Disclosures:

According to ACCME guidance, because there are no current preventive or specific treatments for coronavirus infection, there are no relevant conflicts of interest for any speakers or moderators.
American Neurogastroenterology and Motility Society (ANMS) Task Force Recommendations for Resumption of Motility Laboratory Operations During the COVID-19 Pandemic

Jason R. Baker, PhD
Atrium Health
University of North Carolina Charlotte

Objectives

- Personal Protective Equipment (PPE) and Motility/GI Physiology Laboratory related to COVID-19 Pandemic
- Motility/GI Physiology Laboratory workflow to protect Allied Health Professionals and Patients from spreading COVID-19
- Suggested additional Motility/GI Physiology Laboratory suite air-filtration techniques related to COVID-19
**Personal Protective Equipment and Safety:**

**Allied Health Professional and Patients**

- Primary reason for Allied Health Professionals/Motility Providers to utilize appropriate PPE for GI Physiology/Motility Testing
  - GI Physiology/Motility Testing is a Partnership Relationship
    - Allied Health Professionals and Patient

### Personal Protective Equipment Recommendations for Motility/GI Physiology Laboratory Testing: Relative to COVID-19

<table>
<thead>
<tr>
<th>Motility Laboratory Procedure</th>
<th>PPE Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esophageal Physiologic Procedures</td>
<td>N95 mask, double gloves, face shield (and/or alternate protective eye wear), and gown</td>
</tr>
<tr>
<td>Antroduodenal Manometry</td>
<td>N95 mask, double gloves, face shield, (and/or alternate protective eye wear), and gown</td>
</tr>
<tr>
<td>Colon Manometry</td>
<td>N95 mask, double gloves, face shield (and/or alternate protective eye wear), and gown</td>
</tr>
<tr>
<td>Wireless Motility Capsule</td>
<td>N95 mask, or surgical mask with a face shield, gloves, face shield (and/or alternate protective eye wear), and gown</td>
</tr>
<tr>
<td>Gastric Emptying Breath Test</td>
<td>N95 mask, gloves, face shield (and/or alternate protective eye wear), and gown</td>
</tr>
<tr>
<td>Anorectal Function Testing</td>
<td>N95 mask or surgical mask with face shield (and/or alternate protective eye wear), double gloves, and gown</td>
</tr>
<tr>
<td>Hydrogen Breath Testing</td>
<td>N95 mask, gloves, face shield (and/or alternate protective eye wear), and gown</td>
</tr>
</tbody>
</table>
Motility/GI Physiology Laboratory Workflow to Limit the Spread of COVID-19

- Motility/GI Physiology Laboratory Test Scheduled
- 48 Hours Prior to Date an Motility/GI Physiology Laboratory Test a COVID-19 Test is Required
- Verify COVID-19 Test Results Document COVID-19 Results
- Perform Motility/GI Physiology Laboratory Test Using Recommended PPE
- Thoroughly Clean Motility/GI Physiology Laboratory Suite Between Each Patient
- Reprocess Catheters Using Manufacturer Recommended Instruction for Use (IFU)

Joint ACG/ANMS Webinar
Restarting Your Motility Practice

Additional Air Filtration Devices for Motility/GI Physiology Laboratory Suites: COVID-19

- High-Efficiency Particulate Air (HEPA) Filters:
  - Device used to prevent airborne infections
    - Filters up to 99.7% of airborne particles of 0.3 μm in diameter
  - Time and Speed
    - Adjusted by the number of exchanges and square foot of the Motility/GI Physiology Laboratory suite
- If HEPA is unavailable:
  - Follow institutional control measures
Summary

• Personal Protection Equipment (PPE) measures will provide safety for both the Motility/GI Physiology Allied Health Professional and Patient in relation to COVID-19

• Implementing a COVID-19 Motility/GI Physiology Laboratory strategic workflow enhances safety and effective communication

• Utilizing additional air-filtration system may be an adjunct to standard institutional quality control measures related to COVID-19 cleaning standards

Esophagus

C. Prakash Gyawali, MD
Washington University in St. Louis
Facts Uncovered by Pandemic

Most esophageal physiologic testing is elective
- esophageal manometry has alternatives: barium esophagography, endoscopy, FLIP
- medical reflux management can proceed without ambulatory reflux monitoring
- emergent anti-reflux surgery can be performed without physiologic testing
- neuromodulators and complementary approaches used when reflux symptoms persist

Emergent reflux monitoring is hardly ever needed
- wireless pH monitoring can be performed during endoscopy

Esophageal manometry confirms achalasia diagnosis prior to LES disruption
- symptoms can be temporized by adjusting diet and eating habits
- botulinum toxin injection during diagnostic endoscopy can provide short term relief
- a timed upright barium study can demonstrate esophageal outflow obstruction in achalasia
- FLIP during endoscopy can diagnose achalasia; hydraulic FLIP dilation can treat achalasia

Lee YY et al. CGH 2020

Clinical Indications for HRM

Accepted indications
- Transit symptoms not explained by endoscopy and/or barium studies
- Suspicion of major motor disorders (especially achalasia)
- Assessment of esophageal peristaltic performance
- Assessment of unexplained esophageal symptoms
- Diagnosis of rumination syndrome and supragastric belching
- Evaluation of post fundoplication dysphagia
- Diagnosis of functional esophageal disorders (by exclusion of major motor disorders)
- Localization of the LES for appropriate placement of pH and pH-impedance catheters

Emerging indications
- Assessment of morphology and integrity of the esophagogastric junction
- Measurement of hiatus hernia size
- Assessment of esophageal peristaltic performance prior to bariatric procedures

Indications for Reflux Monitoring

Any form of reflux monitoring off PPI
- high pre-test probability of reflux, confirmation prior to invasive or long-term GERD therapy
- any situation with unproven GERD and typical reflux symptoms

pH-impedance monitoring off PPI (with limited exceptions)
- persisting reflux symptoms despite PPI in proven GERD (testing performed on PPI)
- suspicion of reflux-related micro-aspiration, especially pre-lung transplant
- repetitive belching syndromes
- suspicion of rumination syndrome
- persistent symptoms following invasive antireflux procedures

Wireless pH monitoring off PPI
- intolerance of the transnasal catheter
- infrequent symptoms, where reflux-symptom association is needed
- high clinical suspicion of GERD but negative 24-hour reflux monitoring
- very low clinical suspicion of GERD, to rule out GERD

Sifrim D, Gyawali CP. Am J Gastroenterol 2020

Urgent Esophageal Procedures (<2 weeks)

<table>
<thead>
<tr>
<th>Clinical Qualifiers</th>
<th>Alternative approach if procedure is not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM in suspected achalasia with severe symptoms</td>
<td>EGD with endotracheal intubation and FLIP for diagnosis. Barium esophagography for diagnosis. EGD with endotracheal intubation and Dobhoff tube or gastrostomy tube placement if treatment is delayed.</td>
</tr>
<tr>
<td>HRM prior to achalasia management</td>
<td>EGD with endotracheal intubation and FLIP followed by pneumatic dilation. EGD with endotracheal intubation, FLIP and botulinum toxin injection. Barium esophagography for diagnosis (if no prior confirmation of diagnosis) and myotomy referral.</td>
</tr>
<tr>
<td>HRM prior to hernia surgery</td>
<td>Barium esophagography for diagnosis. *Evidence of ischemia: proceed to emergent surgery.</td>
</tr>
</tbody>
</table>

Lee YY et al. CGH 2020; ANMS Task Force document 2020, motilitysociety.org
### Semi-Urgent Esophageal Procedures (2-4 weeks)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Clinical Qualifiers</th>
<th>Alternative approach if procedure is not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM</td>
<td>Dysphagia with weight loss (Transition to an urgent HRM procedure if nutrition is compromised over 2-4 weeks) Frequent/daily symptoms Impacting quality of life Negative endoscopy/barium</td>
<td>Empiric management with PPI, soft/liquid diet</td>
</tr>
<tr>
<td>HRM and reflux testing</td>
<td>Pulmonary status Time sensitive procedures for Lung Transplant evaluation.</td>
<td>Determined by collaboration between pulmonary, surgery and gastroenterology</td>
</tr>
</tbody>
</table>

Lee YY et al. CGH 2020; ANMS Task Force document 2020, motilitysociety.org

### Elective Esophageal Procedures (>4 weeks)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Clinical Qualifiers</th>
<th>Alternative approach if procedure is not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM and reflux testing</td>
<td>Dysphagia/Chest Pain without weight loss Frequent/daily symptoms Impacting quality of life Negative endoscopy/barium</td>
<td>Empiric management with PPI, soft/liquid diet, esophageal muscle relaxants (nitrates or calcium channel blockers), Neuromodulators</td>
</tr>
<tr>
<td>HRM/reflux monitoring for reflux symptoms prior to antireflux surgery or with incomplete PPI response</td>
<td>Elective, can be postponed</td>
<td>Medical reflux management, neuromodulators, lifestyle measures</td>
</tr>
<tr>
<td>HRM in behavioural symptoms/suspected supragastric belching/rumination</td>
<td>Elective, can be postponed</td>
<td>Remote cognitive and behavioral therapy, diaphragmatic breathing</td>
</tr>
</tbody>
</table>

Lee YY et al. CGH 2020; ANMS Task Force document 2020, motilitysociety.org
Joint ACG/ANMS Webinar
Restarting Your Motility Practice

Precautions for Esophageal Procedures

<table>
<thead>
<tr>
<th>Measures and Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-procedure</strong></td>
</tr>
<tr>
<td>COVID testing based on institutional policy</td>
</tr>
<tr>
<td>Symptom screening</td>
</tr>
<tr>
<td>Temperature check</td>
</tr>
<tr>
<td>Physically distanced waiting area</td>
</tr>
<tr>
<td><strong>Intra-procedure</strong></td>
</tr>
<tr>
<td>Patient: surgical or cloth mask before and after procedure</td>
</tr>
<tr>
<td>Operator: N95 mask, double gloves, face shield (and/or alternate protective eye wear), and gown</td>
</tr>
<tr>
<td><strong>Post-procedure</strong></td>
</tr>
<tr>
<td>Telephone communication to monitor for development of new symptoms</td>
</tr>
</tbody>
</table>

Lee YY et al. CGH 2020; ANMS Task Force document 2020, motilitysociety.org

Final Thoughts

<table>
<thead>
<tr>
<th>Measures and Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Understand why procedures are being performed</strong></td>
</tr>
<tr>
<td>*how will management change</td>
</tr>
<tr>
<td>*what is the approach to a 'positive' result</td>
</tr>
<tr>
<td>*what is the approach to a 'negative' result</td>
</tr>
<tr>
<td>*can these approaches be undertaken without testing</td>
</tr>
<tr>
<td><strong>Consolidate procedures</strong></td>
</tr>
<tr>
<td>*Can HRM/reflux testing be combined with other tests the patient may need</td>
</tr>
<tr>
<td>*Can HRM or wireless pH probe placement or FLIP be performed together with EGD if these are deemed necessary</td>
</tr>
<tr>
<td>*Can procedures be consolidated with office visits or radiologic procedures</td>
</tr>
<tr>
<td><strong>COVID-19 remains possible with a negative test</strong></td>
</tr>
<tr>
<td>*Monitor symptoms and temperature</td>
</tr>
<tr>
<td>*Appropriate precautions for staff and other lab personnel</td>
</tr>
<tr>
<td>*Standard disinfection and cleaning protocols of equipment and laboratory areas</td>
</tr>
</tbody>
</table>

Lee YY et al. CGH 2020; ANMS Task Force document 2020, motilitysociety.org
Motility testing for stomach, small bowel and colonic dysmotility during COVID-19

Baha Moshiree, MD, FACG
Atrium Health, UNC Charlotte

Gastric Motility Testing

Modalities for Gastroparesis rule out:
- Gastric emptying scintigraphy (GES) → Radiology team
- Wireless motility capsule (WMC)
- Gastric emptying breath test (GEBT)
- Antroduodenal manometry (ADM)
Wireless Motility Capsule

- Low risk procedure but has alternatives: GES, Whole gut scintigraphy
- Provides for evaluation of whole gut transit.
- Only FDA-approved for adults: Gastroparesis and slow transit constipation
- Swallowing of capsule may generate coughs or choking when swallowing (aerosolized)
  - Social distancing from patient during capsule and meal ingestion advised
  - PPE indicated
- Contraindication in patients with dysphagia or obstruction

Gastric Emptying Breath Test

- FDA-approved (2015) Breath Test for diagnosis of delayed gastric emptying in adult patients ≥ 18 years
- Utilized mostly in clinical trials
- Measures gastric emptying by evaluating CO2 excretion of a meal after ingestion of 13C-labeled *S. plantensis* enriched meal.
- High risk procedure as it is aerosol generating
- PPE required with N95 if done in office-based setting
**Gastric electrical stimulation**

- Surgically implantable device for management of refractory gastroparesis
- Done through FDAs Humanitarian Device Exemption Program
- Interrogation of device in clinic setting.
- COVID-19 precautions: Follow local guidelines for PPE (Mask, face shield, gloves and gown if adjusting settings)
  - This is a non-aerosolizing procedure in most settings

---

**Antroduodenal Manometry**

- Done in comprehensive motility centers
  - (pediatrics and adult)
- Evaluates for chronic intestinal pseudo-obstruction
- and other small bowel motility disorders.
- Usually elective
- Can be semi-urgent:
  - 1. Decision for enteral feeding versus parenteral nutrition
  - 2. Multi-visceral transplantation
Antroduodenal Manometry

- COVID-19 era recommendations:
  - Placed by fluoroscopy or upper endoscopy
  - Follow same PPE recommendations as with N95/KN95 as for all aerosol-generating procedures
  - Minimize broad aerosolization by getting patient private room for the motility recordings (if in observation unit)
  - Patient should wear surgical mask

Colonic manometry

- Neurogenic bowel evaluation in severe constipation
  - Usually done as part of Pre-op workup for surgical constipation management ----semi-urgent
  - Alternatives: Scintigraphy and radiopaque markers
  - Other choices in pediatrics- Malone antegrade continence enema (MACE)
  - Performed via colonoscopy (fecal soiling a risk with COVID-19)
    - Following same PPE guidelines as for colonoscopy
### Recommended PPE for Motility testing

<table>
<thead>
<tr>
<th>LAB PROCEDURE</th>
<th>PPE RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless motility capsule</td>
<td>N95 mask, or surgical mask with a face shield, gloves, face shield (and/or alternate protective eye wear), and gown, gloves, and gown</td>
</tr>
<tr>
<td>Gastric emptying Breath test</td>
<td>N95 mask, double gloves, face shield (and/or alternate protective eye wear), and gown</td>
</tr>
<tr>
<td>Antroduodenal Manometry</td>
<td>N95 mask, double gloves, face shield (and/or alternate protective eye wear), and gown</td>
</tr>
<tr>
<td>Colonic manometry</td>
<td>N95 mask, double gloves, face shield (and/or alternate protective eye wear), and gown</td>
</tr>
</tbody>
</table>

### Triaging Motility Procedures Pertaining to the Stomach, Small Intestine, and Colon

<table>
<thead>
<tr>
<th>Clinical Qualifiers</th>
<th>Alternative approach if procedure is not available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent (&lt;2 weeks)</td>
<td>None</td>
</tr>
<tr>
<td>None</td>
<td>There are no urgent indications for antroduodenal and colonic manometry</td>
</tr>
<tr>
<td>Semi-Urgent (2-4 weeks)</td>
<td>Malnutrition in patient with gastroparesis, weight loss, severe distension, pseudo-obstruction, preop for multi-visceral small bowel transplantation</td>
</tr>
<tr>
<td>Antroduodenal manometry</td>
<td>CT or MRI enterography</td>
</tr>
<tr>
<td>Small bowel follow through</td>
<td>Whole gut scintigraphy</td>
</tr>
<tr>
<td>Colonic Manometry</td>
<td>Severe constipation</td>
</tr>
<tr>
<td>Suspected neurogenic bowel</td>
<td>Wireless motility capsule (in adults only)</td>
</tr>
<tr>
<td></td>
<td>Radio-opaque marker study with KUB x-ray</td>
</tr>
<tr>
<td>Elective (&gt;4 weeks)</td>
<td>Wireless motility capsule (WMC)</td>
</tr>
<tr>
<td>Wireless motility capsule (WMC)</td>
<td>Prokinetics given empirically to treat gastroparesis, Optimization of laxatives and antiemetics. Whole gut scintigraphy Gastric emptying study plus radiopaque marker studies</td>
</tr>
<tr>
<td>Nausea /vomiting with upper abdominal pain (negative upper endoscopy)</td>
<td>WMC or gastric emptying scintigraphy</td>
</tr>
</tbody>
</table>
Thank you to our senior #Healthcareheroes

Hydrogen-Methane Breath Testing

William D. Chey, MD, FACG
Nostrant Professor of GI & Nutrition
Michigan Medicine
Board of Trustees, ACG
Counsel, ANMS
## Indications for Breath Testing

<table>
<thead>
<tr>
<th>Consensus statement</th>
<th>Percentage of agreement</th>
<th>Quality of evidence (GRADE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Current small bowel culture techniques are not satisfactory for the assessment of SIBO.</td>
<td>Agree (88.9% agree, 0% uncertain, 11.1% disagree)</td>
<td>☒ ☒ ☒ ☒</td>
</tr>
<tr>
<td>2. If culture is considered for diagnosis of SIBO, based on the current evidence, we suggest the threshold of &gt;10^8 c.f.u./ml for the definition of SIBO.</td>
<td>Agree (77.8% agree, 11.1% uncertain, 11.1% disagree)</td>
<td>☒ ☒ ☒ ☒</td>
</tr>
<tr>
<td>3. We suggest breath testing in the diagnosis of small intestinal bacterial overgrowth.</td>
<td>Agree (100% agree, 0% uncertain, 0% disagree)</td>
<td>☒ ☒ ☒ ☒</td>
</tr>
<tr>
<td>4. Until a true gold standard is established, we suggest breath testing in assessing the presence of antibiotic-responsive microbial colonization of the gastrointestinal tract.</td>
<td>Agree (77.8% agree, 11.1% uncertain, 11.1% disagree)</td>
<td>☒ ☒ ☒ ☒</td>
</tr>
<tr>
<td>5. We suggest to evaluate for excessive methane excretion on breath test in association with clinical constipation and slowing of gastrointestinal transit.</td>
<td>Agree (88.9% agree, 0% uncertain, 11.1% disagree)</td>
<td>☒ ☒ ☒ ☒</td>
</tr>
<tr>
<td>6. We suggest that breath testing should not be used for assessment of oroanal transit time.</td>
<td>Agree (77.8% agree, 11.1% uncertain, 11.1% disagree)</td>
<td>☒ ☒ ☒ ☒</td>
</tr>
<tr>
<td>7. We suggest breath testing for the diagnosis of carbohydrate malabsorption syndromes.</td>
<td>Agree (88.9% agree, 11.1% uncertain, 0% disagree)</td>
<td>☒ ☒ ☒ ☒</td>
</tr>
<tr>
<td>8. We suggest breath testing in the assessment of conditions with bloating.</td>
<td>Agree (88.9% agree, 11.1% uncertain, 0% disagree)</td>
<td>☒ ☒ ☒ ☒</td>
</tr>
</tbody>
</table>

Rezai et al. Am J Gastroenterol 2017; 112:775–784

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## Main Categories of Breath Testing

- **Bacterial Overgrowth**
  - Glucose
  - Lactulose
- **Carbohydrate Malabsorption**
  - Lactose
  - Sucrose
- **Carbohydrate Malabsorption**
  - Fructose

---

American College of Gastroenterology
Breath Testing: Preparation

• Before:
  • Avoid antibiotics for 4 weeks
  • Avoid promotility agents & laxatives for 1 week.
  • Day before test, avoid fermentable foods (e.g., complex carbohydrates) and patient should fast for 8–12

• During the breath test,
  • Avoid smoking & minimize physical exertion

Pimentel et al. Am J Gastroenterol 2020;115:165-78

Breath Testing for SIBO

Hydrogen breath test

Saad & Chey, Gastroenterol 2007;133:1763
Breath Testing for SIBO

Methods of Detection
- Direct Aspiration and Culture
- Glucose Breath Test
- Lactulose Breath Test

Bacterial Concentration, Organisms/mL
- $<10^2$
- $>10^5$

Recent studies which performed glucose* or lactulose** breath testing and scintigraphy found that 65-85% of positive breath tests were falsely positive for SIBO

* Banfield et al. JAMA 2004;292:852-858
** Lin & Mesey. Clinical Gastroenterol Hepatol 2016;14:203-208

Rome & North American Consensus’ Protocols:

<table>
<thead>
<tr>
<th>Substrate</th>
<th>Dose</th>
<th>Abnormal Rise in $H_2$</th>
<th>Abnormal Rise in $CH_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactulose</td>
<td>10 grams</td>
<td>$&gt;20$ ppm (90 minutes)</td>
<td>$&gt;10$ ppm (90 minutes)</td>
</tr>
<tr>
<td>Glucose</td>
<td>50-75 grams</td>
<td>$&gt;12-20$ ppm (90 minutes)</td>
<td>$&gt;10$ ppm (90 minutes)</td>
</tr>
</tbody>
</table>

*Double peak not necessary for SIBO

** Authors acknowledge that data to justify their suggested abnormal thresholds is poor

American College of Gastroenterology
Carb Maldigestion Pathophysiology: Lactose or Sucrose

**Disaccharides:**
- **Lactose**
  - Glucose/Galactose
- **Sucrose**
  - Glucose/Fructose
- **Maltose**
  - Glucose/Glucose

**CHO Malabsorption Breath Test Protocols: Rome & North American Consensus’**

<table>
<thead>
<tr>
<th>Substrate</th>
<th>Dose</th>
<th>Abnormal Rise in H₂</th>
<th>Abnormal Rise in CH₄</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactose</td>
<td>25 grams</td>
<td>&gt;20 ppm (3 hours)</td>
<td>&gt;10 ppm (90 minutes)</td>
</tr>
<tr>
<td>Fructose</td>
<td>25 grams</td>
<td>&gt;20 ppm (3 hours)</td>
<td>&gt;10 ppm (90 minutes)</td>
</tr>
<tr>
<td>Sucrose</td>
<td>50 grams</td>
<td>&gt;20 ppm (3 hours)</td>
<td>&gt;10 ppm (90 minutes)</td>
</tr>
</tbody>
</table>

Rezaie et al. Am J Gastroenterol 2017; 112:775–784
What do we know about methane?

- Methanogens are archaea
  - prokaryotic organisms distinct from bacteria & eukaryotes
- *Methanobrevibacter smithii* is the key methanogen responsible for breath methane production in humans
- Methane is associated with slowing of gut transit
- A meta-analysis found that methane is associated with chronic constipation (OR 3.51, 95% CI 2.00-6.16)
- Very limited treatment data:
  - Rifaximin 550 mg tid and Neomycin 500 mg bid x 14 days recommended
  - Lovastatin?

Breath Testing in the COVID 19 Era

<table>
<thead>
<tr>
<th>Elective</th>
<th>Clinical Qualifiers</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breath testing for SIBO (glucose, lactulose)</td>
<td>With rare exceptions, breath tests are <strong>elective</strong>.</td>
<td>• SIBO – empiric trial of antibiotics, small bowel aspiration for quantitative culture</td>
</tr>
<tr>
<td>Breath testing for CHO malabsorption (lactose, fructose, sucrose)</td>
<td></td>
<td>• CHO malabsorption: Dissacharidase deficiencies (lactose, sucrase isomaltase) can be diagnosed with a) Small bowel biopsy and dissacharidase assay, b) Trial of an exclusion diet, c) Substrate challenge, d) Enzyme replacement therapy, e) Blood testing for gene variants can identify patients with congenital hypolactasia or sucrase-isomaltase deficiency</td>
</tr>
</tbody>
</table>

Breath tests are aerosol generating procedures.

Negative COVID 19 testing should be documented before testing

If COVID 19 testing not done, consider deferring test or wearing full PPE

ANMS and ACG websites
Anorectal & Colonic Motility Tests & Treatments in the Era of Covid-19 Pandemic?

Satish S.C. Rao, MD, PhD, FACG
J. Harold Harrison Distinguished University Chair in Gastroenterology, Professor of Medicine, Director, Digestive Health Clinical Research Center, Augusta University, Augusta, GA

OBJECTIVES

• Review common anorectal/colonic tests
  • Can they be performed or alternatives
• Review biofeedback & other treatments
• Discuss recommendations of ANMS taskforce
Tests for Colonic Function/Motility

Stool diary

Colonic transit studies:
Sitz markers, scintigraphy
Wireless Motility Capsule Test
Colonic Manometry

Stool Diary-Constipation©
Record your stool habit for one week

<table>
<thead>
<tr>
<th>Date</th>
<th>Time of Bowel Movement</th>
<th>Straining Yes/No</th>
<th>Feeling of incomplet e BM Yes/No</th>
<th>Stool Consistency (1-7)</th>
<th>Urge Yes/No</th>
<th>Digital Yes/No</th>
<th>Drug</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NAME: 
Hosp. No:
Tools for Improved Understanding of Symptoms

Constipation Stool APP

FI Stool Diary APP

Yan Y, Jiminez E, Rao SSC, et al. Gastroenterol. 2020;158(96); S-400:DDW
Jiminez E, Yan Y, Sharma A, Rao SSC, Gastroenterology 2020; 158(6);S380-1. DDW

Fecal Incontinence Stool Diary APP

Yan Y, Jiminez E, Rao SSC, et al. Gastroenterol. 2020;158(96); S-400:DDW
Jiminez E, Yan Y, Sharma A, Rao SSC, Gastroenterology 2020; 158(6);S380-1. DDW
Evaluation of Colonic Function

Wireless pH and Pressure

Colonic Transit Study with Sitzmarks

Day 1 - Bisects
Day 2 - Rings
Day 3 - Trisects
Day 6 (120 hrs)
- Plain abdomen x-ray


Colonic Transit Test

Abdominal X-ray – 120 hours

Rao SSC, Am J Gastroenterol 2007 ACG
Wireless Motility Capsule Test

Tests of Anorectal Function

- Anorectal manometry
- Anal Endosonography
- Rectal Compliance Test
- TAMS test or Pudendal Nerve Terminal Latency
- Balloon expulsion test
- Defecography

Modified from Rao, ACG Guidelines, Am J Gastro 2004
Baker J, Neshatian L, Rao SSC et al. ANMS Recommend. 2020
Ambulatory Colonic Manometry

- Non-aerosol procedure
- Covid-19 test not mandatory
- Medium risk-fecal shedding
- Requires Colonoscopy
- Outpatient procedure
- Standard PPE precautions
Translumbosacral Anorectal Magnetic Stimulation (TAMS) Test
### Triage for Anorectal Procedures

<table>
<thead>
<tr>
<th>Urgency for Anorectal Tests</th>
<th>Clinical Qualifiers &amp; Indication(s)</th>
<th>Type of Procedure</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent (&lt;2 weeks)</td>
<td>There are no urgent indications for anorectal procedures</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Semi-Urgent (2-4 weeks)</td>
<td>Plan for urgent surgery</td>
<td>Anorectal Manometry and Balloon Expulsion T Endoanal Ultrasound</td>
<td>Defecography</td>
</tr>
<tr>
<td>Anorectal pain</td>
<td>Severe impaction and inability to pass stool</td>
<td>Large volume enema, Hypaque enema, Endoscopic Disimpaction</td>
<td></td>
</tr>
<tr>
<td>Anorectal pain</td>
<td>Significant pelvic/rectal pain, Negative impact QOL</td>
<td>Anorectal Manometry</td>
<td>Medical management</td>
</tr>
</tbody>
</table>

Baker J, Neshatian L, Rao SSC et al. ANMS Recommend. 2020
Home vs Office Biofeedback Therapy: RCT

- A prescriptive biofeedback device for male and female urinary and fecal incontinence that combines muscle & electrical stimulation with voice-guided exercises for patient use at home.

Sharma A, Xiang X, Rao SS. ACG 2018

Wearing & Taking Off PPE

- Step 1: Put on Hairnet
- Step 2: Hand Hygiene
- Step 3: Put on a Gown
- Step 4: Put on Mask
- Step 5: Put on Goggles
- Step 6: Remove Goggles
- Step 7: Remove Mask
- Step 8: Remove Hairnet
- Step 9: Remove Gloves
- Step 10: Hand Hygiene

Important Steps 3, 4, 9 & 10

Courtesy of Dr GS Raju, MD Anderson Medical Center
Take Home Points

- Clinical assessment of colorectal issues
  - Telehealth challenging
  - DRE not possible
  - Stool APPS/Diaries can be useful
- Anorectal Manometry, Balloon expulsion Test, Anal ultrasound & TAMS test are medium risk and Non-aerosol procedures & can be safely performed
  - Covid-19 Test is preferred but not mandatory
  - Adequate PPE for staff is a MUST
  - Patient should wear Mask
- Biofeedback Therapy is medium risk and can be safely performed
  - Covid-19 Test is preferred but not mandatory
  - Adequate PPE for staff is a MUST
  - Home biofeedback (incontinence) option
  - Patient should wear Mask

Financial and Billing Considerations

Abraham R. Khan, MD, FACG
Medical Director, Center for Esophageal Health
NYU Langone Health
Context and Topics

• GI function and motility laboratories face financial challenges
  • Appropriate and safe procedures are the priority
  • Less testing expected in many instances

• Laboratory leaders → opportunities
  • Learn to optimize reimbursement during this time period
  • Understand evolving telehealth expansion
    • Consider the potential for improved quality for patient encounters

Billing and Coding

• Significant advancements in GI function and motility testing in past two decades
  • Coding and reimbursement have not always kept up
  • Experienced billers and coders for gastroenterologists may not be very familiar with the nuances of this area

• Few reference materials in literature to guide the individual practitioner in last 15 years
  • Reimbursement review on wireless pH testing in 2005¹ as well as esophageal manometry and impedance-pH testing in 2012²
  • 2018 ANMS commissioned billing and coding update on current esophageal function testing³
  • Recent 2020 review on establishing a motility laboratory⁴
    • Suggested overall economic framework necessary for a productive laboratory
    • Provided current relevant codes and associated reimbursement information

## Esophageal Testing

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>91010</td>
<td>Esophageal motility (manometric study of the esophagus and/or gastroesophageal junction) study with interpretation and report</td>
</tr>
<tr>
<td>+91013</td>
<td>With stimulation or perfusion (e.g., stimulant, acid or alkal perfusion) (List separately in addition to code for primary procedure) (Use 91013 with 91010)</td>
</tr>
<tr>
<td>91034</td>
<td>Esophagus, gastroesophageal reflux test; with nasal catheter pH electrode(s) placement, recording, analysis and interpretation</td>
</tr>
<tr>
<td>91035</td>
<td>Esophagus, gastroesophageal reflux test; with mucosal attached telemetry pH electrode placement, recording, analysis and interpretation</td>
</tr>
<tr>
<td>91037</td>
<td>Esophageal function test, gastroesophageal reflux test with nasal catheter intraluminal impedance electrode(s) placement, recording, analysis and interpretation</td>
</tr>
<tr>
<td>91038</td>
<td>Esophageal function test, gastroesophageal reflux test with nasal catheter intraluminal impedance electrode(s) placement, recording, analysis and interpretation; prolonged (greater than 1 hour, up to 24 hours)</td>
</tr>
<tr>
<td>91040</td>
<td>Esophageal balloon distension study, diagnostic, with provocation when performed</td>
</tr>
</tbody>
</table>

## Colorectal Evaluations

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>90901</td>
<td>Biofeedback training by any modality</td>
</tr>
<tr>
<td>90912</td>
<td>Biofeedback training, perineal muscles, anorectal or urethral sphincter, including EMG and/or manometry, when performed; initial 15 minutes of one-on-one physician or other qualified health care professional contact with the patient</td>
</tr>
<tr>
<td>90913</td>
<td>Biofeedback training, perineal muscles, anorectal or urethral sphincter, including EMG and/or manometry, when performed; each additional 15 minutes of one-on-one physician or other qualified health care professional contact with the patient (list separately)</td>
</tr>
<tr>
<td>91117</td>
<td>Colon motility (manometric) study, minimum 6 hours continuous recording (including provocation tests, e.g., meal, intracolonic balloon distension, pharmacologic agents, if performed), with interpretation and report</td>
</tr>
<tr>
<td>91120</td>
<td>Rectal sensation, tone, and compliance test (i.e., response to graded balloon distention)</td>
</tr>
<tr>
<td>91122</td>
<td>Anorectal manometry</td>
</tr>
<tr>
<td>95907-95913 (seven separate)</td>
<td>Nerve conduction studies*</td>
</tr>
<tr>
<td>76872</td>
<td>Ultrasound, transrectal</td>
</tr>
</tbody>
</table>

*Depends on how many done (range 1-2 to ≥3)
Other GI Function and Motility Testing

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>91022</td>
<td>Duodenal motility (manometric) study</td>
</tr>
<tr>
<td>91065</td>
<td>Breath hydrogen or methane test (e.g., for detection of lactase deficiency, fructose intolerance, bacterial overgrowth, or oro-cecal gastrointestinal transit)</td>
</tr>
<tr>
<td>91112</td>
<td>Gastrointestinal transit and pressure measurement, stomach through colon, wireless capsule, with interpretation and report</td>
</tr>
<tr>
<td>91132</td>
<td>Electrogastrography, diagnostic, transcutaneous</td>
</tr>
<tr>
<td>91133</td>
<td>Electrogastrography, diagnostic, transcutaneous; with provocative testing</td>
</tr>
<tr>
<td>97032</td>
<td>Application of a modality to 1 or more areas; electrical stimulation (manual), each 15 minutes*</td>
</tr>
<tr>
<td>43263</td>
<td>Endoscopic retrograde cholangiopancreatography (ERCP); with pressure measurement of sphincter of Oddi</td>
</tr>
<tr>
<td>76376</td>
<td>3D rendering with interpretation and reporting of computed tomography, magnetic resonance imaging, ultrasound, or other tomographic modality with image post-processing under concurrent supervision; not requiring image post-processing on an independent workstation**</td>
</tr>
</tbody>
</table>

*Translumbar repetitive magnetic stimulation  
**Can be added to manometry studies if using 3D technology

Yadlapati R et al. Gastroenterology 2020

Importance of Practice Location

- Procedures reimburse differently depending on laboratory coding environment
  - Can significantly alter time delineated
    - Procedure interpretation
    - The ability of the practitioner who ordered test to participate in it
  - In ‘Physician Office’ location the codes can be submitted without modifiers
  - In ‘Hospital Outpatient’ or in some cases ‘Ambulatory Surgical Center’ (ASC)
    - Code with technical component (TC) modifier represents the equipment and other practice expenses for the procedure
    - Hospital actually typically bills the TC component and is reimbursed the allowable Ambulatory Payment Classification (APC) reimbursement mapped to that CPT code
    - Code with professional component modifier (26) is billed by the practitioner interpreting the study, regardless of who performs it
Reimbursement Variation

- Physician (practice) reimbursement can vary by over a factor of seven in some scenarios depending on location

<table>
<thead>
<tr>
<th>CPT Code</th>
<th>Fee</th>
<th>Modifier</th>
<th>Work RVU</th>
<th>2020 Medicare National Average or APC Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>91010</td>
<td>Global</td>
<td>1.28</td>
<td>$205.71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Professional</td>
<td>1.28</td>
<td>$68.21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical</td>
<td>TC</td>
<td>0</td>
<td>$137.50</td>
</tr>
<tr>
<td></td>
<td>APC</td>
<td></td>
<td></td>
<td>$485.55</td>
</tr>
<tr>
<td>91038</td>
<td>Global</td>
<td>1.1</td>
<td>$199.12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Professional</td>
<td>1.1</td>
<td>$58.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical</td>
<td>TC</td>
<td>0</td>
<td>$390.85</td>
</tr>
<tr>
<td></td>
<td>APC</td>
<td></td>
<td></td>
<td>$485.55</td>
</tr>
<tr>
<td>91122</td>
<td>Global</td>
<td>1.77</td>
<td>$257.32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Professional</td>
<td>1.77</td>
<td>$92.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical</td>
<td>TC</td>
<td>0</td>
<td>$165.29</td>
</tr>
<tr>
<td></td>
<td>APC</td>
<td></td>
<td></td>
<td>$234.87</td>
</tr>
</tbody>
</table>

Yadlapati R et al. Gastroenterology 2020

Example Esophageal Coding Concepts

- Esophageal high-resolution manometry with impedance (HRIM) testing is routine in motility laboratories
  - 91010 and 91037 do not need modifiers
    - 91037 denials common → some payers consider impedance (this includes 91038) experimental and investigational

- When combining esophageal HRIM studies with impedance-pH catheter studies on same day
  - By definition impedance-pH test can bill for 91034 or 91038
    - Will not get both reimbursed → likely only 91034 if together
    - Reimbursement varies significantly by carrier
  - Suggested to bill 91010 on day of HRIM and 91034 or 91038 after the recorder is returned on the day the impedance-pH data is interpreted with a separate encounter
    - Consider still billing 91037 with 91010 on day of HRIM despite National Correct Coding Initiative (NCCI) edits with some codes on same encounter
      - Impedance-pH test can be considered as a separate procedure encounter
      - Success among different insurance vendors varies

Khan A et al. Neurogastroenterol Motil 2018

Yadlapati R et al. Gastroenterology 2020
Telehealth Expansion

- Center for Medicare and Medicaid Services (CMS) have greatly expanded telehealth coverage during the public health emergency
  - Including 99201-99215 (office/outpatient visits new and established)

- Audio-only telephone calls
  - When used for a replacement of care for in-person or telehealth visits
  - Paid the equivalent of 99212-99214 (levels 2-4 established office/outpatient) retroactive from March 1st 2020

- Continually evolving across insurers and payers
  - Private payers have different rules


Expanded Visit Opportunities

- Telehealth and audio-only encounters in GI function and motility laboratories

  - Laboratories → reach wide referral base easily
    - Be cognizant of out of state rules

  - Improve quality
    - Direct referral procedures can be explained in terms of expectations and medication alterations before testing
    - Recorder-based results can be provided without patient having multiple in-office visits as well as visit to drop off recorder

  - Utilize as alternative
    - Example: at-home breath testing → telehealth or audio-only encounter to explain how to do test accurately and appropriately
Conclusion

• As GI function and motility laboratories reopen, there are expected financial challenges for the duration of this pandemic.

• Leaders of these laboratories should become familiar with billing and coding of the relevant procedures as well as telehealth opportunities.

• This will help optimize reimbursement and also can provide quality to the patient experience.

Questions?

Dr. Pochapin  Dr. Baker  Dr. Gyawali  Dr. Moshiree
Dr. Chey  Dr. Rao  Dr. Khan  Dr. Pandolfino
Visit ACG's COVID-19 Resource Page
www.gi.org/COVID19

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ACG Functional GI
Health and Nutrition Circle

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