High Resolution Anorectal Manometry

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HRM

• More sensors at close intervals e-sleeve for high pressure zone

• Stationary examination, less discomfort

• Color topographic display, better resolution allowing easier interpretation with less time

• High-definition allows radial besides circular pressure measurement

• More fragile, shorter life-span, greater maintenance needed

Conventional ARM

• Fewer sensors at wider intervals

• Dent sleeve for high pressure zone Pull-through, can be uncomfortable

• Lines display, poor anatomical resolution, less easier to interpret, and time consuming

• Only circular pressure measurement

• Less susceptible to wear and tear little maintenance and seldom malfunctions

Normal values for High-Resolution Anorectal Manometry

Gender normal pressure variation

Sequence

- Resting pressure
- Maximum squeeze and sustained pressure
- Party balloon inflation
- Supine bear-down pressure
- Rectal sensation
- Anal response to balloon inflation
- Rectal compliance
- Simulated defecation test (commode)
Sequence

• Maximum resting sphincter pressure

M 72 (64-80) F 65(56-74) mm HG
Maximum Squeeze and Sustained Squeeze Pressure (10-30sec)

Max  M 193 (175-211)  F 143 (124-162)
Sust M 176 (156-196)  F 120 (104-136)
Party Balloon Inflation

Increase in intra-abdominal pressure that activates a reflex increase in sphincter pressures

<table>
<thead>
<tr>
<th>Location</th>
<th>M</th>
<th>F</th>
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<tbody>
<tr>
<td>Rect</td>
<td>66</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>(51-81)</td>
<td>(51-73)</td>
</tr>
<tr>
<td>Anal</td>
<td>154</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>(138-170)</td>
<td>(89-123)</td>
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Bear Down Maneuver

Increase in Intra-rectal Pressure and Volitional Decrease in Intra-Anal Pressure
Defecation Index

- Maximum rectal pressure when straining/
  Minimal anal residual pressure when straining

Rectal  M 68 (58-78)  F 63 (54-72)
 Anal   M 49 (35-63)  F 40 (32-48)
 Normal index: M 2.2 (1.4-3.0)  F 1.8(1.4-2.2)
Dyssynergic Defecation Types

Symmetrical squeeze pressure
Maximal & Sustained Squeeze

Asymmetrical squeeze pressure
Maximal Squeeze

Sustained Squeeze

low pressure area

3D: Sagittal View  2D: Unfolded View  3D: Oblique View
Rectal Sensation

- Lowest volume of air that evokes first sensation
- Desire to defecate
- Urgency
- Maximum tolerated volume

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<thead>
<tr>
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<th>20—(15-25)</th>
<th>19—(15-23)</th>
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<tbody>
<tr>
<td>First Sensation (cc)</td>
<td></td>
<td></td>
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<tr>
<td>Desire to Defecate (D.D.) (cc):</td>
<td>109—(85-134)</td>
<td>103—(83-123)</td>
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<tr>
<td>Urgency to Defecate (cc):</td>
<td>185—(152-218)</td>
<td>173—(150-196)</td>
</tr>
<tr>
<td>Maximum Tolerable Volume (cc):</td>
<td>249—(223-275)</td>
<td>230—(205-255)</td>
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Rectal Compliance

- Rectal distension causes increase in rectal pressure followed by a slow decline in pressure to reach a steady state
- Compliance = \( \frac{dV \text{ (Balloon volume)}}{dP \text{ (rectal pressure)}} \text{ ml/mm/Hg} \)

RAIR

- An anal reflex response characterized by a transient relaxation of the anal canal following distention of the rectum, and the modulation is processed in supra spinal and parasympathetic centers.
- Its lack can detect dysganglionosis.


Normal

Hirschprungs Disease
Simulated Defecation Test (60 cc balloon on commode)
What is this??

Catheter movement
Case 1

HPI: 28 Y/O female C/O abdominal pain and bloating that has exacerbated within the last few weeks

PMH: 1-2 Bowel movements a week (Bristol 1-2) “for many years”

PE: Abdomen: **Mildly distended**, soft, mild tenderness in LUQ on deep palpation, no masses, bowel sounds+

DRE: Anal fissure in posterior midline, erythema

**large hard impacted stool**
Type I Dyssynergic Defecation

Bear down supine

Bear down commode
Case 2

• M 53 Y/O with Constipation for the last 7 months after 2 spinal laminectomy operations
  Prior to that had normal bowel movements on a daily basis

• He has been taking different treatments like fiber, fluids, exercise, and Miralax without improvement and currently he has 2 movements a day with incomplete evacuation and a daily episode of incontinence of solid stool and soiling

• Was on hydrocodone therapy until 9/2014 with gradual decrease until 2 months ago and is NOT taking narcotics since then

• EGD, Colonoscopy: Normal KUB: normal

PMH
Rheumatoid arthritis; Asthma; History of migraine headaches; GERD, Hypertension; Low back pain
DX: Weak Sphincter Function (Neurological damage)
50 Y/O female

Suffering from constipation for “many years”
Colonoscopy in 2012 that was normal

She has bowel movement every other day **only with laxatives and T. Amitiza 24 mcg Qd**
“**but recently also this is not enough**”

She denies abdominal rectal or colonic surgery, states her thyroid hormones are normal
She is G1P1 C-section (preclampsia)

**PMH**
MVP

**PSH**
ASD repair in childhood
DX: Slow Transit Constipation
Sheath Artifact