

What can a Motility Lab Offer in 2023?

Rutgers University/RWJMS Robert Wood Johnson University Hospital

Director, Motility Center New Brunswick, NJ



Overview

- Testing offered
- Motility Center and Lab Testing
- Review of motility tests and indications
- Review of preparation instructions
- Summary

Tests currently offered in our motility lab and endoscopy unit

- High Resolution Esophageal Manometry with impedance
- High Resolution 3D Anorectal Manometry with sensory testing
- Anorectal Balloon Expulsion Testing

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- pH Impedance acid and nonacid reflux testing 24 hour
- Wireless capsule based pH testing 48 or 96 hour
- Endoluminal Functional Luminal Impedance Planimetry (EndoFLIP)

The heart of our motility lab is the motility nursing team.



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- Protocol driven procedures
- Pre and Post procedure counseling
- Careful and caring perioperative and intraprocedural care
- Consistent lab equipment cleaning, reprocessing and maintenance
- Culturally sensitive care men only or women only on request
- Transgender LGBTQAI friendly inclusive care
- > Trauma-informed care



Motility lab tests scheduled with our two pronged approach: open access scheduling vs. clinic visit first scheduling

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Casey Cho, NP Lead, Motility NP

Makayla Buck Lead, Motility Procedure Scheduling

Sharon Frazier Lead, RWJMS Clinic Scheduling

Motility Clinic

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Motility Lab 1 RWJ Place RWJUH New Brunswick, NJ 08901 Phone 732-235-7784

 Clinic first is indicated for patients who have a hard time following instructions, take medications like blood thinners, or have cardiac needs like AICD/PPM





Easy to read, readily available patient pre-procedure education

- <u>https://umg.rwjms.rutgers.edu/d</u> <u>epartments/medicine/divisions/g</u> <u>astroenterology-procedure-</u> <u>preparation.html</u>
- Standardized instructions
 - Digital mychart and paper based instructions
- Pre-procedure nursing call
- Day of procedure teaching
 - Visual based video learning or paper based instructions

Clinic evaluation of complex motility patients - such as. . .

- Eosinophilic esophagitis or gastritis
- Dysphagia achalasia, stricture, stenosis, esophageal spasm, weak
- GERD heartburn, belching, reflux, regurgitation, acid sensation
- Gastroparesis nausea/vomiting
- Constipation
- Fecal incontinence

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Outlet dysfunction constipation











r #son #b



Current multidisciplinary conferences: can request a discussion of a complex patient to have a consensus on actions.

- Diva conference discussion of complex urogyn, colorectal, lower GI focused patients.
- Foregut Conference discussion of reflux cases, hernia cases, gastroparesis cases, achalasia/dysphagia, and bariatric surgical reflux concerns.
- Pulmonary WTC virtual collaboration cough, IPF etc.



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- High Resolution Esophageal Manometry with impedance for upper GI issues (HREMi)
- High Resolution 3D Anorectal Manometry for lower GI issues
- Anorectal Balloon Expulsion Testing (HRAM + BET) for lower GI issues
- 24hr pH impedance acid and nonacid reflux testing (pH impedance)
- Wireless pH testing 48 or 96 hour acid reflux testing (Bravo)
- Endoluminal Functional Luminal Impedance Planimetry (EndoFLIP) assessment of esophageal function or other sphincter function







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Why we do HREM?

- Patients have symptoms + want answers.
 - Dysphagia
 - Chest Pain
 - Regurgitation
 - Heartburn
 - GERD

Causes of esophageal dysphagia

• Structural

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- Benign stricture, GERD,
 Eosinophilic esophagitis, Schatzki's ring, Esophageal web, Foreign body, Extrinsic compression,
 Esophageal Cancer
- Neuromuscular
 - Achalasia, scleroderma, nonrelaxing LES, diffuse or distal esophageal spasm, Chagas disease, Other spastic disorders

- Evaluation
 - History from patient
 - Distinguish orophayngeal from esophageal
 - Endoscopy
 - Solid bolus barium swallow
 - Timed Upright Barium swallow
 - Esophageal manometry
 - EndoFLIP





Obstruction: Tumor - stent Esophageal ring - dilate Esophageal stricture - dilate Eosinophilic esophagitis – biopsy, medicate and possibly dilate

3-



Dilation practice





- Dilation can be performed with:
 - Through-the-scope balloon
 - Savary dilators
 - Maloney dilators
 - Stent to dilate malignancy
 - Endoflip dilators



- Timing of dilation is not proven to be optimized.
- Balloons offer some delicate ability for placement
- Savary offers wire guided ability to more broadly stretch

30 mm Balloon

20 mm Halloor





Esophageal manometry should likely be performed if feasible.





For those with normal findings with persistent dysphagia Esophageal manometry should be performed

CONTRACTOR AND ADDRESS OF A DATE OF

 Boeckxstaens et al. Current Diagnosis and Management of Achalasia J Clin Gastroenterol 2014;48:484–490. high-







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Care pathway for GERD

1030 AGA Section

Gastroenterology Vol. 150, No. 4





HREM: Catheter



- 4.2 mm in diameter
- 36 circumferential
 pressure sensors
- Each sensor = 12 loci
- Sensors spaced at 1 cm intervals

- Fast for 6 hours prior to testing
- Anesthetize nares topically with lidocaine
- A small catheter is inserted via the nares beyond the lower esophageal sphincter while the patient is awake.
- Swallows of liquid or viscous material are undertaken every 30 seconds and observed
- Esophageal pressure readings are taken from multiple sensors along the catheter and recorded for review
- A computer generated color plot demonstrates the strength of the contractile forces along the esophageal wall
- Analysis can then be performed



How we do it?

HIGH RESOLUTION ESOPHAGEAL MANOMETRY STANDARD PROTOCOL CHICAGO CLASSIFICATION VERSION 4.0[®]

STUDY PROCEDURE

Study begins in supine position [use supine normative values]

- <u>>60</u> second adaptation period
- · Document position with at least 3 deep inspirations
- ≥30 second baseline period
- 10 supine wet (5mL) swallows
- 1 multiple rapid swallow (MRS) sequence (MRS may be repeated up to 3 sequences if failed attempt or abnormal response)

Change position to upright [use upright normative values]

- <u>>60 second adaptation period</u>
- Document position with at least 3 deep inspirations
- <u>></u>30 second baseline period
- ≥5 upright wet (5mL) swallows
- 1 rapid drink challenge

If no major motility disorder is found consider the following manometric evaluations

- · For high probability of a missed EGJ outflow obstruction: Solid test swallows, solid test meal, and/or pharmacologic provocation
- For suspected rumination/belching disorder: Post-prandial high-resolution impedance observation

If equivocal results are found and/or there is suspicion for an obstruction that does not fulfill criteria for achalasia, consider the following supportive tests

- · Timed barium esophagram, preferably with tablet
- Endoluminal functional lumen imaging planimetry (FLIP)

CONSIDERATIONS

Prior to procedure patients should fast for at least 4 hours and informed consent should be obtained. The CCv4.0 Working Group recommends using a solid state high-resolution manometry catheter with less than 2cm sensor spacing with combined impedance sensors. However, the protocol and classification can be performed with water perfused catheters if appropriate normative values are used. Although the protocol designed by the CCv4.0 working group is considered to be the optimal protocol, clinicians can modify this protocol based on limited resources and time as long as normative values are applied and other positions and provocative tests are used appropriately. Physicians choosing to begin the study in the upright position should consider performing 10 upright swallows. **Classification is based on the primary position in which 10 wet swallows are performed, either supine or upright. Assessment of swallows in the secondary position and with provocation provide supportive data**

In addition to Chicago Classification v3.0 metrics, final report should include baseline measures of the esophagogastric junction (EGJ) and symptoms experienced during the study and within 15 seconds of a motility dysfunction.



Chicago 4 protocol



(B) Protocol in Upright Position



Courtesy of University of California San Diego Center for Elophogeal Diseases

FIGURE 2 High-resolution manometry images depicted the standard protocol. A, The supine position includes a 60 second adaptation period, 3 deep breaths, 30 second baseline period, 10 five ml wet swallows and at least one multiple rapid swallow. B, Position is changed to the upright position followed by a 60 second adaptation, 3 deep breaths, 30 second baseline period, 5 five ml wet swallows, and a rapid drink challenge

SUPINE

- 60 second adaptation
- 3 deep breaths
- 30 second baseline
- 10 wet swallows (reclining)
- Multiple rapid swallow challenge

UPRIGHT

- 60 second adaptation
- 3 deep breaths
- 30 second baseline
- 5 ml wet swallows
- Rapid drink challenge

Sometimes will try viscous material or food challenge.

Sometimes will observe 30 minutes post prandial



Normal HREMi with pressure topography





Achalasia with HREMi

- Pan esophageal pressurization
- Elevated pressure at the LES
- Failure of LES to relax.





CINE ESOPHAGOGRAM





Achalasia Subtypes:

Pandolfino and Kahrilas *Presentation, Diagnosis and Management of Achalasia* Clinical Gastroenterology and Hepatology 2013;11:887-897.





Bringing provocative testing online

TABLE 2 Supportive manometric measures which may increase confidence for a disorder

Supportive measure	Protocol	Normal response	
Multiple Rapid Swallows (MRS)	Five swallows of 2-mL liquid at 2-3 second intervals	Absence of esophageal body contractility (DCI <100 mmHg+s+cm) with complete deglutitive inhibition of the LES during MRS and presence of post-MRS contraction augmentation (DCI post-MRS greater than single swallow mean DCI).	MRS
Rapid Drink Challenge (RDC)	Rapid drink of 200 ml of liquid	Absence of esophageal body contractility (DCI <100 mmHg+s+cm) with complete deglutitive inhibition of the LES during RDC and no evidence of major motility disorder post-RDC.	Papid dr
Solid Test Swallows	Ten swallows of ~1-cm ² soft solid (eg bread, soft boiled rice, marshmallow)	Presence of >20% pharyngeal swallows being followed by an effective esophageal contraction defined by DCI >1000 mmHg+s=cm and without a large break (>5 cm) in the contractile front.	Napiu ui
iolid Test Meal (STM)	200 g of soft solid meal (eg soft boiled rice, bread) ingested at normal rate for patient. Study stopped if STM not completed in 8-min.	Presence of >20% pharyngeal swallows being followed by an effective esophageal contraction defined by DCI >1000 mmHg- s-cm and without a large break (>5 cm) in the contractile front. No symptoms during STM (any symptoms should be recorded in electronic record to assess association with abnormal motility or function). Slow eating with <200 g ingested during 8 minutes also considered abnormal.	<mark>Solid sw</mark>
Post-Prandial Meal (High- resolution impedance manometry)	Administration of a STM or a self-identified symptom inducing meal followed by extended monitoring (minimum of 10 minutes and occurrence of abnormal activity)	Absence of symptoms and abnormal motility or function during post-prandial period. Maximum 4 transient LES relaxations (TLESRs) with belching during initial 10-minute post-prandial, no volume regurgitation, no rumination or supra-gastric belching episodes.	Solid tes
Pharmacologic Provocation	Amyl Nitrite inhalator (4–5 sniffs) in recumbent position	Profound distal esophageal and LES smooth muscle inhibition with reduction in deglutitive IRP. In healthy controls amyl nitrite- induced EGJ IRP is similar to deglutitive IRP. In patients with a disorder of EGJ obstruction, such as achalasia and true functional EGJOO, amyl nitrite-induced EGJ pressure drop is markedly lower (±10 mmHg) than compromised deglutilive IRP (i.e., relaxation gain). In contrast, amyl nitrite in patients with EGJOO secondary to other factors than LES smooth muscle dysfunction will display little amyl nitrite-induced EGJ pressure chance (< 10 mmHa).	
			<mark>Post pra</mark>
			observat
	Cholecystokinin (CCK) 40 ng/kg IV in recumbent position	CCK generally triggers a biphasic esophageal motor response. Phase 1 is always present and starts shortly after injection. In healthy controls, CCK induces a mild esophageal shortening (2 cm or less) associated with incomplete EGJ relaxation (inspiratory crural diaphragm contraction preserved). In contrast, CCK in patients with inhibitory dysfunction such as achalasis induces a paradoxical EGJ contraction of more than 50 mmHg.	Med cha

Classification is based on the primary position in which 10 wet swallows are performed, either supine or upright. Assessment of swallows in the secondary position and with provocation serves as supportive data (with the exception of EGJOO and absent contractility). Abbreviations: DCI, Distal Contractile Integral; EGJ, esophagogastric junction; EGJOO, EGJ outflow obstruction; IRP, integrated relaxation pressure; LES, lower esophageal sphincter.

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- High Resolution Esophageal Manometry +/- provocative testing
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- 24 hour pH impedance testing for detecting acid reflux
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Care pathway for GERD

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Endoscopic/surgical treatment of GERD



Wireless pH Probe in the Anatomy

During EGD, a catheter is positioned in the esophagus 6 cm above the GEJ, and the capsule is deployed.

Contains nickel.





Wireless pH monitoring

- It measures acid exposure and records symptoms (button press and diary help keep track of symptoms)
- Abnormal acid exposure is defined as an elevated % time of acid exposure (acid exposure if identified when the probe measures a ph<4).
- Most studies consider abnormal exposure to be greater than 6%.
- Once placed, no MRI until it passes out of the body.







Analysis of results of wireless testing - early detachment



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24 Hour pH Impedance: Indications

- GERD
- Chronic cough
- Non-cardiac chest pain
- Pre-operative (anti-reflux surgery, lung transplantation)



24 Hour pH Impedance

- Insert intranasal catheter after HREM to find
 lower esophageal sphincter (LES)
- Disposable Catheter
 - 1 pH sensor at tip in stomach
 - 1 pH sensory at 5 cm above the LES
 - 6 to 8 impedance rings
- pH sensor is placed 5 cm above the LES
- Patient sent home with the catheter in the nose and a recorder for 24 hrs, they keep a diary and record activities





Tutuian & Castell, 2006)



24 Hour pH Impedance

- Measures two values: Reflux and pH
- Reflux determined by presence of liquid in the esophagus
- pH data determined by a probe 5 cm above the end of the catheter, confirmed by a gastric ph probe that measures intragastric pH throughout the 24 hours.
- Patient cannot shower, must return to endoscopy 24 hours after test start.
- They wear the tube in the nose and keep a diary of their activities throughout.



24 Hour pH Impedance

- Normal esophageal pH is considered close to pH 7.0
- GERD = sudden decrease in intra-esophageal pH to below 4.0
 - Air has low conductivity = increased impedance
 - Seen as black
 - Fluid has high conductivity = decreased impedance
 - Seen as white



What does acid reflux look like? Can also detect NONacid (ph > 4)





Summary

- Ph impedance
 - Can provide information about acid and nonacid reflux
 - If an intranasal test that lasts 24 hours
 - Patients should record meal times, symptoms and when they lie down and rise up in their diary and with buttons on the machine.
 - Patients must be prepared to return the catheter and device at 24 hours
 - Referring physicians should understand that the test takes at least 24 hours to complete, then the study must be uploaded and interpreted which may be an additional few days.



pH Tests OFF Therapy Guidelines (wireless and wired ph testing)

- Stop PPIs: 7 days prior to test
- Stop H2 Blockers: <u>2 days</u> prior to test
 - Don't take acid suppressive medications while the catheter is in.
 - If patient is ordered for "two days off and two days on", they should restart their meds on day three of the study.

- Default guidance would be to stop PPI therapy 7 days in advance of a test. This will identify any and ALL acid reflux present.
- If the physician wishes for the patient to continue therapy, they should indicate their preference for that in the order for the testing or in their referral forms. This test can identify breakthrough reflux if present.

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Functional luminal imaging probe (FLIP)



Figure 1. (A) EndoFLIP system (EF-100) with real-time 3-dimensional imaging of the EGJ. The *blue* color on the screen represents the narrowest portion at the EGJ. (B) A 10-cm balloon with 0.5-cm channel spacing housed within an 8-cm length FLIP segment (EF-325). (C) Positioning of the 16-cm (EF 322) catheter with the distal portion through the EGJ and 10 recording segments in the body of the esophagus. The paired impedance planimetry rings (*black*) provide the measure of diameter and cross-sectional area. The pressure sensor (*blue dot*) is located in the distal aspect of the catheter and the infusion port (*red dot*) in the proximal aspect of the catheter within the balloon.

- Patient is sedated for their planned upper endoscopy.
- The endoFLIP is positioned within the esophagus
- Appropriate locations are identified using the waist-like constriction of the EGJ on the realtime, 3-D geometric display at a low fill volume (typically 20–30 mL)
- Inflation of the balloon is observed and measurements obtained.



DI

Real-time FLIP to guide surgical or endosurgical myotomy and fundoplication for treatment of achalasia



Teitelbaum et al. Comparison of esophagogastric junction distensibility changes during POEM and Heller myotomy using intraoperative FLIP. Surg Endosc (2013) 27:4547–4555 DOI 10.1007/s00464-013-3121-2





EndoFLIP shows esophageal function

Diameter (mm)

FIGURE 1 Patterns of the esophagogastric junction (EGJ) response to distension. Functional luminal imaging probe (FLIP) Panometry output from four patients with normal motility on manometry (A-D) is displayed as length (16-cm) x time x color-coded diameter FLIP topography (top panels) with corresponding intraballoon pressure (bottom panel). EGJ-distensibility index (DI) was assessed during the 60-ml fill volume (dashed box) as the median of three values obtained during the peaks (ie, greatest diameters) of EGJ opening (dashed vertical lines: A-C); maximum EGJ diameter is marked by^{*}. A, Normal EGJ opening with EGJ-DI of 5.8 mm²/mmHg and maximum EGJ diameter of 22mm. The normal EGJ-diameter-pressure relationship involves EGJ opening (diameter increase) associated with increase in intraballoon pressure—dashed vertical lines reflect peaks of EGJ diameter align with peaks in pressure. B, Borderline reduced EGJ opening (EGJ-DI of 1.8 mm2/mmHg) while a maximum EGJ diameter of 14.6mm is achieved (*). C, Reduced EGJ opening with EGJ-DI 0.6 mm²/mmHg with low maximum EGJ diameter (9.3mm). D, Sustained lower esophageal sphincter contraction (sLESC) are observed (numbered 1,2,3). Note the *reduction* in diameter that occurs within the EGJ that is associated with an *increase* in intraballoon pressure. SLESC #1 and #2 occur shortly after filling of the FLIP of 60 and 70ml, respectively, while sLESC 3 occurs at the stable 70ml fill volume. Figure used with permission from the Esophageal Center of Northwestern





Endoflip indications and utility

- Can be used as a triage tool for patients with dysphagia undergoing endoscopy to see if they
 could benefit from HREM
- Can be used to help assess the EGJ function in patients with HREM studies that are unclear or incomplete in their results
- Can be used to monitor patients who are undergoing POEM or fundoplication surgery to make sure the functional capacity of the EGJ is maintained
- Can be used to monitor achalasia or dysphagia patients over time to see if they have been and remain adequately treated.
- FLIP is under study for utility in gastric, bariatric and anorectal disorders as well.

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Indications for anal manometry testing

- Concerned about fecal incontinence?
- Concerned about constipation not responding to OTC medications?
- Patient experiencing fecal smearing?
- Patient complaining of urgency or discomfort, but no fissure, normal colonoscopy etc. to explain symptoms.
- Many indications to proceed to testing.



Multiple catheters available for high resolution or high definition anorectal testing



Fig. 1 High resolution anosectal manometry from: a Given Imaging, Yoqueam, Ismel; b Sandhill Scientific, Highlands Ranch, USA, and c Medical Measurement System (MMS). The Netherlands





Fig. 2 = 3-D high definition anotestal manometry probe (Given Imaging, Yoopsam, Israel) 6–3-D and 3-D topographic displays from high definition manometry during ressing and squeeze

Lee, Erdogan, Rao, High Resolution and High Definition Anorectal Manometry and Pressure Topography: Diagnostic Advance or a New Kid on the Block? Curr Gastroenterol Rep (2013) 15:360



IAPWG PROTOCOL



FIGURE 1 Schematic of the IAPWG standard protocol for high-resolution anorectal manometry and rectal sensory testing. The balloon expulsion test should be performed either immediately before or after this protocol of anorectal manometry and rectal sensory testing

Stable Rest

Squeeze x 3 Cough x 2 Push x 3

Sensory balloon

RAIR



Procedure	Nursing/technician coaching language
Rest	"Breathe in and out gently, try to rest as much as you can."
Squeeze, squeeze, squeeze	HR-ARM Short squeeze: "Squeeze as hard as you can for 5-s as though you are stopping yourself passing wind or stopping yourself opening your bowels." Guide through three attempts
Long squeeze	Long (endurance) squeeze: "Squeeze as hard as you can for as long as you can." The practitioner should give cues every 5-s saying "keep squeezing, keep squeezing."
Cough, cough	Cough: "Please give a single cough." The practitioner should demonstrate a cough and emphasize that a single (not double) cough is required.
	Then provide instruction again for second cough.
Push, push push	Push: "Push down as though you are sitting on the toilet opening your bowels/ passing a bowel movement/ trying to defaecate."
RAIR testing	Let them know you will be inflating the balloon and ask if they have any of the sensation, urge or maximum sensation tolerable during the inflation
Rectal sensory testing	RST: "I am going to put some air into the balloon. Tell me when you first feel a sensation inside your bottom that doesn't go away" (first constant sensation volume), "when you feel a constant urge to defaecate/open your bowels" (desire to defecate volume), "and when it becomes too uncomfortable and you need me to stop" (maximum tolerated volume).
Balloon expulsion testing	BET "Try to push the balloon out into the toilet like you're opening your bowels/ passing a bowel movement/ trying to defaecate." Let us know when the balloon has been able to pass.
	(before proceeding - REMOVE probe and insert the catheter and inflate balloon, then walk patient to commode)



ARM: Normal Bear Down





ARM: Dyssynergy





Information gained from manometry guides treatment.

Procedure	Learn about
Rest	Baseline sphincter tone and strength
Squeeze, squeeze, squeeze	Effective sphincter ability to maintain contraction and keep stool in place, identify fecal incontinence etiology
Long squeeze	Identify whether there is early fatigue with squeeze intensity
Cough, cough	Demonstrate whether the spinal connections are in tact via the cough reflex
Push, push push	Bearing down and simulating defecation to identify if the patient can coordinate muscles and relax the sphincter appropriately
RAIR testing	Idenitfy if there is recto anal inhibitory reflex, reflex relaxation of the sphincter – if not present may indicate Hirschsprung's disease is present.
Rectal sensory testing	Detect the sensory capacity of the anorectal area – hypersensitivity, hyposensitivity, lack of sensation – like with a spinal cord injury or nerve damage?
Balloon expulsion testing	Identify in functional practice whether the patient can expel a balloon (simulated defecation) and correlate the motility test findings to a real life practice event.







Clarity of 3D instantly visible compared to 2D or water perfusion



Figure 5. Manometric and pressure topographic changes in a healthy individual (*left*) and a patient with dyssynergic defecation (*right*). In the healthy subject, normal relaxation of anal sphincters can be seen both with manometry and topography, whereas in the dyssynergic subject there is an increase in rectal pressure with a paradoxic increase in anal sphincter pressure seen both with manometry and topography.

 Rao, S Advances in Diagnostic Assessment of Fecal Incontinence and Dyssynergic Defecation Clinical Gastroenterology and Hepatology 2010;8:910-919.



Advantages of 2D HRAM



Fig. 3 Four types of dyssynergic defecation seen with high resolution anorectal manometry, with normal finding as comparison

- Dyssynergia (type 1)
- Impaired rectal propulsion with paradoxic contraction (type 2)
- Increased intrarectal pressure without anal relaxation (type 3)
- Decreased intrarectal pressure without anal relaxation (type 4)



Anorectal manometry – training days on a regular basis to upskill our motility nurses





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Preparation for motility procedures

Procedure	Requirements	If they get anxious
HREMi awake	Able to follow instructions and tolerate a catheter in the nose for 30 minutes, best if off opiates.	Avoid anxiolytics and opiates
3D ARM + BET awake	Able to follow instructions and tolerate a catheter for 15 to 20 minutes followed by a 5 minute balloon expulsion period	Avoid anxiolytics and opiates
24h ph impedanceawake	24 hours of an intranasal catheter, keep a diary of symptoms, return the recorder after 24 hours	Avoid anxiolytics and opiates
Bravo pH testing + EGD asleep for placement	Tolerate an upper endoscopy with anesthesia and bravo placement and then wear a recorder and keep a diary for 48 - 96 hours of recording time	Avoid anxiolytics and opiates
asleep	Endoflip is performed under anesthesia usually, best if off opiates	Avoid anxiolytics and opiates



Preparation for motility procedures

Procedure	Preparation	Blood thinners
HREMi	NPO for 6-8 hrs	Hold if safe
HRAM + BET	2 enemas AM procedure	Hold if safe
24 h ph impedance	NPO for 6-8 hrs ** hold or take PPI (give instructions)	Hold if safe
Bravo pH testing + EGD	NPO for 8 hours ** hold or take PPI (give instructions)	Hold needed
EndoFLIP + EGD	NPO for 8 hours prior to procedure	+/- hold if safe

There are complementary radiology tests offered at RWJ

- 4 hour gastric emptying test
- High quality timed barium swallow and esophagram
- Oropharyngeal swallow study with speech pathology
- Sitz marker testing

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• MR defecography or dynamic pelvis examination

High quality examinations can be helpful and complement the motility laboratory testing when needed.



Motility Center

Practice information

MOTILITY CLINIC

Clinic visits are reserved for consultations and referrals for patients with motility diagnoses.

To expedite a consultation or referral please reach out to me by text or email, Ellen Stein 917-859-1762 <u>ellen.stein@rutgers.edu</u>.

MOTILITY LAB Some procedures can be done as an open access referral - Aware of the procedure needed - No blood thinners - Able to follow instructions

Lab referral and CPT codes

HREMi CPT 91010, 91037

HRAM + BET CPT 91122, 91120

24 hour ph impedance test (done with esophageal manometry) CPT 91034, 91038

Wireless capsule endoscopy testing, done with endoscopy CPT 91035 + endoscopy codes.

EndoFLIP testing is done with endoscopy CPT 91040 + endoscopy codes



Ordering guide for EPIC

TEST	CPT associated – need all listed in EPIC order to be authorized for the case	EPIC order name	EPIC order number
Esophageal manometry 91010, 91037	91010 - Esophageal motility (manometric study of the esophagus and/or gastroesophageal junction) study with interpretation and report 91037 - Esophageal function test, GERD test with nasal catheter intraluminal impedance electrode(s) placement, recording, analysis and interpretation	High resolution esophageal manometry	GI74 or GI24
Anorectal manometry and sensory testing 91122, 91120	91122, anorectal manometry 91120, rectal sensation, tone and compliance	Manometry, anal	GI41
24 hour ph impedance test 91034, 91038	91034 - esophagus, gastroesophageal reflux test 91038 - Esophageal function test, GERD test with nasal catheter intraluminal impedance electrode(s) placement, recording, analysis and interpretation; prolonged (greater than 1 hour, up to 24 hours)	24 hour ph impedance test (GERD)	GI46
Bravo testing 91035	91035 - Esophagus, gastroesophageal reflux test; with mucosal attached telemetry pH electrode placement, recording, analysis and interpretation	Esophageal bravo ph capsule results/interpretation (GERD)	GI91