ISSN 1473-7493

BRITISH SOCIETY OF GASTROENTEROLOGY

New Wave

The Official e-Newsletter of the Association of GI Physiologists

Welcome

Welcome to the July2021edition 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@uhd.nhs.uk

Chicago 4.0

We are continuing to think about the impact of Chicago 4.0 on oesophageal motility assessment and diagnosis of motility disorders

Contents:

July 2021

Forthcoming Events 2021

13-14 September 2021	7th Oxford Pelvic Floor Masterclass Oxford Ellen.gregory@ouh.nhs.uk CANCELLED
21-23 September 2021	MPEC 2021 Virtual Meeting Institute of Physics and Engineering in Medicine https://www.ipem.ac.uk/ConferencesEvents/MPEC.aspx
03-05 October 2021	UEG Virtual Week 2021 https://ueg.eu/week
12-15 October 2021	ICS 2021 MCEC Melbourne Australia https://www.ics.org/2021
3-5 November 2021	The Pelvic Floor Society National Conference Dundee

https://thepelvicfloorsociety.co.uk/events/29/

21-24 May 2022 Digestive Diseases Week. San Diego and Virtual
https://ddw.org/attendee-planning/ddw-2022/

The articles regarding Chicago Classification 4.0 published in this and subsequent editions are personal comments by their authors

These do not represent the agreed position of AGIP. The AGIP Council continues to endorse and support the use of the Chicago Classification in upper GI assessments and supports the modifications to the classification described in Chicago Classification 4.0

Chicago Classification Version 4.0: Experiences in Practice

Elisabeth Kirton, Clinical Scientist

Hull University Teaching Hospitals NHS Trust

Introduction

The eagerly anticipated Chicago Classification version 4.0 (CC v4.0) from the international working group was published in January 2021. In a previous issue of New-Wave (January 2021), Andres Vales succinctly summarised some of the key updates to the classification. At a time when GI Physiology practitioners and departments may be transitioning to using the new classification in their protocols, this article aims to briefly reflect on some first experiences of using CC v4.0 in clinical practice.

Upright versus supine

A key change introduced in CC v4.0 is the inclusion of normative values for both the upright and supine positions. As emphasised by CC v4.0, two testing positions can give more confidence to manometric diagnoses (for example, an abnormal IRP in both the supine and upright positions is now part of the manometric criteria for oesophago-gastric junction outflow obstruction). In practice, having specific normative values for the upright position may also improve the quality of interpretation of investigations that can only be carried out upright due to patient circumstances (for example, patients who would struggle to lie supine for the testing period, perhaps due to restricted mobility or breathing difficulties). Upright testing may also arguably be considered more reflective and representative of normal physiological swallowing.

Clinically relevant findings

The new classification emphasises the significance of obstructive oesophageal symptoms (dysphagia and/or non-cardiac chest pain) occurring during the investigation, to distinguish when manometric findings such as distal oesophageal spasm, hypercontractile oesophagus and oesophago-gastric junction outflow obstruction can be considered “clinically relevant”. As we all know, good patient communication is vital throughout any oesophageal manometry investigation; this addition to CC v4.0 reminds us of the importance of encouraging patients to share

and clearly describe obstructive oesophageal symptoms they may experience during the test, to allow us to identify if these are associated with manometric findings and consider this when reporting.

Ineffective oesophageal motility: new criteria

Anecdotally, using the more stringent criteria to identify ineffective oesophageal motility has thus far appeared to result in less investigations meeting the threshold for this diagnosis (CC v4.0 requires >70% of swallows to be “ineffective” – which also now includes fragmented contractions – or ≥50% “failed”). There is a subtle but key distinction from the criteria for ineffective motility specified by CC v3.0 (the criteria previously included ≥50% “ineffective” swallows, which could be either failed or weak). This is a potential pitfall to mindful of, particularly for experienced practitioners who are already familiar with interpreting investigations according to CC v3.0.

Adjunctive testing

CC v4.0 provides clearly defined protocols and normal parameters for various adjunctive tests, including multiple rapid swallows, a rapid drink challenge, solid test swallows and a solid test meal, and emphasises the benefits of adjunctive testing to strengthen confidence in diagnosis. Several suggestions are included for what to use during solid test swallows (~1cm3 of bread, soft boiled rice or marshmallow), which has raised interesting discussions with GI Physiology colleagues about the pros and cons of each. In practice, 1cm3 of solid may be difficult to achieve, and there is variability in what individual patients would consider a “normal” swallow. It is also worth noting that the suggested portion for the solid test meal (200g) equates to approximately 5 slices of plain white bread, which may significantly extend testing time and pose a challenge for patients with smaller appetites. However, alternatives such as a single-serving pot of rice pudding may provide a more palatable and convenient option for a soft solid test meal.

Summary

The latest evolution of the Chicago Classification provides a more comprehensive standardised protocol for high resolution oesophageal manometry, including both upright and supine positions and various adjunctive tests.

Chicago classification V. 4.0, a short practical review (part 1)

Jafar Jafari MD Medical, PhD

GI Cognition Ltd.
Hon. Senior Lecturer, King's College London

This review is set in three parts:

- Part 1: testing protocol and general considerations
- Part 2: diagnosis of oesophageal motility disorders
- Part 3: Summary of practical points

Parts two and three will be published in subsequent editions

Introduction

Without a doubt, Chicago classification (CC) has put order in the chaos of oesophageal motility testing. As per the objectives of the CC:

"A priority of the Chicago Classification was a standardized manometry protocol for motility laboratories around the world, to facilitate procedural consistency, improve diagnostic reliability and promote collaborative research …. from comprehensive, uniformly collected data…"[1].

These objectives were met to a high degree with some further clarification required moving forward which was resolved in each successive issue of the CC (see image 1). However, in the current version, there seems that the authors to deal with further optimisations, added a large volume of complexity and flexibility to the CC. The concern is whether the many mix-and-match options both in performing and diagnostic criteria, are we moving to the square one? Is the outcome of the CC v4 to be (with apologies to the authors of the above quotation):

"Not any more standardised manometry protocol for motility laboratories around the world, not to facilitate procedural consistency, improve diagnostic reliability in some areas, but making it hard to perform collaborative research"!

The aim of this review is to focus on the practical aspects of the CC from beginning to the end: the protocol and setting, diagnostic criteria of motility disorders, and summary of practical suggestions.

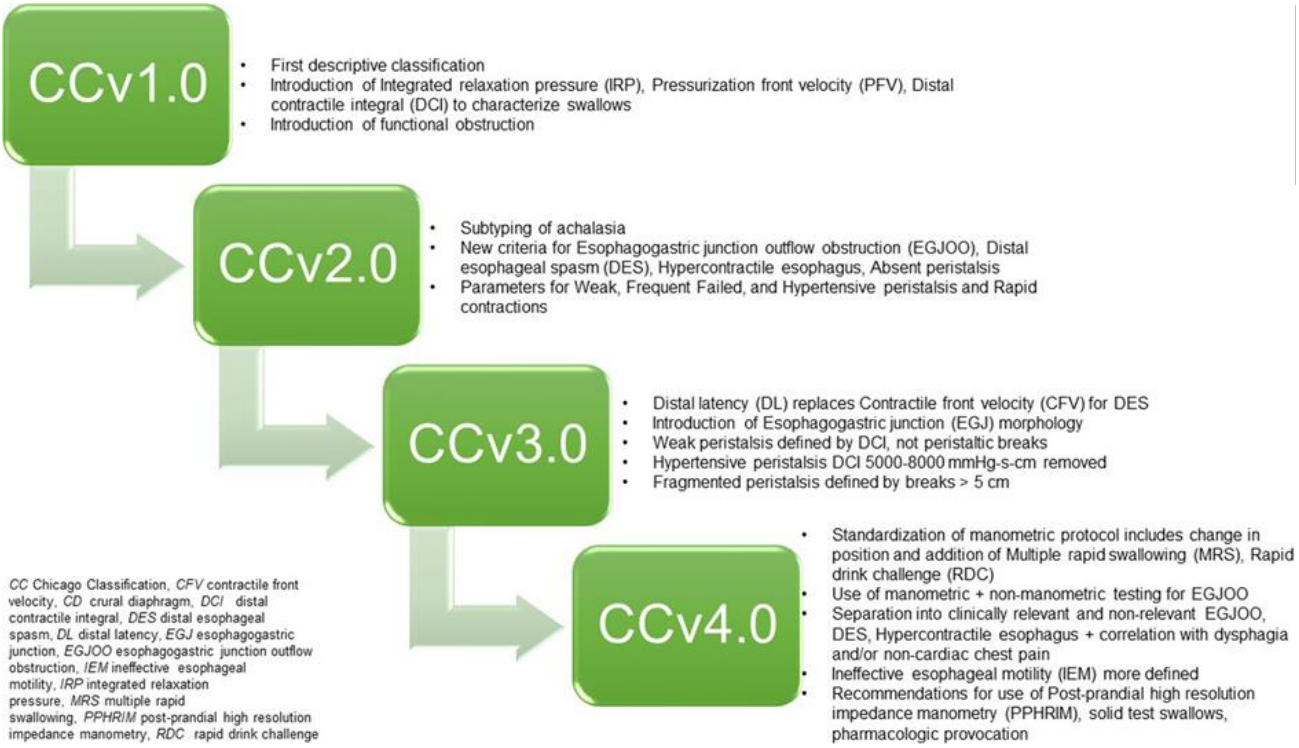


Image 1 - Chicago Classification of oesophageal motility disorders: Past, present, and future, Kelli De-Lay et al.; May 2021

Diversity, a good idea, not quite achieved yet

It was nice to see "diversity" in CC v4: "CCv4.0 represents motility perspectives from a diverse working group in terms of geography, age, gender, practice type, years in practice, and research contributions to the field…. 52 experts…". However, it was rather disappointing to note that the diversity was limited to the authors and not to the actual patient groups. Less than 20% of reference articles were from Eastern population and no healthy studies from outside the Western cohort.

The CC still does not acknowledge the paediatric age group and the world has to use any random resources (the best that can be) for this voiceless population group. Children undergoing HRM do not have a range of papers published by a varied list of authors relating to their conditions and there is no clear paediatric-focussed consensus classification for their oesophageal disorders. Nor there is any notes on oesophageal motility in geriatric and varied ethnic populations. Perhaps, gathering all the experts from across the globe can be wonderful opportunity to achieve a truly diverse "Chicago Classification".

Standardised HRM protocol?

There are many more steps in the testing protocol in CC v4 and that will significantly increase the time to do the procedure and to analyse the data. This is of course if a patient can cooperate well throughout the test. To come to a conclusion, sometimes the physiologist is left in the hands of radiology investigation for instance to make the final diagnosis of OGJ outflow obstruction (OGJOO). This can potentially protract the diagnostic process and care to the patient.

Standardisation in each individual steps of High-resolution manometry (HRM) has been improved for instance giving an objective size and time for solid meal testing. However, the variation on the choice of manoeuvres and doing supine and upright position is such that it could de-standardise the overall testing method in each lab, between the labs worldwide. This potentially could lead to incomparable data in the future literature.

Body position

It is intriguing that the major authors of the CC, in the pre-release review of the CC v4 clearly state: "…while some cases of EGJOO represent LES dysfunction and variant or evolving achalasia, a substantial proportion of EGJOO in the supine position is unrelated to LES dysfunction (eg, effect of artefact, sliding hiatal hernia, mechanical obstruction, or opioid effect)."[2] However, in the previous CCs and to a large extent in the CC v4, there is still an emphasis on using supine position.

According to the CC, LOS relaxation is the first and most important parameter in the hierarchy of oesophageal motility diagnosis. If we agree that this is so, then in my opinion why should HRM be done primarily in the supine position and then try a variety of methods to clarify the correctness of the data? Why not perform the whole assessment in the upright which is indeed more resembling physiological way of real life physiology? It also eliminates the pressure effect from heat, aorta, hiatus hernia and other elements in the mediastinum on the OGJ which is a problem in supine position to begin with? There is no real concern regarding the differences in oesophageal peristaltic measures in both upright and supine position anyway[1]. It is like causing a shadow on the wall and then trying to paint it white or use lighting techniques to brighten it up.

Adjunctive tests tailored to the study

Throughout the CC v4, it is advised that if during the study, the diagnosis is not conclusive, to consider a variety of adjunctive tests. CCv4: "…the current protocol allows for some flexibility if the diagnosis is inconclusive with 10 swallows in either the primary supine or upright position and allows for a sequenced progression of the protocol to help confirm or rule out the diagnosis[1]."

How often we can analyse the data whilst performing live study? The options are either to extubate, analyse and redo the study, or more practically (according to the CCv4), to do as many of the adjunctive and positions as possible just in case later it is realised that LOS is not relaxing enough and so should have done additional steps! This is of course most relevant to the OGJOO but also can apply to any other motility condition too.

Perhaps, a concise and practical yet overall covering version of the protocol would make the CC v4 really implementable in the daily use for the frontline users. These users who are the majority to use the CCs, are not able to change the duration of study as and when needed, cannot arrange additional radiology studies as well as educating the radiologist on what is a Barium swallow with solid boluses/tablet, +/- arrange a Functional Lumen Imaging Planimetry if available, and then follow up the outcome until reaching to a diagnosis. They also do not have time or the experience to put all the varied information gathered together especially when there are contradicting findings in different positions and steps so that to come to a conclusion. With a practical protocol, also the data will be consistent across the labs so that will be comparable for future research.

References

1. Esophageal motility disorders on high-resolution manometry: Chicago classification version 4.0©, Rena Yadlapati et al. Neurogastroenterol Motil 2021 Jan;33(1):e14058. doi: 10.1111/nmo.14058
2. What is new in Chicago Classification version 4.0?; Rena Yadlapati et al. Neurogastroenterol Motil 2021 Jan;33(1):e14053. doi: 10.1111/nmo.14053

Survey of Adoption of the Chicago Classification 4.0 in the South West

Emma Jones*, Jana Kolarikova^ and Steve Perring^

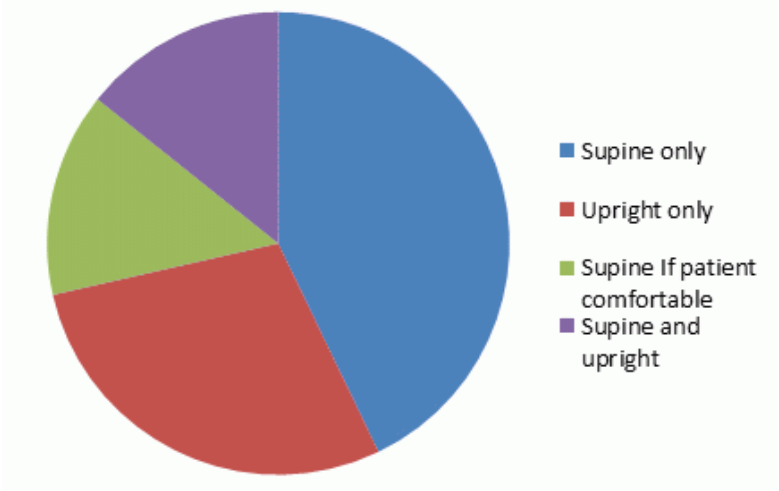
* University Hospitals Southampton
^University Hospitals Dorset

Introduction

In preparation for the most recent meeting of the South West GI Physiology Group in June we surveyed the ways in which units in the region have responded to CC4.0 and to what extent they follow the guidance detailed in this document

The survey was sent out in May 2021. 7 centres in the South West responded

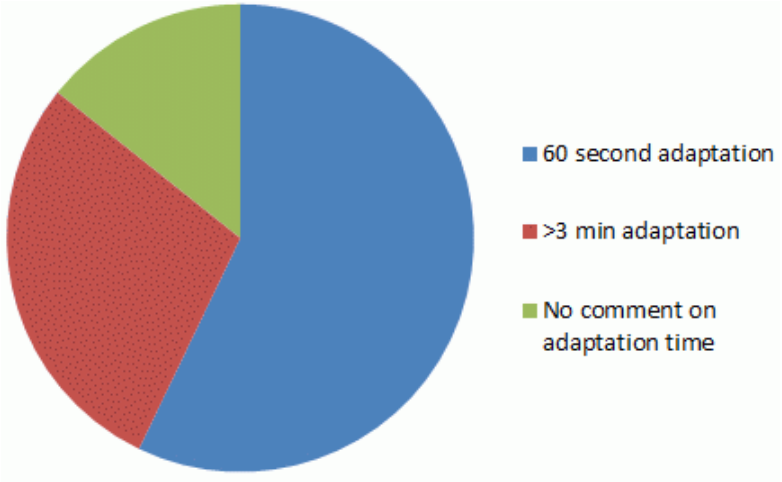
Position for investigation



Only one unit reported following CC4.0 fully in performing assessment in the supine position followed by further assessment in the upright position.

A number of units are considering moving to full compliance with CC4.0 on investigation position in the near future, particularly following discovery at this meeting that it is possible to revert to a previous zero position with the MMS water perfused system, allowing correction for the change in position

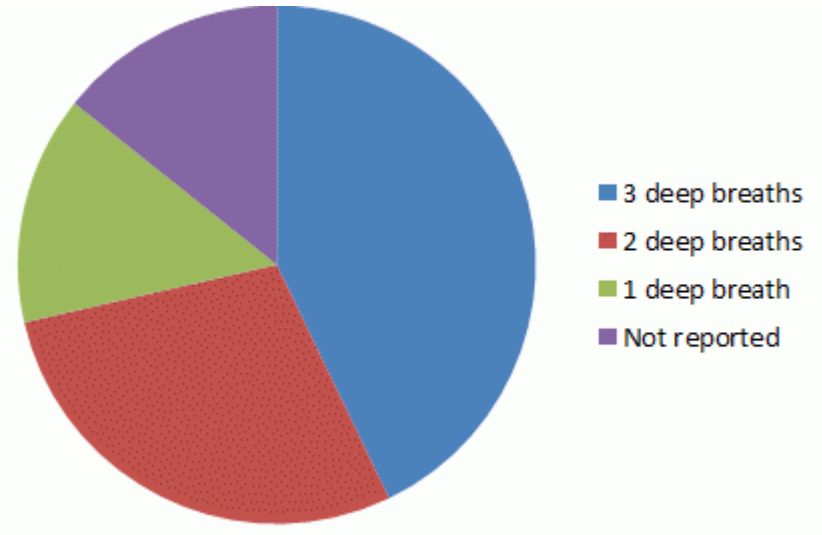
Adaptation time



There was general agreement that an extended period of adaptation is required, the only query being how long to allow.

Steve Perring referenced work due for publication in NGM by H Abdul-Razakq et al pointing to an extended period being required to guarantee the recovery of motility following the trauma of intubation prior to formal assessment of motility.

Performance of deep breath manoeuvres



There was general agreement that 3 deep breaths was an appropriate policy when establishing the location of anatomical landmarks, even if not as yet necessarily enshrined in the local active standard operating procedure for upper GI testing. While the number of deep breaths varied slightly the principle was well supported.

Adjunctive testing

There was general agreement about the value of adjunctive testing

- 6/7 centres routinely perform multiple rapid swallowing
- 6/7 centres perform rapid drink challenge, 5/7 routinely on all patients
- 7/7 centres perform solid test swallowing, at least on occasion. The solid foodstuffs used for testing include bread, marshmallow, digestive biscuit and corn thin.
- 3/7 perform solid meal assessment for patients with post-prandial symptoms including rumination

Other discussion

At the meeting there was a general approval of the advice given in CC4.0. Even those groups who were not matching their protocols to CC4.0 at present were considering it actively. We particularly appreciated the emphasis on adjunctive testing and the importance of contemporaneous symptoms for diagnosis of diseases of motility.

As a group with a high proportion of units using water-perfused systems we appreciated that CC4.0 recommendations clearly point to the preference for solid-state Manometry but without insisting on adoption of solid-state manometry. We also appreciated the acceptance by the authors of CC4.0 that investigation may need to be performed in the upright position and that normal ranges are quoted for IRP in the upright as well as supine position.

Steve Perring pointed to these comments as well as the reference to high resolution impedance Manometry in CC4.0. He suggested that these could serve a useful purpose as evidence in support of a business case for solid-state HRIM.

National School of Healthcare Science Curriculum Review
GI Physiology

Elisa Skinner

Salford Royal NHS Foundation Trust

Introduction

The process for the Scientist Training Pathway (STP) curriculum review of all disciplines within the National School of Healthcare Science (NSHCS) started over 12 months ago. With over 30 different specialties it was a big task! Each of the specialties shortlisted lead editors and I was fortunate enough to be selected for GI Physiology. My role has been to put together a team of interested individuals all of whom had either experience as an educator, training officer or an ex STP with some individuals fulfilling more than one of these criteria.

The process

Over the course of approximately 4 months we got "together" virtually to discuss what we thought GI Physiology will need in the future not just for the workplace but also the academic content. This was quite a challenge as we were encouraged to start with a blank canvas and to not think of what we have now, which is easier said than done! The NSHCS invited each specialty to think of what we needed. Previously GI Physiology was paired with Urodynamic Science and over the years we had developed quite a bond with colleagues from this discipline, which many of us had not had previously. However, with this new challenge I think the Curriculum Review team have produced something that I think addresses previous inconsistencies and aspects of our roles that hadn't been addressed before, paediatrics being the forefront of this.

Changes to the curriculum

The first change is that the new curriculum separates Urodynamic Sciences from GI physiology rather than offering a joint STP training route. This is the result of the decision by the NSHCS to stop offering joint training routes.

Previously there was a mismatch between Lower GI Physiology and Upper GI Physiology especially where academic credits were concerned, so to bring balance we have spread these two areas of GI Physiology over years 2 and 3 – namely in year 2 Lower GI 1 and Upper GI 1 and in year 3 Lower GI 2 and Upper GI 2! Rotations will still be in place for year 1, which does include urodynamics. The other 3 rotations include: Intro to GI; Clinical Assessment and Investigation and Respiratory Physiology. These rotations are now "tasters" for a minimum of 4 weeks focusing on giving trainees an introduction to the specialty, the work they do and how they contribute to the patient pathway . This allows STP trainees to expand on areas that they feel they need to and, also to spend more time in GI Physiology. This also gives us a chance to show case GI Physiology should other disciplines wish to rotate into GI Physiology. With Lower and Upper GI Physiology being over 2 years, this has allowed us to create a "Specialist Investigations" module in year 3. This includes specialist GI Physiology investigations such as antroduodenal manometry, capsule endoscopy, and Sphincter of Oddi manometry to name a few, but also to include paediatrics. This will al-

low colleagues who specialise in paediatrics to have specialist training and, also for those who are in adult hospitals the opportunity to experience the world of paediatrics.

The new curriculum offers an opportunity to review the Accredited Specialist Practitioner (ASP) programmes to ensure they continue to deliver what is needed. There will be a period of some adjustment unique to the ASP route because the new curriculum will be delivered as a 3 year package with some of the training only being delivered in year 3, whereas the ASP training is designed to be achieved in as little as a year if the trainee has appropriate previous experience

I do feel that the Curriculum Review team have done a fantastic job in creating a curriculum that covers all aspects of GI Physiology from the common to the rare and we hope that future STPs, ASPs and those accessing for CPD enjoy the curriculum. The curriculum will be ion the public domain from 21st July 2021 following a NSHCS webinar, and the curriculum itself is due to go live in September 2022. If you are interested please use the web address below to find out more.

https://nshcs.hee.nhs.uk/events/curriculum-launch-for-2022-and-what-you-need-to-know-now-webinar/

An Investigation of the Effectiveness of Correction for Sub -Optimal Breath Sampling in Hydrogen/ Methane Breath Testing using Exhaled Oxygen Concentration to Guide Normalisation

Steve Perring
University Hospitals Dorset

Introduction

Breath testing (BT) is performed widely for assessment of carbohydrate malabsorption (CM) and small intestinal bacterial overgrowth (SIBO). The value of BT has been questioned widely, not least because of a lack of consistency in assessment technique. As an attempt to achieve more consistency of technique the North American Consensus Statement on hydrogen and methane BT was published in 2017[1], concentrating on establishing standards for preparation, performance and interpretation of BT in clinical practice and research. AGIP responded to this document by publishing their own advice regarding standardisation of BT methodologies and interpreting, generally agreeing with the Consensus Statement but on certain issues recommending a different approach[2].

The Consensus Statement document settled on a threshold of >=20ppm hydrogen during the study for defining CM and the same threshold within 90 minutes of ingestion of the substrate for defining SIBO. Other thresholds and timing have been suggested for SIBO assessment, such as 10ppm within 60 minutes as recommended in the AGIP position statement and based on the work of Eisenmann et al (2008)[3]. The Consensus Statement also proposed a threshold for significant methane production of >= 10ppm. The Consensus Statement recognised the need for CO2 or O2 measurement to adjust the measured breath hydrogen to allow for dilution by non-alveolar air in the exhaled sample, but did not state the nature of any such correction or make any recommendation as to what reference (perfect) breath oxygen should be used. The value of correction for oxygen concentration in breath sampling in improving reproducibility has been demonstrated in neonatal breath sampling[4]. The suggested normalisation formula was as displayed below:

$$\textbf{Normalised H2} = \textbf{ObservedH2} \times \frac{\textbf{(Atmospheric O2 – Reference O2)}}{\textbf{(Atmospheric O2-ObservedO2)}} \quad \textit{(Equation 1)}$$

This algorithm has been enacted at least in part by some manufacturers e.g. Bedfont/ Laborie in the UK.

There are some important issues with the use of such a correction factor:

- Is this relatively simple correction factor effective in order to make a valid correction for sub-optimal breath sampling?
- Is the same correction factor valid over the whole range of breath sampling quality which is achieved in practice?
- If using a hydrogen-only breath sampling system with no access to oxygen sampling there is no means to assess the quality of the breath sample. What effect will that have to the likelihood of interpretation of the result to be a positive study?
- Were the threshold recommended by the consensus statement and AGIP defined using breath sampling without correction for breath quality?

Methods

4 members of staff agreed to volunteer for this investigation. Breath sampling was performed using the Bedfont GastroGenius hydrogen/ methane testing system (Bedfont Scientific Ltd, Maidstone, UK), using the option to collect breath samples using breath bags. There was no preparation required for breath sampling. In fact the breath sampling was encouraged to be performed some 2-3 hours after a meal in order to have a raised hydrogen breath level. All 4 volunteers were known to be hydrogen generators. 3 breath samples were taken as closely together as possible, each performed within a minute of the previous sample. Breath samples were taken in breath sampling bags. The following breath manoeuvres were performed.

1. Attempted ideal breath sample (deep breath, breath hold for at least 15 seconds, steady blowing-out with sampling of last of the breath)
2. Intentionally poor breath sample (poor breath intake, little or no breath hold, sampling breath well before running out of breath)
3. Medium breath sample (reasonably deep breath, breath hold for ~5 seconds, sampling before running out of breath)

These were performed in random order in case the breath manoeuvres adversely affected the breath quality of subsequent breath samples. The Gastrogenius had been calibrated and the calibration checked by a simulated breath sample using the calibrated gas supply before this assessment was performed.

The displayed hydrogen concentration, oxygen concentration and correction factor were recorded for each breath sample. As the true (raw) measured hydrogen concentration is not displayed with the GastroGenius system, the true measured hydrogen concentration was calculated for each hydrogen measurement according to the formula:

True measured H2 conc = Displayed H2conc / Correction-Factor *(Equation 2)*

Measures were rejected if the measured hydrogen concentration was below 10ppm because with such low levels of hydrogen in the breath comparison of concentrations was likely to be unreliable. Breath samples were compared as shown below:

Sample 2 vs Sample 1
Sample 3 vs Sample 1
Sample 3 vs Sample 2

For each pair of samples the hydrogen concentration of the sample with the higher breath oxygen level was normalised to the reference oxygen concentration of the lower breath oxygen sample. The normalised breath hydrogen concentration of the worse breath sample was then compared with the actual breath hydrogen concentration of the better breath sample.

Results

63 valid pairs of breath samples were obtained. Best breath oxygen concentrations ranged from 11.4% to 16.0% oxygen.

Figure 1 represents the breath hydrogen levels measured for the worse breath sample and normalised to the oxygen concentration of the best sample compared with the breath hydrogen levels obtained from the best sample directly. The correlation between the normalised breath hydrogen measure and the correct measure was very good throughout ($R=0.909$, $P<0.001$), suggesting that the normalisation formula used (equation 1) is valid.

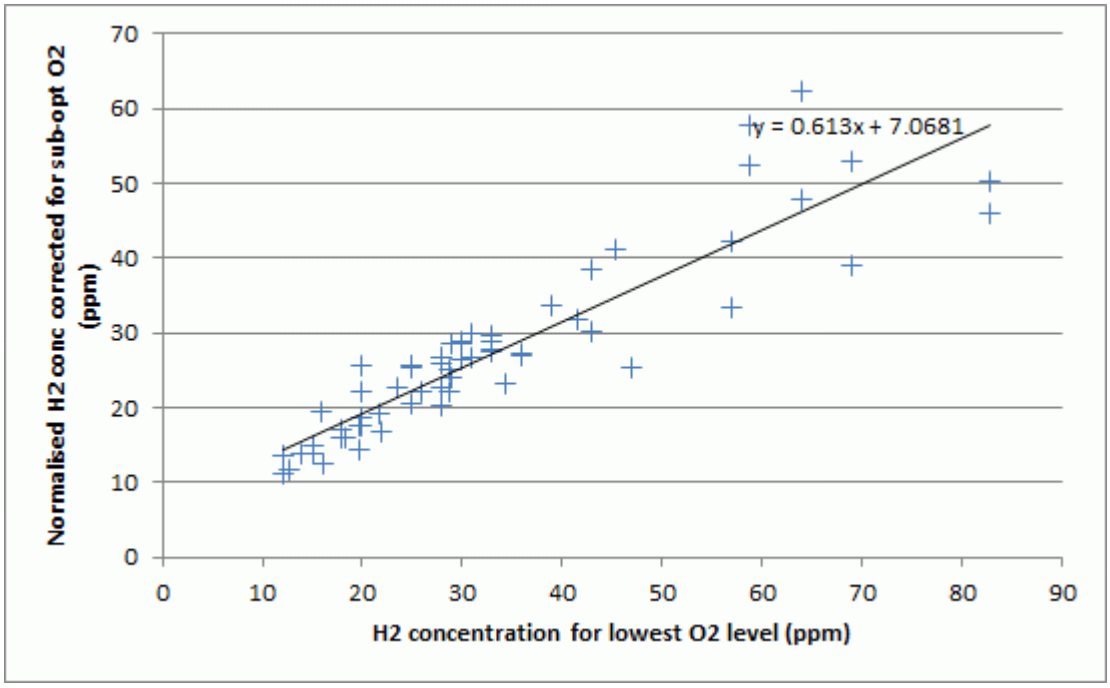


Figure 1. Comparison of the breath hydrogen concentration in the worse breath sample normalised to the oxygen concentration in the better breath sample to the actual breath hydrogen concentration measured in the better sample

Figure 2 is a representation of the same data separating those samples where the best breath sample had an oxygen concentration of <13%, 13-14% and >14%. There was no indication of difference in relationship dependent on the oxygen concentration the data was being normalised to. In other words there is no optimum plateau point at which the hydrogen (and presumably therefore methane) measurement is no longer dependent on the oxygen concentration in the breath sample.

The line of identity is also displayed on the graph. It is clear from the graph that even with the normalisation formula being used the corrected hydrogen breath concentration is still generally an underestimate of the "true" breath hydrogen concentration in the lower oxygen concentration sample.

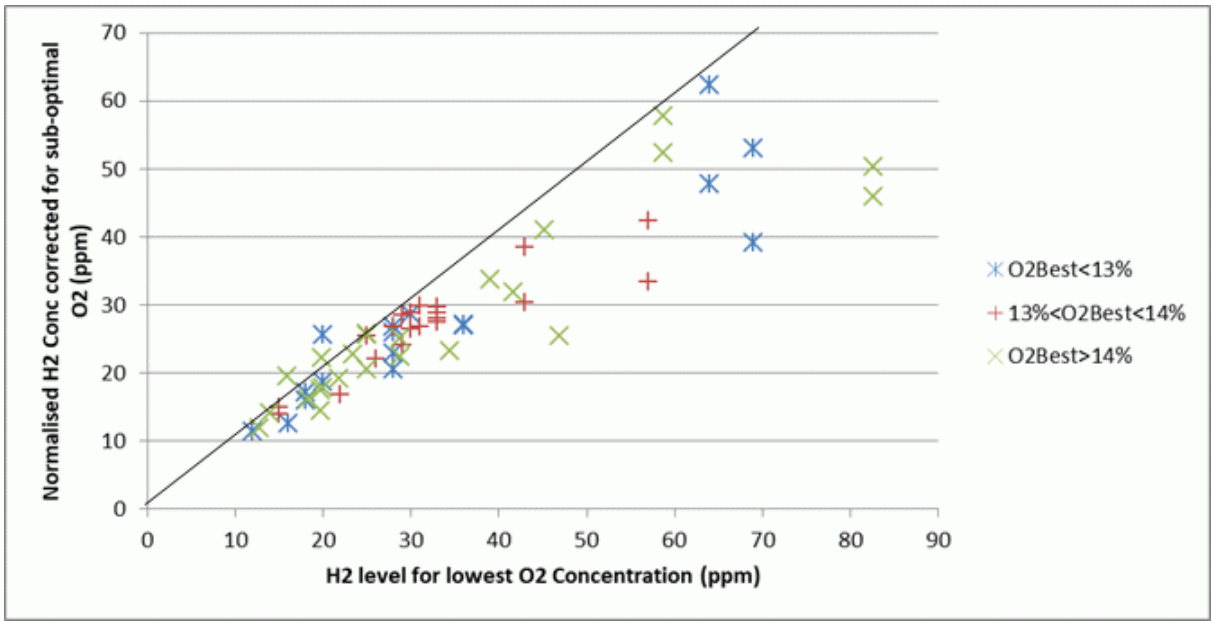


Figure 2. The same comparison with the samples separated into those where the better breath sample had an oxygen concentration in the good range (<13%), reasonable range (between 13 and 14%) and the somewhat poor range (> 14%). The line of identity has been included to show that the normalised hydrogen breath concentration was still generally an underestimate of the true concentration.

Discussion

The close correlation of the normalised hydrogen concentration for the worse breath sample when compared with the hydrogen concentration in the better sample is an indication that the correction formula (equation 1) is valid when correcting for sub optimal and variable breath quality in hydrogen/ methane breath testing. This appears to be true for any oxygen concentration, even for very low oxygen levels indicating very good breath sampling.

Bedfont use this correction algorithm for their GastroGenius system for correction of hydrogen and methane breath sample concentrations in sub-optimal breath samples, which they define as >13.9% oxygen concentration. The problem is that measured breath hydrogen concentration appears to continue to rise with better quality of breath sample (i.e. lower oxygen concentration) well past this 13.9% oxygen cut-off and probably at least as far as the lowest practical oxygen concentration achievable (approximately 11% oxygen). Thus assuming any breath sample better than 14% oxygen is optimal and therefore does not need normalisation has the potential to misrepresent hydrogen and methane concentration and therefore potentially misdiagnose SIBO or carbohydrate malabsorption.

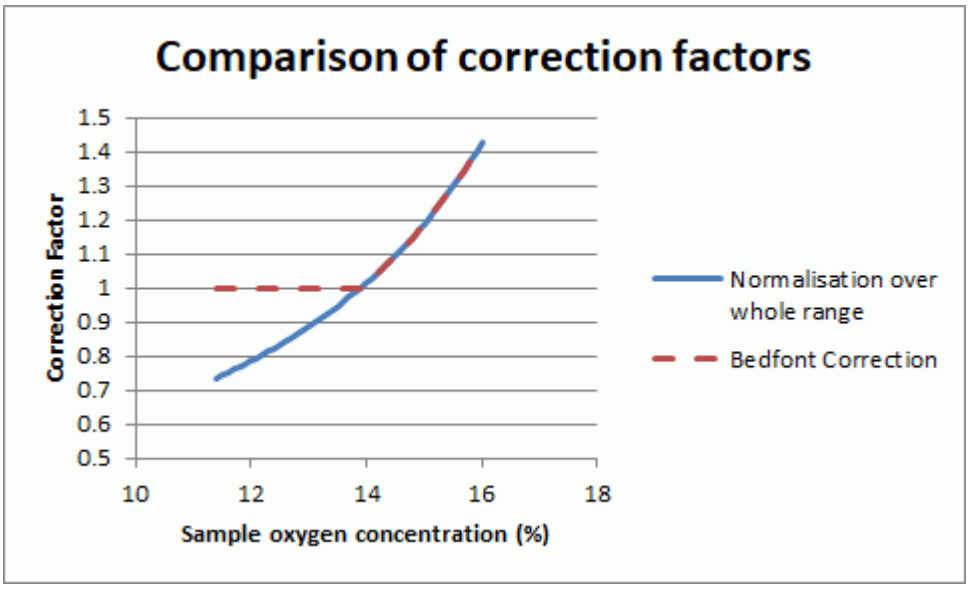


Figure 3. Representation of how the correction factor from Equation 1 varies with breath quality as measured by oxygen concentration. The blue graph represents the correction factor applied over the whole range of typically measured breath oxygen concentrations, using 13.9% oxygen as the reference oxygen concentration. The dotted graph represents the correction factor as implemented in the Bedfont GastroGenius system.

It is important to obtain international consensus on what the reference oxygen concentration is to be for breath testing. 13.9% oxygen could be such a reference oxygen concentration as it is a level that should be easily achieved by the majority of patients. Indeed in this study in spite of 2/3rds of the breath samples taken being deliberately sub-optimal, 59% of breath samples achieved breath oxygen concentrations at or below 13.9%. Perhaps a more appropriate reference oxygen concentration should be close to the practical limit of oxygen concentration at (say) 11%.

Our recent experience with home breath testing using breath sample bags is that average oxygen concentrations in breath samples have deteriorated somewhat with lack of supervision and have become more inconsistent between breath samples in the same investigation. This would imply that reliable normalisation of breath hydrogen and methane concentrations based on oxygen concentration over the whole range of oxygen levels encountered is even more important if this form of investigation is to be the norm.

Take-Home Messages

- There is a pressing need for standardisation of the normalisation of breath hydrogen and methane concentrations based on the quality of the breath sample as measured by oxygen or carbon dioxide concentration in the breath samples
- The normalisation formula as described in this report (and used in part by Bedfont) is effective and consistent over a wide range of breath oxygen concentrations, even if the correction it achieves is not perfect.
- There is not yet agreement as to what reference oxygen concentration to correct breath samples to. 13.9% oxygen is the de -facto standard as a result of its use by Bedfont but 11% oxygen as the practical lower limit of oxygen concentration could also be chosen as a standard reference point
- It is wrong to assume that below a reasonable breath oxygen concentration (say <14% oxygen) no adjustment of the measurement for variation in breath quality is required. A normalisation correction is needed over the whole range of breath oxygen measures obtainable if breath testing measures are to be consistent.
- Because of their inability to measure breath quality by either oxygen or carbon dioxide concentration, the breath gas concentrations measured by cheaper hydrogen-only sensing systems cannot be normalised for breath quality and are therefore unsatisfactory and should not be used

References

1. Rezaie et al. Hydrogen and Methane-Based Breath Testing in Gastrointestinal Disorders: The North American Consensus. Am J Gastroenterol 2017; 112:775–784
2. https://www.bsg.org.uk/wp-content/uploads/2019/12/AGIP-Best-Practice-Statement-for-HMBT_24.01.19.pdf
3. Eisenmann A, Amann A, Said M, Datta B, Ledochowski M. Implementation and interpretation of hydrogen breath tests. Journal of Breath Research. 2008;2(4):1752-7155
4. Broadbent R, Robb TA, Davidson GP. Reproducibility of expired breath hydrogen levels in the neonate: a comparison of two methods for sample collection. Clin Chim Acta. 1983 Feb 7;127(3):337-42

PRESS RELEASE

We are thrilled to announce that all business relating to The Registration Council for Clinical Physiologists (RCCP) has been transferred into the Academy for Healthcare Science (AHCS) with immediate effect.

This commences an exciting new chapter within clinical physiology where there is now one organisation running the two respective registers to develop greater clarity, understanding and improved patient safety.

Nothing will change in the immediate future; all existing staff are being retained and the RCCP annual renewal process for 2021/22 will continue as normal. Any registrant, public or Fitness to Practice queries should continue to be addressed to the respective organisation.

We would like to thank Paul Burgess, Chair of RCCP, who has stepped down from this role after 2 years of service to the organisation.

There will be announcements made over the coming months as new developments are launched within AHCS at what is an exciting time for our organisations.

We have also prepared a list of FAQ's covering the changes which are being made. This will be published on our website in the next few weeks.

Any press enquiries can be addressed to: rccp@rccp.co.uk

NOTES: The AHCS is the overarching body for the whole of the Healthcare Science Profession, working to ensure that Healthcare Science is recognised and respected as one of the key Clinical Professions in the Health and Care system. Working alongside a diverse range of professional bodies and other stakeholders to bring together a wide range of scientific disciplines across the UK, the AHCS takes a proactive role in the identification of issues of concern to patients and the profession and supports the highest standards of patient care. It holds an Accredited Register, an equivalence process and supports the Certificate of Attainment and Certificate of Equivalence for the scientist training programme, AHCS has a long and key role in relation to voluntary and statutory regulation and registration.

The RCCP campaigns for patient safety and holds an Accredited Register for the disciplines of Audiologists (including Educational Audiologists and Hearing Therapists), Cardiac Physiologists, Gastrointestinal Physiologists, Neurophysiologists, Respiratory Physiologists and Sleep Physiologists.

01/06/2021