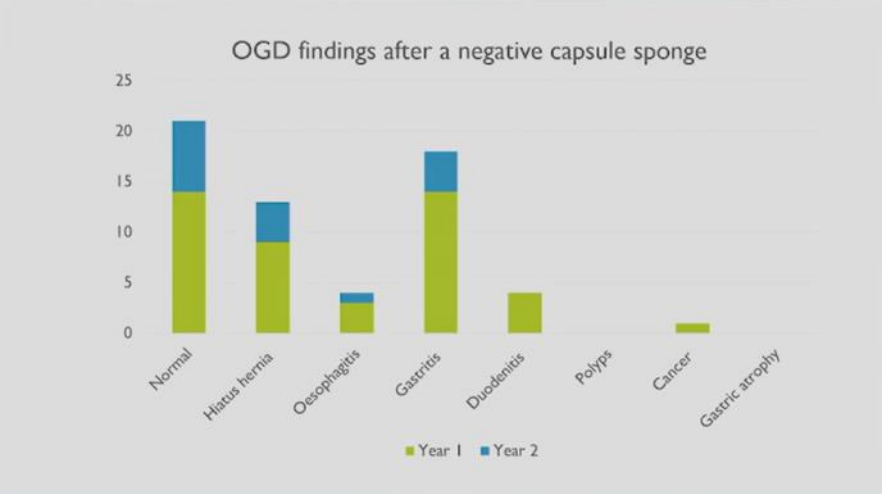
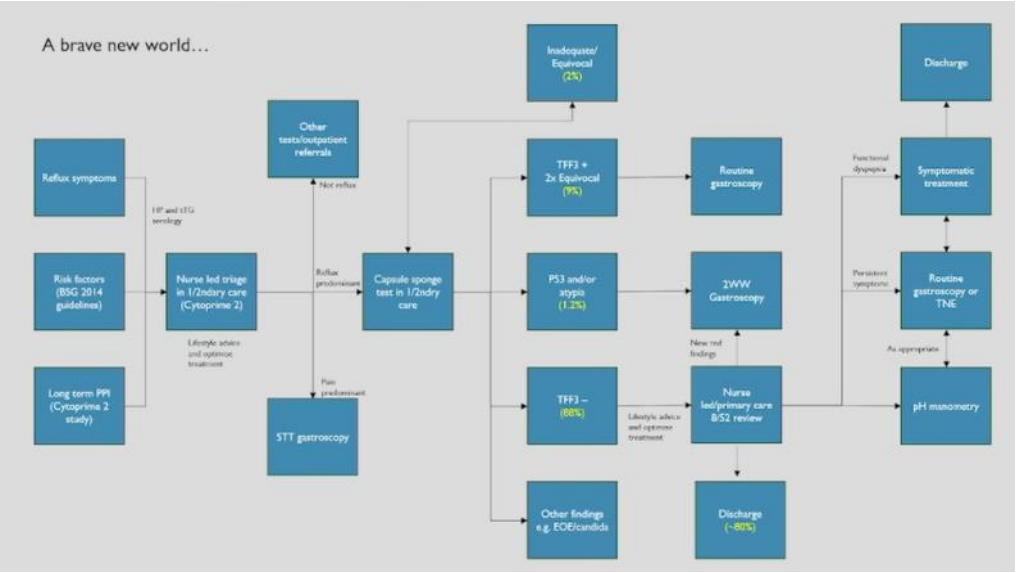


Fig. 2: *OGD findings 2 years after a negative capsule sponge test. Image taken from Dr Angel's presentation.*

Fig. 3*: Proposed capsule sponge pathway. Taken from Dr Angel's presentation.*



Overall, Dr Angel's talk was well received. Questions from the audience were concerned with whether the proposed pathway drives a selection bias in which capsule sponge becomes a screening test for BO in patients who have very low risk of BO, whereas those with greater likelihood of BO are less likely to be tested. Should it instead be used to screen those on long-term PPI, or in patients with greater risk factor (e.g. those >50 years). Despite this, Dr Angel estimated a £10-35 million saving over 5 years using capsule sponge as proposed.

This presentation was of particular interest to me as the GI Physiology department at Sandwell Hospital took part in the Delta trial and capsule sponge is becoming an established part of the BO screening service in the Trust. Anecdotal evidence from the department corroborates improved patient tolerance for capsule sponge over gastroscopy. Additionally, research carried out in the department suggests it is also better in terms of sustainability.

"Carbon Impact of a Capsule Sponge Service vs Upper GI Endoscopy for Barrett's Oesophagus Surveillance in a General Hospital"

BSG Poster Presentation by John Hayman, Consultant Clinical Scientist

Sandwell & West Birmingham NHS Trust

Firstly, I would like to thank AGIP for providing the bursary for my attendance at BSG Live 24. It was great to see good representation from AGIP members, and nice to meet new members and catch up with others throughout the course of the meeting. I was slightly disappointed, however, at the lack of AGIP representation at the Fun Run!

For our poster, we wanted to understand the carbon impact of a newly implemented Capsule Sponge (aka Cytosponge) service for Barrett's Oesophagus surveillance at our Trust, when compared to the traditional surveillance method of upper GI endoscopy. This service started in September 2022 as part of an NHS England feasibility pilot as an alternative to upper GI endoscopy for patients requiring Barrett's Oesophagus surveillance. This service was set up by and run out of the GI Physiology department.

A Capsule Sponge test involves a patient swallowing a capsule consisting of a spherical sponge in a dissolvable capsule, which is attached to a thread. Once swallowed, the outer coating of the capsule dissolves, exposing the sponge. This is then pulled back by pulling on the string, and it collects cells from the lining of the proximal stomach and the oesophagus.

Method

All single-use consumable waste for each procedure (Capsule Sponge and upper GI endoscopy) was recorded and weighed. Using UK government guidance, carbon emissions for the disposal of consumable waste and the transport of samples were calculated. Using published estimates of water and energy usage for the reprocessing of endoscopes, the carbon emissions for reprocessing endoscopes were also estimated. The total carbon emissions per patient for each procedure were calculated. This was then applied to the number of patients seen for CS between September 2022 and September 2023 and compared to the equivalent number of patients undergoing upper GI endoscopy only.

Results

Each Capsule Sponge procedure requires 6 single-use consumables at a weight of 0.1 kg, 0.25 L of water, and sponges are transported 87.3 miles for analysis. Estimated carbon emissions per patient were calculated at 7.1 kgCO2.

Upper GI endoscopy requires 31 single-use consumables at a weight of 1.5 kg, reprocessing of endoscopes uses an estimated 130 L of water and 0.4 kWh per cycle. Local biopsies are transported 9.1 miles for processing. Estimated carbon emissions per procedure were calculated at 35.8 kgCO2.

A total of 61 patients underwent Capsule Sponge instead of upper GI endoscopy. Of these, 6 (9.8%) patients required subsequent endoscopy due to potential high-grade dysplasia findings requiring endoscopy for confirmation. This resulted in a total saving of 55 endoscopies.

Total carbon emissions for the Capsule Sponge service, including subsequent endoscopies, resulted in total carbon emissions of 647.9 kgCO2. An endoscopy-only program for the same number of patients would have resulted in an estimated total carbon emission of 2183.8 kgCO2, resulting in a carbon saving of 1535.9 kgCO2.

Conclusion

This evaluation showed that the Capsule Sponge provides substantial carbon savings over upper GI endoscopy for Barrett's Oesophagus surveillance. Some of the carbon emissions were estimated, therefore it is likely there could be further carbon savings from a Capsule Sponge service.

Other studies have also found the Capsule Sponge to have a high patient acceptance rate (9/10) and an excellent safety profile with the most severe adverse event being detachment of the capsule (<1:2000) requiring endoscopic removal, and the most common side effect being a mild sore throat.

Additionally, at our Trust, the Capsule Sponge service has saved the equivalent of 3 months of dedicated Barrett's Oesophagus surveillance endoscopy lists, allowing consultants to see more complex patients and easing pressures on surveillance.

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“The Optimal Duration of pH Monitoring. Testing the Validity of Lyon 2.0: Recommendations for Prolonged Wireless pH Measurement”

BSG Presentation Review by Samantha Scott, Lead Clinical Scientist
University Hospitals Bristol and Weston NHS Foundation Trust

Dr. Radu Rusu, Senior Clinical Fellow at Guy's and St Thomas' NHS Foundation Trust, delivered an enlightening presentation on the optimal duration of pH monitoring for diagnosing gastro-oesophageal reflux disease (GORD). His talk, titled "The Optimal Duration of pH Monitoring: Testing the Validity of Lyon 2.0 Recommendations for Prolonged Wireless pH Measurement," provided a comprehensive overview of the latest findings and recommendations.

Overview

Dr. Rusu began by discussing the Lyon 2.0 Consensus, which advocates for a 96-hour wireless pH monitoring duration as the preferred diagnostic tool for unproven GORD. This recommendation is based on evidence that prolonged pH measurements offer a higher diagnostic yield compared to traditional 24-hour studies. However, Dr. Rusu acknowledged the practical challenges associated with this extended monitoring period, such as early detachment of the capsule and financial constraints, which often result in the adoption of 48-hour studies in many clinical settings.

The study presented by Dr. Rusu aimed to determine the optimal duration for pH monitoring and to evaluate different analysis methods for the data obtained. The objectives are displayed in Fig. 1.

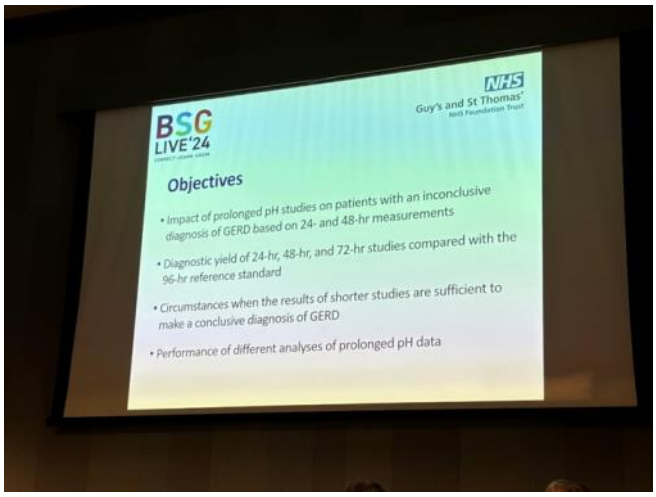

Fig.1: *The Optimal Duration of pH Monitoring: Study Objectives. Image captured by Samantha Scott.*

Data from 944 patients who underwent wireless pH monitoring for over 92 hours were analysed. Patients were classified based on acid exposure time (AET), with AET <4% considered negative and AET >6% considered positive for GORD. The analysis methods compared included average day, worst day, and dominant pattern analysis.

Key Findings Presented
Improved Diagnostic Yield: Dr. Rusu demonstrated that prolonging pH studies from 24 to 72 hours significantly improved diagnostic accuracy. The proportion of patients with inconclusive results dropped from 113 at 24 hours to 40 at 96 hours, underscoring the benefit of extended monitoring.

Effective Analysis Methods: The presentation highlighted that average day and dominant pattern analyses were more effective in reducing inconclusive diagnoses compared to the worst day analysis. This finding suggests that using comprehensive data analysis methods can provide more reliable diagnostic outcomes.

Thresholds for Conclusive Diagnoses: Dr. Rusu noted that clearly negative (AET <2%) or positive (AET >6%) results from 24-hour studies were generally sufficient to exclude or confirm GORD. This insight is particularly useful in situations where extended monitoring is not feasible due to technical or financial limitations.

The presentation was well-received by the audience, who appreciated the detailed analysis and practical insights offered by Dr. Rusu. The discussion segment was particularly engaging, with attendees posing thoughtful questions about the implications of the study's findings on clinical practice. Dr. Rusu's responses emphasised the importance of tailoring the monitoring duration to individual patient needs and local clinical capabilities.
Dr. Rusu's talk was highly informative and relevant to current clinical practice. The evidence supporting prolonged pH monitoring is compelling, especially in terms of improving diagnostic accuracy and resolving inconclusive results from shorter studies. This information is particularly valuable for clinicians dealing with complex GORD cases, where accurate diagnosis is crucial for effective treatment planning.

The practical recommendations for utilising different analysis methods and understanding the thresholds for conclusive diagnoses are directly applicable to my own practice. These insights will undoubtedly aid in making more informed decisions regarding the duration and method of pH monitoring for patients presenting with GORD symptoms.
Even though Dr. Rusu's talk highlighted the improved accuracy with prolonged pH monitoring, it is important to acknowledge the added benefits of catheter-based approaches, such their ability to perform pH-impedance studies. Such methods can provide comprehensive insights by ruling out behavioural air swallowing, which might also contribute to symptoms, ensuring a more holistic evaluation of patient conditions.

In conclusion, Dr. Rusu's presentation provided a thorough and practical overview of the latest advancements in pH monitoring for GORD. The findings and recommendations discussed are poised to significantly enhance diagnostic accuracy and patient outcomes in clinical practice.

Fig.2: *Dr Rusu presenting at the BSG 2024. Image captured by Samantha Scott.*

"Meet the Expert: Oesophageal Manometry and pH Testing: Everything You Wanted to Know but Were Too Afraid to Ask!"

BSG Presentation Review by Josephine McLachlan, Clinical Scientist
Barts Health NHS Trust

Dr Natalia Zarate-Lopez, a consultant from University College London Hospitals NHS Foundation Trust and Dr Ian Beales, a clinical associate professor from University Of East Anglia delivered a joint "Meet the expert" session to give an in depth overview of oesophageal manometry and ambulatory reflux testing.

Dr Zarate-Lopez began by presenting on the "why, when, and how?" of ambulatory pH monitoring.

Why? She highlighted that these tests should only be used for phenotyping gastro oesophageal reflux disease (GORD) as part of a long-term management plan, with strategies being developed based on the outcome of these investigations.

Who should undergo pH monitoring?

- Those that have typical reflux symptoms (heartburn and regurgitation of acid) that are refractory to medication (1). Additionally, a patient with a negative gastroscopy with typical symptoms should not be referred for surgery without confirming that GORD is the cause of the patients' symptoms.

- Patients that are responding to PPI therapy but are facing long term management with medication, to ensure they are not receiving a placebo effect.

- Patients with atypical symptoms, (such as belching, dysphonia or chronic cough) prior to treatment escalation.

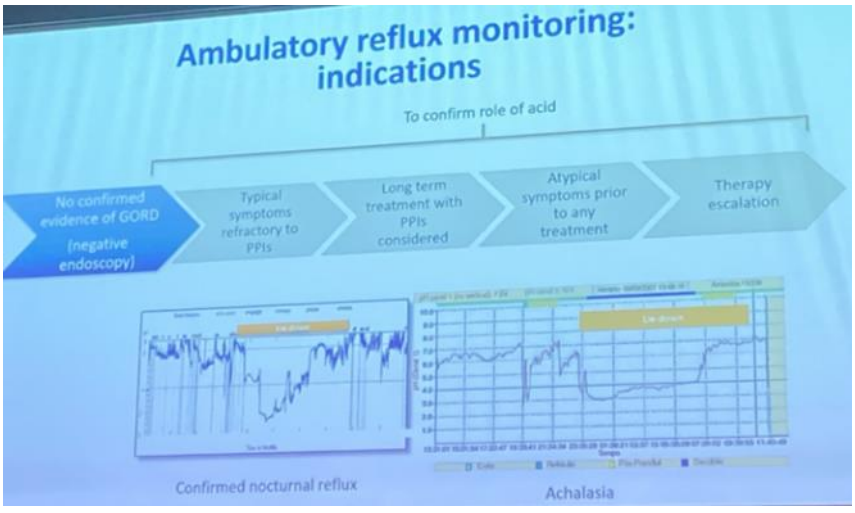

Fig. 1: *Indications of reflux monitoring and comparison of nocturnal reflux with achalasia: pH of patient with achalasia dropped below 4 in the nocturnal period, but drop was not as marked as patient with confirmed nocturnal reflux due to food fermentation.*

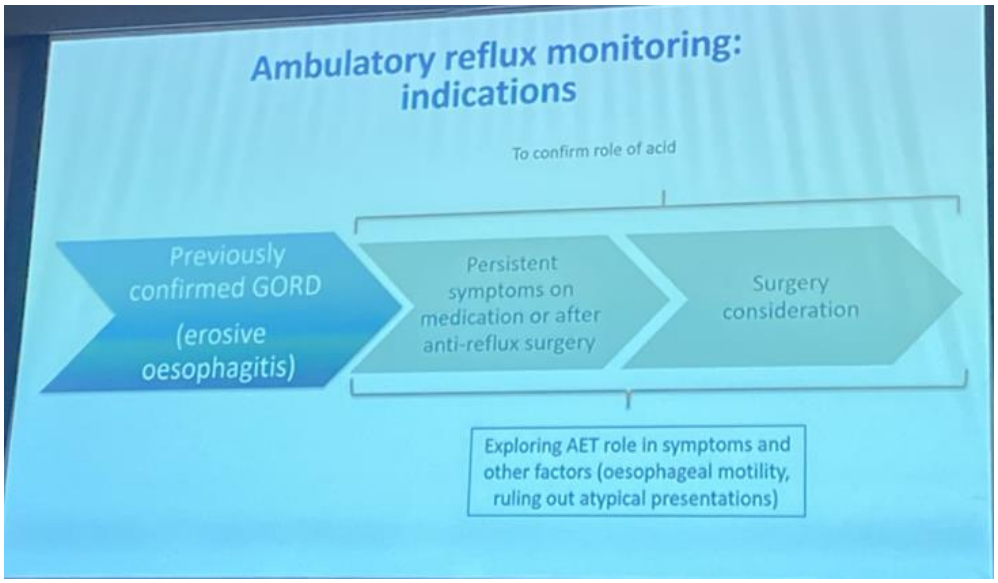

Fig. 2: *Further indication of reflux monitoring: If GORD has already been confirmed, ambulatory reflux monitoring might be conducted due to persistent symptoms on medication/after anti-reflux surgery, or prior to surgical consideration.*

When? pH monitoring should only be performed, following a gastroscopy, to visualise a potential mechanical obstruction (2). Additionally, a 1/3 of patients have erosive oesophagitis on gastroscopy and may not need to undergo further testing. Furthermore, stopping PPIs for 4 weeks prior to gastroscopy should be discussed to prevent the underdiagnosis of oesophagitis. It's important to note that the severity of symptoms described has been shown to not impact gastroscopy results (3).

How? Its increasingly being recognised that wireless pH monitoring is an excellent option, especially with the possibility of utilising this during endoscopy if erosive oesophagitis has not been observed. Wireless studies also allow for a prolonged recording period. However, while wireless pH monitoring is convenient, it doesn't allow for the measurement of impedance or proximal reflux. pH only and pH-impedance catheters remain great options for phenotyping GORD, especially with the possibility of detecting gas transit with pH-impedance studies.

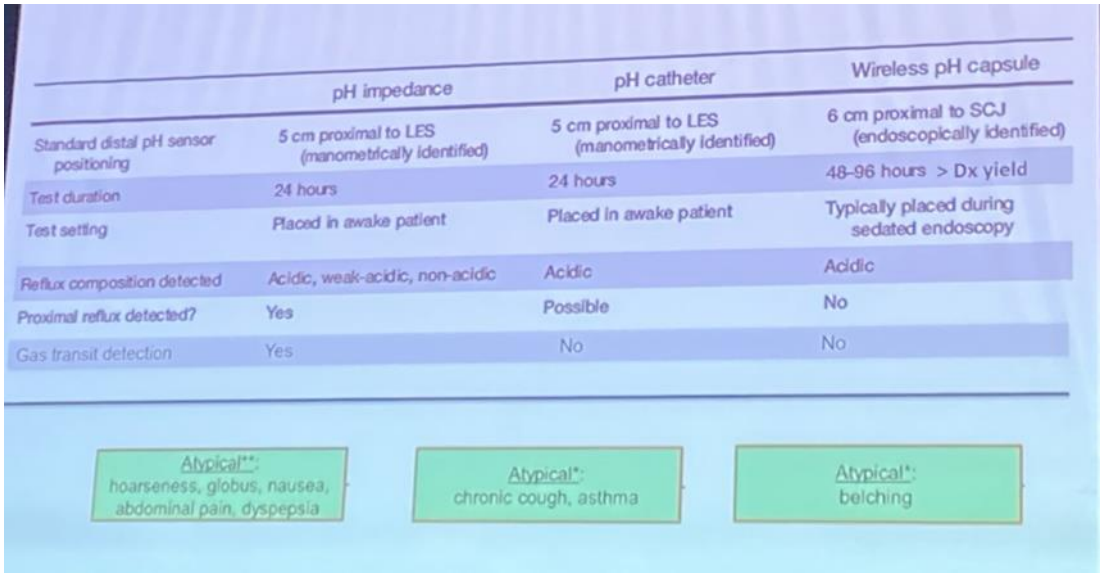

Fig. 3: *Options for ambulatory pH monitoring.*

Result interpretation

In this section Dr Zarate-Lopez mentioned that reports typically have many different numbers and metrics that could be overwhelming for the referrer. She encouraged referring clinicians to have a basic understanding the study, rather than just skipping to the last few sentences. On reflection, this has implications for the clinical scientist/physiologist interpreting the study. When examining the results, we should always be aiming to create a clinically relevant summary and ask ourselves “what will be useful for the clinician?”. I began to think about my own practice, and how I gain feedback from those receiving my reports. What is useful for them from the reports I write?

When analysing the results, Dr Zarate-Lopez stated that the most important parameter derived is the acid exposure time (AET). Secondary to this are the number of reflux episodes and the correlation between symptoms and reflux. The mean nocturnal baseline index (MNBI) is an emerging metric used to examine the integrity of oesophageal mucosa. Within her department, the is increasingly used to add further data in inconclusive cases. A high AET correlates to an attenuated baseline impedance index.

Dr Zarate-Lopez discussed the place of studies conducted while the patient is taking PPI medication and the use of pH-impedance catheters. PPIs are unable to change the number of reflux events, just the chemical nature of them (4,5). If the purpose of the study is to examine the patient’s response to medication, and the desire is to conduct this while the patient is taking PPIs, a pH-impedance test is the only technique able to identify alkaline or weakly acidic reflux events. When asking a patient to undergo these tests whilst off PPIs, some patients will describe that the severity of their symptoms makes cessation almost impossible. In this subset, a lower dose of medication could be considered.

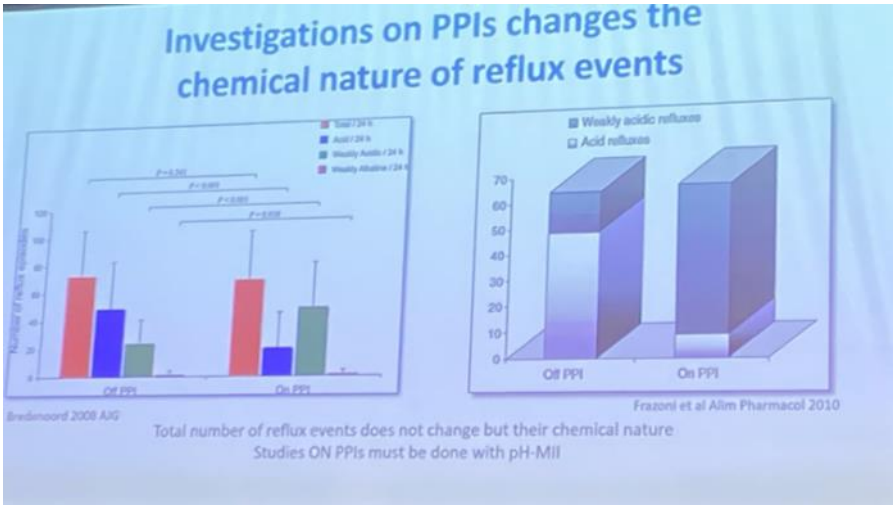

Fig. 4: *Explaining the use of ambulatory 24hr pH impedance studies performed on PPI therapy*

After discussing the normal values used for interpretation, Dr Zarate-Lopez briefly showed examples of rumination syndrome and supragastric belching. In her practice, she has been asked many times by patients with supragastric belching, about the possibility of also having small intestinal bacterial overgrowth (SIBO). She explained that this combination is very rare.

Audience questions

One question asked after Dr Zarate-Lopez’s presentation included “what is the current role of the DeMeester score in diagnosis?” She mentioned that she no longer uses this, however it was discussed that lots of surgeons still prefer this metric.

Another attendee asked about the significance of impaired oesophageal motility in the stratification of reflux disease. Patients with ineffective oesophageal motility have an increased risk of an abnormal AET. When discussing if those with ineffective motility should be referred for anti-reflux surgery, she mentioned she has not seen evidence to suggest that these patients suffer from additional dysphagia, unless the multiple rapid swallow (MRS) shows reduced contractile reserve.

Dr Ian Beales then gave a presentation focused on oesophageal manometry.

He began by emphasising Dr Zarate-Lopez argument that these tests should only be conducted to inform patient management. Historically, manometry was predominately conducted to examine dysphagia, to ensure the pH/pH-Impedance catheter was positioned correctly and to confirm the patient didn't have achalasia prior to surgery. The role has evolved to now examine oesophageal dysfunction as a whole. Also, provocative tests have become increasingly mainstream as the indication has evolved. These include:

MRS – this test can be used to uncover latent oesophageal motility in those that have impaired motility. Dr Ian Beales stated that it is unclear if this detects a patient subset who are more likely to develop dysphagia following anti-reflux surgery.

Rapid drink challenge – this is utilised as a stressor to the lower oesophageal sphincter (LOS) to unravel if the patient has a functional obstruction, achalasia or if the previous finding is artefactual.

Solid swallows – the different foods used for this test include marshmallows, bread, and biscuit. Caution should be used if the results from this challenge are abnormal, but the patient is asymptomatic. This should be treated as a likely false positive result.
Test meals – these are used predominately to examine rumination syndrome.

The Chicago Classification 4.0 is used for conducting oesophageal manometry, but Dr Beales mentioned that each centre needs to determine their own tweaks to the protocol (2). When discussing the metrics derived from the test, Dr Beales stressed the importance of understanding each metric such as the integrated relaxation pressure (IRP), distal contractile integral (DCI) and distal latency (DL).

The most common question Dr Ian Beales receives by other clinicians is "what is oesophageal gastro junction outlet obstruction (OGJOO)?". He defines this diagnosis as a functional measurable obstruction, but with intact peristalsis. Historically, OGJOO was diagnosed frequently, but the Chicago classification has adapted over time to reduce the possibility of a false positive diagnosis. OGJOO can have a pathological aetiology, be a form of early achalasia or artefactual. In addition to manometry, a timed barium oesophagram should be utilised to form a clinically relevant diagnosis of OGJOO. Endoflip can also be used, but many centres struggle to access this technology.

The session ended with questions for both speakers.
An attendee asked for further details on supragastric belching. In her answer, Dr Zarate-Lopez mentioned how passionate she was about this, as it is often underdiagnosed. Many patients must experience a delay in diagnosis. I began to examine my own biases with the patients I see. How can I be more compassionate to patients, irrespective of their diagnosis?

The next question came from a clinical scientist, surrounding the use of opioids and the type 3 achalasia phenotype often described. They asked if its best to test while the patient is on opioids (to examine the motility pattern causing the patients described symptoms), or if stopping opioids is preferred, even with the possibility of not finding symptoms, especially if there is no view to stop taking them.

Dr Ian Beale mentioned the test should be conducted off opioids, and the length cessation should relate to the half-life of the opioid used, if possible. If the study is conducted while the patient is taking opioids, the clinician will still be unsure if there is an underlying motility disorder, and ultimately the goal should be stop opioid use anyway.

Amyl nitrate and CCK can be used to determine if pathology is opioid induced or achalasia; but both are difficult to find in the UK. Dr Zarate-Lopez highlighted how difficult it can sometimes be for patients to stop opioid use, however, if achalasia is questioned, there needs to be a plan in place for opioid cessation. In her practice, if a patient is taking a high dosage of opioids and does not have achalasia, but rather dysphagia secondary to opioid use is suspected, she often goes straight to Botox as a therapeutic trail and follows this up with additional manometry.

Next a doctor asked how the decision is made between a pH only or pH-impedance study, prior to knowing if the patient is suffering from biliary or acid reflux. Dr Ian Beales described that if the patients upper GI anatomy is intact, it is most likely that the patient is suffering from acid reflux. If the patient's anatomy has changed, the likelihood of bile reflux increases. pH impedance is therefore critical in those with a change in anatomy.

Another audience member asked Dr Beales "if OGJOO is seen on manometry and the timed barium study is normal, but the patient is symptomatic, would you go forward with treatment?". He explained that he would watch and wait, to see if the patients' symptoms evolve into something more obstructive. In the past he has used Botox as a therapeutic trail. When discussing how manometry diagnosed OGJOO is reported, he mentioned that his scientists would say in the report "unconfirmed diagnosis of OGJOO, consider adjuvant testing/consider repeating in 6 months", however he also highlighted the importance of asking if unsure.

The last question asked surrounded accessing wireless pH for NHS patients. Dr Zarate-Lopez answered this one by saying that each service needs to create a business case after looking at the needs of the population. For example, if it is identified that approximately 70% of your patients have typical reflux symptoms but no oesophagitis on endoscopy, then a capsule could be deployed and the patient phenotyped, in one test. However, if wireless monitoring is performed, the endoscopy slot is typically doubled, which needs to be thought about from a business point of view. Furthermore, service leads need to establish the cost of physiologist time, the room, and endoscopy time during the creation of a business case.

Overall, I felt this session was important for those looking for an overview of pH monitoring, oesophageal manometry, and the clinical implications of these tests. I found it useful to hear a doctor's perspective and reflect on how I could work better with the clinicians who refer for investigations in my trust.

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3. Venables TL, Newland RD, Patel AC, Hole J, Copeman MB, Turbitt ML. Maintenance Treatment for Gastro-Oesophageal Reflux Disease: A Placebo-Controlled Evaluation of 10 Milligrams Omeprazole Once Daily in General Practice. Scandinavian Journal of Gastroenterology. 1997 Jan 1;32(7):627–32.
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5. Hemmink GJM, Bredenoord AJ, Weusten BLAM, Monkelbaan JF, Timmer R, Smout AJPM. Esophageal pH-Impedance Monitoring in Patients With Therapy-Resistant Reflux

"Navigating the Good, the Bad and the Ugly: The Impact of Drug Use and Abuse on Gastrointestinal Physiology."

BSG Presentation Review by Dr Tanya Miller, Principal Clinical Scientist
Oxford Universities NHS Foundation Trust

The AGIP symposium was well attended and kicked off with a presentation from Mrs Samantha Scott, Lead Clinical Scientist from UHB. The session was chaired by Dr Rami Sweis, Consultant Gastroenterologist/President of AGIP, and Prof. Anthony Hobson, Clinical Scientist and Chair of AGIP.

The talk began with an introduction on the various diagnostic tests available in a GI Physiology department and the scope of the problem in terms of prescription and recreational drug usage. Samantha highlighted that according to NHS Digital, adverse drug reactions account for approximately 7.5% of hospital admissions in the UK. The wide variety of drugs used to treat specific upper GI symptoms were discussed with an emphasis on those that have been shown to have an adverse effect on generated diagnostic data and therefore the importance of distinguishing functional disorders from drug-induced GI disorders was outlined.

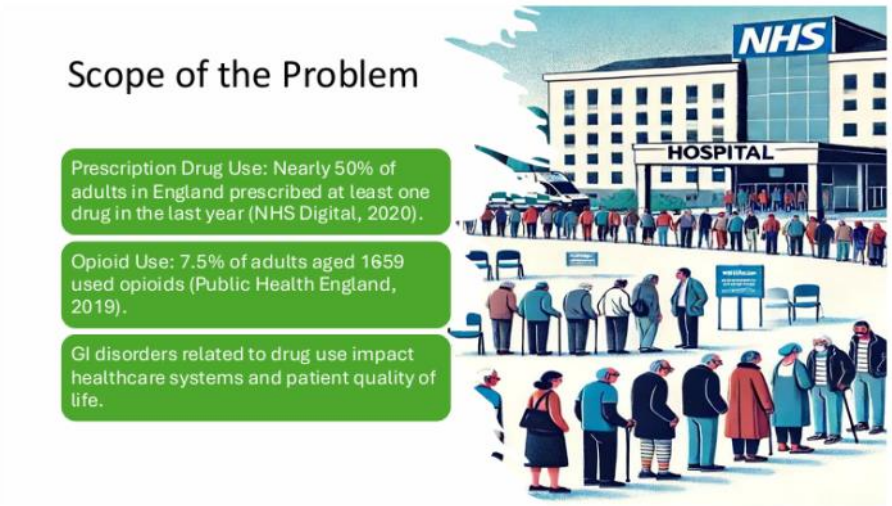


Fig 1: *Scope of the Problem (Slide provided by Mrs Samantha Scott)*

The drugs discussed included opioids, calcium channel blockers, smooth muscle relaxants, anticholinergics, antianxiety medications, ketamine, cocaine, cannabis and alcohol.

The presentation went on to discuss the difficulties associated with a wash out period for patients reliant on these types of drugs, making robust studies to support and reliably prove

The reliance of patients, on the therapeutic effects of some of these drugs, is undeniable, but unfortunately, there are often secondary effects on GI function. In some cases, it is hypothesised that the reported symptoms could be a direct result of these drugs and not necessarily related to alternative pathology. The potential effect on diagnostic findings is varied and range from (but are not exclusive to) impaired peristalsis, reduced LOS pressure, delayed gastric emptying, reduced oesophageal motility, increased reflux, abdominal pain, nausea and changes to anal canal sphincter function.

Case studies from patients' taking Ketamine, cannabis and cocaine were considered.

As an example: a 30-year-old female patient with a history of cocaine abuse was discussed, who reported severe chest and abdominal pain. Diagnostic findings revealed oesophageal body hypercontractility, spastic contractions, mucosal ischaemia and ulceration. It was emphasised that it is important to take a thorough and accurate patient history taking the time to build trust and thereby enabling normalisation of the conversation. This might also be achieved, in part, by the incorporation of patient questionnaires prior to the appointment.

The talk then led to the question of potentially reversing drug-induced GI effects and how this could be achieved. This is of course not an easy undertaking with the most obvious option being to cease use of the offending drug. This is unrealistic in most cases and therefore an alternative approach could be to substitute with a drug which provides the same therapeutic effect minus the unwanted secondary effects on GI function—this would be ideal. Likewise dietary and lifestyle modifications were also discussed. Unfortunately, it is very difficult to obtain evidence on the reversibility and recovery timelines of these drugs, due to their inherent, addictive nature and the debilitating symptoms they are used to treat. Therefore, it can be very difficult to improve patient outcomes whilst these drugs are in use. This this further emphasises the importance of highlighting the use of these drugs in clinical reports, particularly those recreational drugs that are not prescribed and therefore could go undocumented. It may be helpful to further focus on the potential effect that these drugs may have on the generated data, particularly when an anomaly is recorded in line with the reported symptoms which were not present PRIOR to the initiation of the drug in question. This also underscores the necessity of collaboration at MDT's to share information and allow a fully holistic approach to patient care.

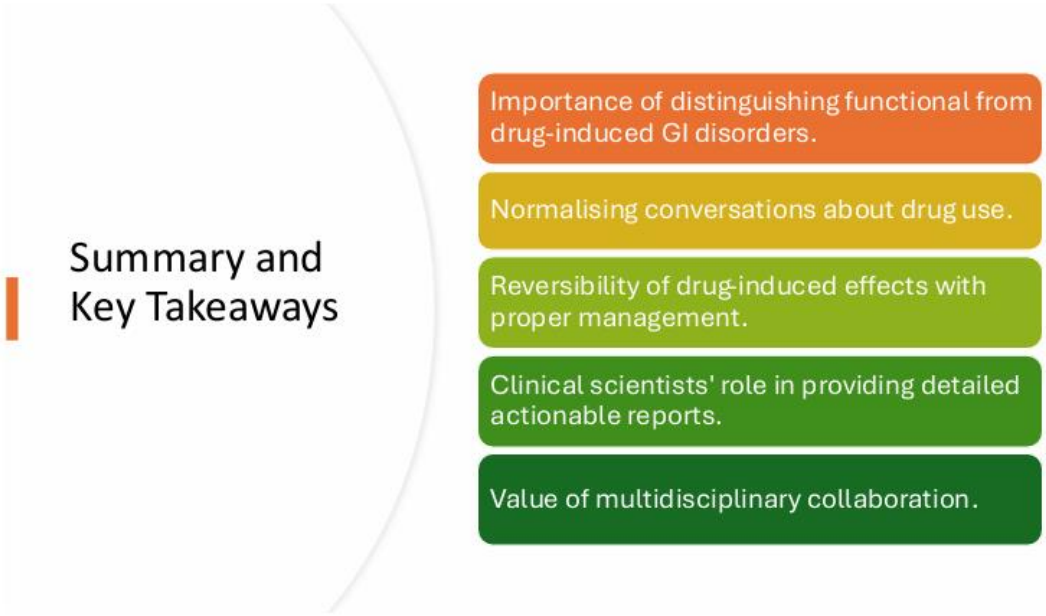


Fig 2: *Summary and Key Takeaways (Slide provided by Mrs Samantha Scott)*

The final thought was: 'Empowering clinical practice through knowledge and collaboration,' and how this leads to improved patient care and outcomes.

It was no surprise that this talk generated much discussion amongst the delegates with many questions from the floor. Samantha emphasised the difficulties in setting up a study to corroborate the assumption of a reverse in symptoms once the drug is stopped – the so-called 'chicken and egg' scenario.

Other comments discussed the lack of evidence to support surgical intervention with the supposition that the symptom was caused specifically by the drug and that if the drug could not be stopped in the long term the further assumption that the symptom would resolve if treated surgically. However, this has not been found to be the case: with patients reporting poor outcomes with invasive therapies beyond that of dilatation. It was suggested that pain often tends to be the primary presenting symptom, and that this symptom responds least well to surgery, with dysphagia responding best.

Dr Sweis commented that, at most, a pneumatic dilatation or use of Botulinum toxin should be used to treat these patients, with more invasive treatments such, as myotomy, reserved for only those patients that are certain symptoms were present PRIOR to regular opioid use – and only then with extreme care.

He suggested that symptoms induced by opiates don't do well post myotomy, because as already discussed the underlying issue tends to be pain, (with the exception if pain is secondary to dysphagia).

It is clear that evidence-based research is limited and therefore a definitive and reliable treatment option for this patient group is not available. It is important to ask the right questions when taking a patient history, particularly in relation to the use of non-prescription drugs, and to incorporate this information in clinical reports and patient records, to enable informed decision making for the most robust and long-lasting treatment pathway.

"Microbiome Masterclass" - The Keynote Lecture in the AGIP Symposium

BSG Presentation Review by Naomi Rune, Clinical Scientist
Oxford Universities NHS Foundation Trust

The keynote lecture given at the AGIP Symposium was given by Mrs Malwina Nahibi, head of Clinical Development at ADM Heath (Archer Daniels – Midland Company), an American multinational company which specialises in food products and dietary supplements. In addition to this, ADM is also investing in research into the function of the microbiome.

First of all, as part of the masterclass, Malwina introduced us to a number of key terms necessary to get to grips with the terminology of the microbiome:

Bacteria are classified using an established system which specifies the strain. Each strain is unique and is not to be misidentified with any other, as they possess different properties and characteristics. Malwina compared this classification system with the unique properties and flavours of cheeses, likewise, one cheese must not be mistaken for another! As a foodie myself, this analogy has stuck in my memory!

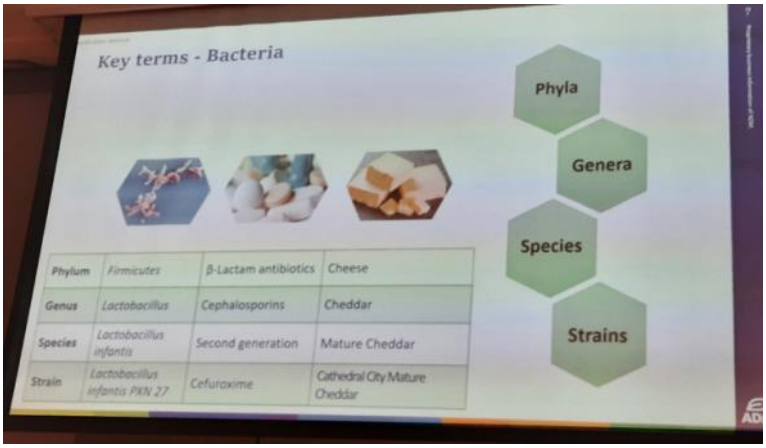


Fig. 1: *Classification of bacterium strains*

Biotics were then defined, along with their uses:

Probiotic – live organisms to support the healthy composition of the gut microbiome
Prebiotic – a non-digestible ingredient which promotes the growth of healthy bacteria in the microbiome
Symbiotic- a mixture of pro and pre- biotic
Postbiotic- inactive bacteria known to improve gut health.

<u>Diet and state of health affect the microbiome</u>
Malwina shared a slide displaying the microbiome profiles of different populations in different countries. The study demonstrated that the diet which contained more cellulose increased the proportion of *Bacteroidetes* in the microbiome, whereas the other had more *Firmicutes*. This was an example of how diet can influence the composition of bacteria in the gut.

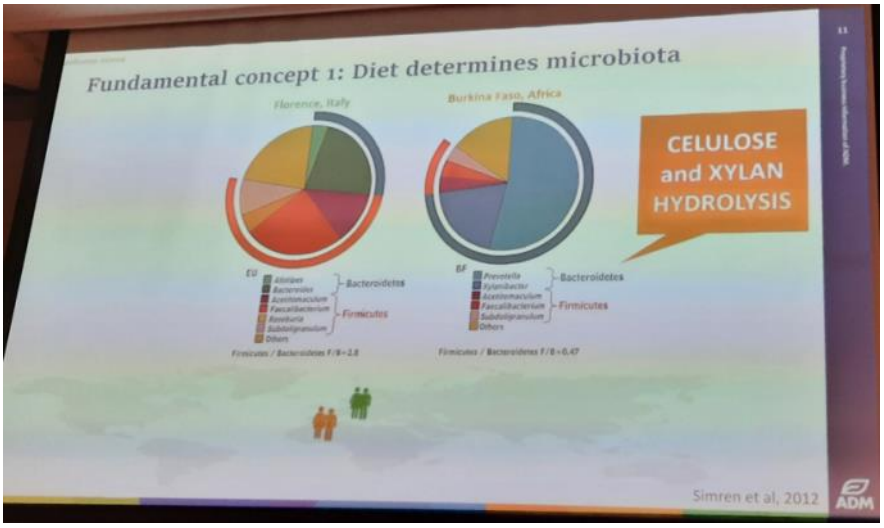


Fig. 2: *Comparison of microbiota from two populations with different diets*

In addition to this, the effect that the state of health has on the microbiome was demonstrated through comparison of an omnivore vs someone following a paleo diet. Before ill health, the omnivore had a microbiome which reflected that of someone that consumes more dietary cellulose to that of the person on the paleo diet. This however, changed when they became ill and this reflected in the composition of bacterial phylum which changed notably.

<u>Microbiome profile can influence our health and supports certain processes in the digestive system.</u>

Malwina went on to demonstrate how the microbiome can influence processes in the GI system. For example, it was explained that secondary bile salts usually have a protective mechanism against the proliferation of *Clostridium difficile.* However, the commensal bacterial are responsible for facilitating the reaction which produces these (Fig. 3). In cases where the commensal bacteria cannot support the process, *Clostridium difficile* is allowed to proliferate in the gut.

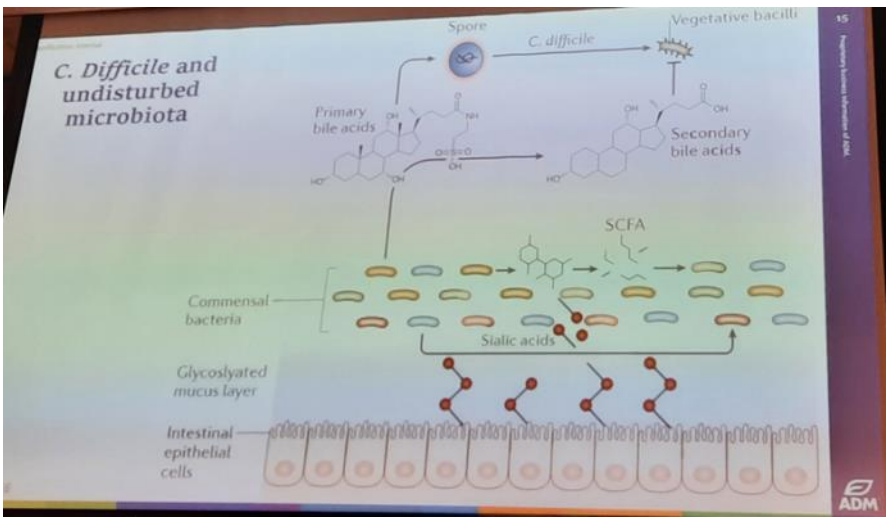


Fig. 3: *Depiction of the roles bile salts play in preventing activation of Clostridium difficile and the role of commensal bacteria in facilitating conversion of primary bile salts to secondary.*

In addition to this, the commensal bacteria of the gut are responsible for converting certain substances into their active form, this includes sulfasalazine. In order for sulfasalazine to be broken down into its active product, amino salicylic acid, the correct bacteria must be present. Without this reaction, sulfasalazine cannot have its anti-inflammatory effect.

Prescribed drugs affect the profile of the microbiome

Interestingly, many prescribed drugs affect the commensal bacteria of the microbiome, including human targeted drugs. This may lead us to ask the question of whether more consideration should be given for the microbiome when prescribing such drugs.

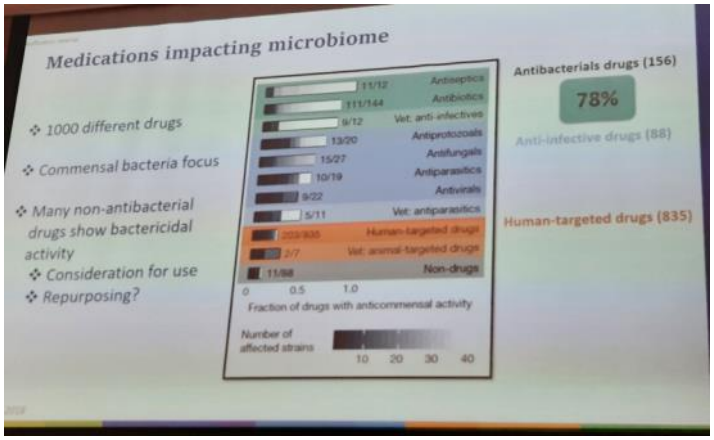


Fig. 4: *Depiction of the proportion of drugs (in their classes) which impact the microbiome.*

The microbiome can play a role in improving existing conditions

Studies have shown probiotic supplementation to improve mood and anxiety scores in major depressive disorder. This was evaluated with 3 different questionnaires and resulted in clinically meaningful reduction in scores.

How can we modulate the microbiome?

Given all the benefits and functions of a healthy microbiome, this would suggest that maintaining its health and restoring this when compromised, is key to maintaining body wide health. This is where prebiotics, probiotics and postbiotics, (mentioned earlier), can be utilised for example, following a course of antibiotics

Questions form the Audience

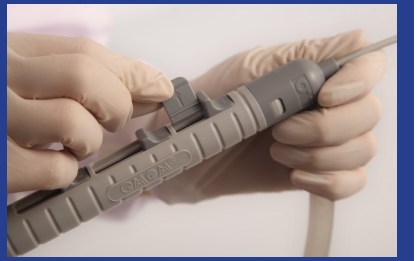
The talk stimulated a series of questions, one of which was particularly interesting:
It was asked whether the composition of an individual's microbiome could be an indicator of response to certain therapies such as a FODMAP diet. Malwina responded that this is a possibility and, in some ways, has shown to be useful in treatment for Crohn's disease. However, she reminded us that we should have some reservations about the clinical utility of faecal samples as an indicator of the composition of the microbiome as this may not always be representative.

The take – home message of this talk is that the microbiome is complex and despite many recent discoveries (including its role in maintaining overall health and its sensitivity to lifestyle and outside influence) we have only just touched the surface. With enough interest and funding, there is scope for much more to be discovered.

Are you attending a conference / event?

NewWave is always looking for reviews of GI Physiology events and meetings. If you have an event coming up and would like to submit a review (or advertise it in our next issue), please contact Gemma Norris (gemma.norris@sthk.nhs.uk)

The next issue of New Wave will be published in October 2024



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Please join us for the Advanced HRM & Impedance/pH Study Day

Sept 11th 9:30 - 16:00 | **DoubleTree by Hilton, Manchester Piccadilly** | **Chaired by Prof Arjan Bredenoord**

- **09.30-09.55** - Registration
- **09.55-10.00** - Introduction
- **10.00-10.30** - Chicago Classification 4 protocol
- **10.30-11.00** - Achalasia & Outflow obstruction in CC4
- **11.00-11.30** - Pitfalls and artefacts
- **11.30-12.00** - Coffee break
- **12.00-12.30** - HRM in anatomical abnormalities and post-surgical cases
- **12.30-13.00** - 24hr Imp/pH + manometry for rumination
- **13.00-13.30** - Clinical cases in reflux
- **13.30-14.15** - Lunch
- **14.15-16.00** - Complex case studies & delegate patient cases
- **16.00** - Meeting close

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