Acta Scientific Gastrointestinal Disorders (ISSN: 2582-1091)

Volume 4 Issue 1 January 2021

Opinion

The Future of Gastric Motility Assessment Modalities

Riddhima Banerji*

Msc in Gastroenterology, Barts and The London School of Medicine, Queen Mary University of London

***Corresponding Author:** Riddhima Banerji, Msc in Gastroenterology, Barts and The London School of Medicine, Queen Mary University of London.

Received: December 01, 2020

Published: December 10, 2020

Defining the challenge

The past decade has witnessed major advances in the understanding of gastric and intestinal motility disorders. In view of the fact that the manifestation of physical symptoms are often not in accordance with the severity of disturbances in gastrointestinal function, it is necessary to develop diagnostic testing modalities which will assist in directing treatment. It is equally necessary for all gastrointestinal function tests to follow protocols that are appropriately standardised and approved. Strikingly, the existence of gastrointestinal dysfunction detected on clinical investigation can significantly influence disease management strategies, in addition to prognosticating response to medical treatment in some diseases (Hoad., *et al*. 2018; Schwizer., *et al*. 2002; Holloway, 2006).

It is crucial to detect and exclude upper gastrointestinal dysfunction as well as evacuation disorders in patients with treatment tolerant constipation under consideration for colectomy. This is because dysfunction in upper GI motility can negatively impact treatment outcome diseases (Hoad., *et al*. 2018; Schwizer., *et al*. 2002; Holloway, 2006).

At present, Scintigraphy is the reference standard for quantifying gastric emptying. 13C-gastric emptying breath tests are another option which is now available (Consensus Statement, 2018).

The perfect modality would be readily available, non-invasive, uncomplicated, accurate in its measurement and would not involve exposure to ionising radiation. It would offer a precise evaluation of the degree of gastric accommodation, gastric emptying, gastroduodenal and pyloric motility, without affecting any of these parameters. Crucially, the ideal technique would define the relationship between gastric emptying, motility and trans-pyloric flow as well as offering a real time quantification of essential gastrointestinal functions. It would differentiate between food, secretions and the presence of air and would concomitantly assess gastrointestinal tone, tension and motility.

In addition, it would quantify the subtle alterations in gastric accommodation that occur in response to solid and liquid meals (Schwizer., *et al*. 2002).

Previous studies have proposed that GI MRI is uniquely positioned to offer valuable insights into GI motility and pathophysiology (Marciani, 2011). However, the deficiency of analysed data and the absence of standardised protocols have proven to be a serious impediment to the routine use of GI MRI in clinical practice. This study will analyse the limitations of current modalities used to measure GI motility in detail and elucidate the advantages of GI MRI over these techniques. It will also describe the pitfalls of present day GI MRI and attempt to provide suggestions as to how these may be overcome.

Measure of GI function	Current gold standard	MRI advantages over current standard	Shortcomings of MRI
Gastric motility	Manometry Advantages Only modality which provides information on the strength of contractions Disadvantages The facileness of intra-luminal transit of gastric contents is estimated through observation of the changes in recordings in pressure transducers. However, this is not a direct observation and the readings, therefore, are largely a presumption (Holloway, 2006).	No exposure to ionising radiation Non-invasive Able to identify non- occlusive pathological processes Able to: gauge abnormalities in gastric anatomy, quantify gastric motility and measure gastric emptying concurrently in a single session. Able to distinguish between food contents (solid and liquid states), various gastric secretions and air. Can characterize the intra-gastric distribution of ingested food and secretions. This technique, therefore, has the potential to provide guidance for clinicians as well as facilitating treatment decisions for patients with gastric motility disorders Able to measure post prandial gastric accommodation	Provides only structural information about wall movements. Unable to gauge alterations in gastric wall pressure. Post-processing of image data is time consuming and technically demanding.
Gastric emptying	Scintigraphy: Provides two dimensional images. SPECT: Provides three dimensional images Advantages Can assess provide a thorough evaluation of gastric accommodation by measuring The whole gastric volume. Can potentially, also quantify gastric Emptying through radioactive imaging of the gastric mucosa. Disadvantages Imaging needs to be performed in a short time frame following isotope injection. Unable to typify gastric content. Considerable time and technology required for data analysis and image processing (Schwizer., *et al.* 2002). Comments: Intense exposure to ionising radiation may prohibit repeated use.	No exposure to ionising radiation Gastric secretions, gaseous and food content can all be individually identified Multiple MRI GI parameters can be quantified at a time (for instance, motility and water content)	Image development may be an extensive process. Comments: Nottingham Test Meal is standardised. However, this is not used clinically.

Gastric accommodation	A. Gastric Barostat Is the insertion of a balloon in the gastric fundus. Advantages: Only technique which concomitantly quantifies intra- gastric volume and pressure. Single best modality for assessing gastric accommodation. Disadvantages Invasive Using this technique with solid meals is a challenge May affect intra-gastric distribution of food contents. Relaxation of gastric wall may be amplified. Ultrasound Imaging of gastric antral accommodation Quantifies gastric emptying and transpyloric flow. Advantages Non-invasive Widely available, except for POM devices. Disadvantages Measurement of gastric accommodation is indirect. Costal margin and air in the abdomen restricts visibility of the fundus. Even three dimensional ultrasound is unable to distinguish between the nature of stomach contents (solid/liquid, food/secretions)	Can be used for solid meals without difficulty. Dispersal of intra- gastric contents and gastric wall relaxation unaffected. However, the person is either prone or supine and not in a physiological position.	Generation and reorganisation of images of gastric volume plots requires considerable expertise. User dependent.

Table 1: Table describing the different modalities for assessing gastric motility with strengths and limitations.

Acknowledgement

I would like to thank Dr Alex Menys for his comments and suggestions.