Welcome

Welcome to the October 2016 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

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Members News

Due to the recent changes in the BSG CPD system all attendees at the AGIP symposium (BSG, Liverpool, 21st June 2016) will not receive a separate certificate from AGIP to say that they attended the symposium. It is acceptable to submit the CPD certificate provided by the BSG for the purpose of AGIP CPD evidence.
Job Advert

GI Physiologist – Band 7

We are looking to recruit an enthusiastic and motivated Clinical Physiologist to join our team in the GI Physiology Unit at University College Hospital. This is a consultant led, multi-disciplinary team consisting of Gastroenterologists, GI Physiologists, Specialist Nurses and Nursing Assistants. We undertake a range of tests of upper and lower gut function, and associated treatments for patients with gastro-intestinal and pelvic floor problems. This includes ano-rectal and oesophageal physiology, hydrogen breath tests, biofeedback, percutaneous tibial nerve stimulation and pain management.

Your primary role will be to provide service delivery by undertaking diagnostic GI Physiological investigations and by contributing to the day to day running of the Unit. You will also help to co-ordinate and support further development of the service, and participate in education, audit and research. You must have the ability to work autonomously and as part of a team, and be able to demonstrate clinical expertise and effective decision making skills in relation to providing specialist care and support to patients with complex problems. Ideally you will be an experienced GI Physiologist with a proven track record undertaking GI investigations, and as such will be a member of the Association of GI Physiologists and registered with the Registration Council for Clinical Physiologists. However, nurses with relevant GI experience will be considered. This is an opportunity to join a specialist Unit and be part of an enthusiastic and friendly team.

Informal enquiries can be made to Dr Amanda Raeburn (GI Physiologist) on 0203 447 9130 or email Amanda.raeburn@uclh.nhs.uk.

Closing date: 11/10/2016

To Apply: https://www.jobs.nhs.uk/xi/vacancy/4142e0e104153edaeca0ba1b65b40763/?vac_ref=914332618
Forthcoming Events 2016/2017:

6th October, 2016  HRM & Impedance/pH Study Day  
Life Science Centre, Newcastle  
rachel@ardmorehealthcare.com

15th - 19th Oct 2016  United European Gastroenterology (UEG) Week  
ACV, Vienna, Austria  
For further details go to:  
https://www.ueg.eu/week/past-future/ueg-week-2016/

25th-27th Jan 2017  British Society of Paediatric Gastroenterology, Hepatology  
Nutrition Annual Meeting  
Glasgow  
https://bspghan.org.uk

6th-9th May 2017  Digestive Disease Week  
Chicago  

19th-22nd June 2017  BSG Annual Meeting  
Manchester  

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25th Anniversary of the Association of GI Physiologists  
History of Our Association  
Patricia Vales and Josephine Barlow

The Clinical Associates Section of the BSG was inaugurated in 1991 so this is our 25th Anniversary and since that time we have continuously held Council meetings and held a Seminar at the annual BSG Conference.

Many units throughout the country were already providing services in GI Physiology prior to this and the Association was formed in response to the need to standardise practice and to provide a networking forum and an educational pathway to attract and retain non clinical personnel into this emerging clinical science.

The force behind the formation of this group came mainly from the Clinicians working in the field who recognised the need to formalise and standardise practice. Most “Clinical Associates” came into the field from very disparate backgrounds; nurses, biomedical scientists, physiotherapists, physical scientists and a large co-cohort were recruited from the more traditional physiological measurement modalities. This mix of healthcare professionals continues to the present day and with the support of a strong Association we are all Gastrointestinal Physiologists.

It is difficult in such a short article to mention all of the Clinicians and physiologists who were instrumental in establishing our Association but some tribute is due and we apologise in advance for those we do not mention.

Our first President was John Lennard-Jones and he guided us and ensured that our constitution was compliant with the BSG. He also organised and sourced funding for meetings to bring together clinicians and physiologists to formulate the constitution and the educational pathway. Dr Lennard – Jones is one of our Honorary members. Our first chair person was Graham Buckton who continued to work on various committees and was a contributor to the Department of Health’s National Occupational Standards project. He retired from clinical work and from his position as Symposium Secretary in 2015. He is now an Honorary Associate Member of the BSG.

Our second president was Robert C Heading whose unit in Edinburgh provided training for both clinicians and physiologists. Dr Heading was one of those original clinicians who helped establish our Association and went on supporting us as we developed and led our team at the Department of Health’s Physiological Measurements forum. The unit in Edinburgh continues to provide a first class service and training opportunities. Dr Heading is also an Honorary member of our Association.

John de Caestecker who heads the unit at Leicester was our next President. John has been a strong supporter of our Association throughout our existence and stepped down from his role in 2015. He has supported our Association from the early stages and more recently has been part of the Royal College of Physicians involvement in Improving Quality In Physiological diagnostic Services (IQIPS), and he is also an Honorary Member.

Graeme S Duthie who leads the team at Castlehill Hospital, Hull has been active throughout our 25 years and came to so many meetings up and down the length of the country he should be re – named “The Michael Portillo of GI”. My personal fondest memory of Graeme is his “expletives deleted” description of the sheep on the line that kept him late for a meeting at Swansea! I have long forgotten why we were are at that meeting but never Graeme’s description. We appreciate his constant support and recognised his contribution by asking him to become one of our earliest Honorary members.

A few other clinicians who supported us in those early years need to be mentioned; some of them already recognised in our Honorary Members list.

John Bennett, Kingston-upon-Hull; Thomas Dehn, Reading; William Owen, London and John Bancewicz, Salford.
Our training pathways have continued to develop over the years to keep up with our changing scope of practice and clinical responsibilities. Our original training programme started in 1991 and was part of the generic Physiological Measurements programme and was supported by the BSG and the Department of Health and provided by Peoples College Nottingham. Our first course included a practical demonstration which took place at Birmingham Heartlands: established in 1981/1982 and one of the first diagnostic unit to be staffed by scientists rather than medics. This course was further developed into “A Study Course in GI Physiology”, a four module introduction to GI Physiology delivered through distance learning. This course was incorporated into our BSc in Clinical Physiology and was in use until 2012 when the Department of Health’s Modernising Scientific Careers (MSC) programme included a Clinical Scientists pathway for GI Physiologists.

We also established week long residential courses to support underpinning knowledge and to introduce our trainees to the wider gastrointestinal field and to innovative developments in GI. The practical components for upper and lower GI Modules were originally held at Salford Royal, the unit originally set up by John Bancewicz and Margaret Marples. The underpinning knowledge was increased to cover a 2 year Part One Professional Body Qualification and then to a 4 year University Certificate of Continuing Personal Development qualification as part of the BSc in Clinical Physiology. These have now been further developed into M-level modules as part of MSC scientist training. All of our courses have been and are accessible as part of individual continuing professional development as well as having been incorporated into national training qualifications for clinical physiologists.

Our first “Handbook” was published in 2000 and our name was changed to the Association of Gastro-intestinal Physiologists (AGIP) to establish ourselves as a Professional Body within Healthcare Science and to be able to participate and contribute to the new training pathways and standardisation of practice being rolled out from the Department of Health. It also enabled us to join with other modalities in clinical physiology as founder members of the Registration Council of Clinical Physiologists and to campaign for Statutory Registration for all of our members not already governed by a statutory body. The “Handbook” was edited in 2015 and brought up to date to reflect our current clinical roles and educational pathways and to underpin our status as a multi-disciplinary profession within the British Society of Gastroenterology.

Margaret Marples . (1950 to 1991)

Margaret was one of our first non-clinical leaders and worked alongside John Bancewicz at Salford Royal Infirmary from the early 1980s. Margaret had originally been trained as a Cardio-Respiratory Physiologist and brought with her a knowledge of rigorous patient investigations, the importance of standardisation and of a national training pathway. She was passionate about integrating GI physiology in the national curricula in Physiological Measurement which started in 1991 and opened her unit to train recruits to our profession. She was actively involved in research and development at Salford and was first author on a paper “Can an Oesophageal pH Electrode be accurately positioned without Manometry”? She also continued her own professional development by registering for an MSc.

Margaret carried on working until eight weeks before her death from cancer in 1991. Her death was a great personal loss to all those that knew her as a friend, trainer and inspiration for the development of our Association. We instituted the Margaret Marples Prize in 1992 to encourage our trainees to get involved in research and development and this has now become the Margaret Marples Lecture.

Here’s to the next 25 years!
A 67 year old female presented with a two year history of dysphagia, regurgitation and severe recurrent chest pain on eating solid food. Past medical history included high blood pressure and diabetes mellitus type II. Medication she was taking regularly included insulin, oral hypoglycaemics and calcium channel blockers. There was no response in her oesophageal symptoms to proton pump inhibitors or calcium channel blockers. Endoscopy at another hospital was unremarkable and barium swallow showed tertiary contractions and inefficient bolus clearance.

Question 1
How would you investigate this lady next?
1. Repeat OGD
2. Barium swallow
3. Manometry
4. Ambulatory pH monitoring
5. Exercise tolerance test

Conventional manometry for liquid swallows showed non-specific motor abnormality with occasional oesophageal spasm (see below)

Question 2
What investigation(s) would you do next?
1. CT chest
2. Multichannel Intraluminal Impedance
3. High Resolution Manometry
4. Repeat OGD
5. Would not investigate further
High Resolution Manometry was performed. There was a normal lower oesophageal sphincter (LOS) residual pressure (12mmHg) with normal relaxation. On liquid swallows there was essentially normal peristalsis activity with a velocity of 5cm/s and a high/normal contractile pressure (160mmHg) with diffuse oesophageal spasm activity in 30% of swallows.

For solid swallows there was high pressure, segmental, repetitive oesophageal spasm with pressures reaching 300mmHg lasting up to 12 seconds in the mid and distal oesophagus. This was associated with dysphagia and severe chest pain. Baseline LOS pressure and activity was normal.

**Question 3**

How would you treat this lady with the above findings?

1. Increase Calcium channel blocker dose
2. Add oral nitrate
3. Increase proton pump inhibitor
4. Add nocturnal H2 blocker to PPI
5. Refer for biofeedback and trial of amitriptyline
A trial of a long acting nitrate donor (Isosorbide Mononitrate) had some benefit but regular use could not be maintained due to severe headaches. A therapeutic trial of 50mg Sildenafil was given and HRM was repeated within 45 min. Findings: LOS pressures dropped to 8mmHg. For liquid swallows oesophageal contractile pressure and peristalsis velocity dropped to 40mmHg and 4cm/s.

HRM of 5 ml water swallow post sildenafil showing a markedly reduced contractile pressure.

For solid swallows contractile pressures were reduced to 60mmHg, the frequency of oesophageal spasms decreased from 100% to 50% and repetitive contractions stopped. Dysphagia improved and chest pain completely resolved.

HRM of 1cc bread swallows showing markedly reduced contractile pressures and no further focal segmental spasms.

Continued therapy on Sildenafil BD for 2 weeks maintained symptom control with no troublesome side effects.
**Discussion**

Disorders of oesophageal motility are thought to be caused by a breakdown in the interplay between inhibitory (predominantly nitroxinergic) and excitatory (predominantly cholinergic) neurotransmitters that produce sequential relaxation and contraction of the smooth muscle oesophagus required for effective bolus transport.

Oesophageal spasm is an uncommon condition that presents with dysphagia, regurgitation of fresh food and chest pain. Current treatments for oesophageal spasm are aimed at reducing contractile pressure and slowing peristaltic velocity; however available medications are limited by poor efficacy and troublesome side effects.

Sildenafil potentiates the action of endogenous nitric oxide and reduces peristaltic contractile pressure and velocity in the smooth muscle of the oesophagus.\(^1\)

The differential effect on liquid and solid swallows suggests that Sildenafil raises the threshold required to trigger peristalsis rather than exerting a general, non-specific inhibitory effect on contractility.\(^1\)

**Question 4**

What are the advantages of High Resolution Manometry?

1. Pressure sensors are closely spaced <2cm apart to depict focal abnormalities often not seen with conventional manometry
2. Produces a visually intuitive spatiotemporal plot
3. Produces a continuous analysis which is presented in real time
4. Shifts of position do not affect the reliability and reproducibility of the results
5. It produces very pretty colours

All the answers to question 4 are true! Abnormalities on conventional manometry are defined in terms of a few basic patterns: incomplete sphincter relaxation, oesophageal spasm, hypertensive contractions, loss of tone and nonspecific dysmotility. This is a simple classification which does not cover the breadth of abnormalities known to occur with oesophageal function, and is subject to poor inter-observer agreement in interpretation. HRM incorporates closely spaced pressure sensors to demonstrate the segmental functional anatomy of the entire oesophagus. Furthermore HRM can measure the intra-bolus pressure and oesophago-gastric pressure gradient which drives bolus transport. Such features are linked to improved diagnostic accuracy.\(^3\) Normal values have been established for peristalsis and the gastro-oesophageal junction,\(^3\) and it is subject to less inter-observer variability.

A large study of 212 consecutive patients referred with oesophageal symptoms and had conventional (5 sensor) and High Resolution Manometry performed showed 12% manometric disagreement.\(^4\) A similar study performed at St Thomas’ hospital in which manometry results of 100 consecutive patients were blindly analysed showed that a clear diagnosis was established by HRM only in 20% of cases.\(^5\)

In this case HRM provided a clear description of focal oesophageal spasm and its response to Sildenafil treatment. This case also highlights the importance of using solid swallows as the findings could have been interpreted as normal for liquid swallows.

This was a very interesting 2 day meeting considering the latest understanding of the causes, diagnosis of and treatment of faecal incontinence (FI).

Even the definition of FI is less than clear so it is unsurprising that estimates of the incidence of FI vary widely, but there is no doubt that the incidence is high (5-15% of the general population, up to 50% of residents of care homes) with a significant cost burden to the health service. Surprisingly the rate of incidence is similar in males to females, though the aetiology differs.

Prof Shakila Thangaratinam (London) eloquently described the risks of FI following childbirth, particularly with a long second stage of labour or instrumental delivery. Karen Nugent (Southampton) indicated the risks of FI following bowel cancer treatment and the use of the low anterior resection syndrome (LARS) score.

Phil Dinning (Adelaide, Australia) presented evidence for colonic motility having a substantial effect on FI. Normal colonic activity is periodic peristalsis at the rate of 2-4 cycles/minute, stronger on eating and predominantly retrograde in nature. Colonic motility appears to relate to stool form and frequency, with increased motility leading to reduced frequency with formed stools and vice-versa. Diarrhoea dominant IBD appears to be associated with a high rate of colonic activity but predominantly antegrade in direction. There is evidence that at least some of the benefit of sacral nerve neuromodulation results from enhancement of retrograde colonic motility.

Mark Scott (London) talked about the high incidence of FI secondary to constipation, with a co-existence of both FI and constipation in 45% of patients, and a high proportion of FI patients having an intact sphincter. Mark posited that FI can be secondary to incomplete evacuation and rectal hyposensitivity. This was echoed by Christine Norton (London) who emphasised the huge burden of “laxative-induced diarrhoea” found in nursing homes where the emphasis is very much towards avoiding constipation.

Diagnosis and assessment of function in FI was covered by several presenters. Emma Carrington (London) talked about the role of high resolution anal manometry, and the possible new metrics obtainable with this technology. She also talked about extended post-prandial studies looking at periodic resting anal relaxations associated with urgency in normal volunteers and looking rather like spontaneous RAIR reactions. Klaus Krogh (Arhus, Denmark) spoke about the EndoFlip system which measures anal distension and is claimed to be more discriminatory as a marker for FI than manometry. Mark Fox (Basle, Switzerland) spoke about Barostat measurements of rectal capacity and compliance.

Mike Swash (London) talked about the musculo-elastic theory of anorectal dysfunction, emphasising the damage done to ligaments from childbirth and the weakened collagen resulting from pregnancy.
Treatment was reviewed by several speakers, and the emphasis was on progression or escalation of treatment (see slide above)

The roles of pharmacological treatment, behavioural therapies, anal irrigation, bulking agents, anal sphincter repair, sacral nerve neuromodulation (SNS) and percutaneous tibial nerve stimulation (PTNS) in the treatment of FI were all discussed. The evidence for treatments is not as robust as one would like. Bill Whitehead (North Carolina, USA) indicated that part of the problem is how outcomes are measured. In particular he questioned if a 50% improvement in FI episodes is sufficient to be a reliable outcome measure of treatment.

Budding Reviewers

If you attend a meeting and wish to review a presentation at that meeting in a future edition of NewWave, please contact the NewWave editor (steve.perring@poole.nhs.uk)

Help-out the rest of us who did not manage to get to the meeting

Also if you have some interesting research or an interesting case that you would like to share with the AGIP community in a future edition of NewWave, please contact me at steve.perring@poole.nhs.uk
Meeting Review
Chris Fraser’s “Gastroenterologist’s perspective – how does GI physiology help in the diagnosis and management of medical patients”

Presented at BSG Annual Meeting
Liverpool, 20-23rd June 2016

Reviewed by Andres Vales, Clinical Physiologist at
The Functional Gut Clinic

Dr. Chris Fraser is a consultant gastroenterologist at the Royal Infirmary of Edinburgh with specialist interests in functional disorders.

He started by explaining how the diagnosis of functional disorders are becoming more and more common in modern gastro clinics with many patients never reaching a resolution of symptoms. Heartburn, bloating, urgency and straining are classic symptoms that persist despite the patient trying many different medications and attempting substantial lifestyle modifications, inevitably ending up with a very poor quality of life. However good work is being done to understand the underlying physiology with advances being made in the diagnosis of reflux, gut microbiome disorders and incontinence/constipation. This, along with the involvement of other modalities such as dietetics and biofeedback in the treatment pathway, mean that tricky ‘functional’ patients can be given the chance of a cure.

Dr. Fraser highlighted key aspects of the diagnostic pathway that are often overlooked but can provide essential information. A thorough patient history and careful examination of the patient is vital with blood and stool tests as routine where consideration should be given for latent coeliac disease in adults even in only mildly elevated TTG levels. A simple PR exam can reveal a lot and a flexible sigmoidoscopy can quickly rule out IBD with these options being considered before deciding to send for a colonoscopy.

A series of case studies were then reviewed with insight into how physiology was used to get a diagnosis:

**Oesophageal dysmotility** – Achalasia may be considered as a text book diagnosis with set treatment pathways and prognosis. However an example of how oesophageal physiology can be used to augment the diagnosis was given where a Barium swallow suggested type I but high resolution manometry confirmed type II which gave the patient a better prognosis and treatment options. Another patient was reviewed with pathological supine GORD and hypomotility however an extended high resolution manometry study with bread swallows showed a good improvement in contractility. In patients like this Dr. Fraser suggested that the Stretta procedure, where radiofrequency energy is applied to the LOS and cardia, has been shown to help symptoms whilst having little effect on bolus outflow and so can be a useful option for patients where the benefit of fundoplication is uncertain.

**SIBO/Colonic mal-fermentation** - Commonly patients experienced bloating, abdominal pain and altered bowel habit for many years without investigation. One patient presented had coeliac disease and so symptoms were overlooked as they were thought to not be following a strict enough gluten free diet. In these types of patients a lactulose breath test was used to reveal SIBO with some being methane producers highlighting the importance of measuring for
this gas during breath testing. Lactulose is non-absorbable in the small bowel and so is also useful for investigating colonic fermentation where excessive breath values in the 100’s of parts per million towards the end of the study may suggest that a FODMAP diet can be useful to reduce gas production in the large bowel. Used in conjunction with lactose and fructose mal-absorption tests, this diagnosis can greatly help a dietician to create an individualised diet for the patient with many improving simply with antibiotics and a dietetics referral. Another test which can be used to look at the gut microbiome is the SmartPill wireless motility capsule. By measuring pH, pressure and temperature simultaneously, the capsule can provide a transit profile of each individual section of the gut as well as whole gut transit and has compared well against radiopaque marker studies making the test useful for those with suspected gastric emptying, as well as those with constipation. The pH measurement of the bowel can supplement the lactulose breath test as colonic bacterial fermentation produces short-chain fatty acids. In excessive fermentation this increased production can lower caecal pH and the increased irritation it causes has been linked with IBS in terms of increasing pain and decreasing contractility.

Anorectal physiology – the case studies showed that on occasions symptoms such as diarrhoea and constipation were, after a detailed consultation, found to also be occurring with straining, tenemus, rectal urgency or vaginal fullness during evacuation. Anorectal physiology including a defecating proctogram were essential in revealing issues such as hypersensate rectum, prolapses and intussusception. Treatment could then go ahead with sessions of biofeedback therapy and tailored diet modifications being effective in an array of different disorders.

Overall the ‘functional’ patient can present with vague symptoms however paying attention to them when taking a history and not being afraid of investigating the different areas of the gut using the methods covered above can lead to a positive diagnosis. With this in mind Dr. Fraser underlined the need for strong physiology services in gastroenterology.

References have been removed to save space however please feel free to contact me if you would like them: andres@thefunctionalgutclinic.com