**Participating in the Webinar**

- All attendees will be muted and will remain in Listen Only Mode.
- Type your questions here so that the moderator can see them. Not all questions will be answered but we will get to as many as possible.

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**How to Receive CME and MOC Points**

**LIVE VIRTUAL GRAND ROUNDS WEBINAR**

ACG will send a link to a CME & MOC evaluation to all attendees on the live webinar.

ABIM Board Certified physicians need to complete their MOC activities by **December 31, 2021** in order for the MOC points to count toward any MOC requirements that are due by the end of the year. No MOC credit may be awarded after **March 1, 2022** for this activity.
MOC QUESTION
If you plan to claim MOC Points for this activity, you will be asked to: Please list specific changes you will make in your practice as a result of the information you received from this activity.

Include specific strategies or changes that you plan to implement.
THESE ANSWERS WILL BE REVIEWED.

ACG Virtual Grand Rounds

ACG Virtual Grand Rounds
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Week 3, 2022
Endoscopic Myotomy: Update on POEM and GPOEM
Mihir Wagh, MD
January 20, 2022 at Noon Eastern

Week 4, 2022
Feeding Tubes: What GI’s Need to Know in 2022
John Fang, MD
January 27, 2022 at Noon Eastern

Visit gi.org/ACGVGR to Register
Disclosures:

Speaker:
Kyle Staller, MD, MPH
Consultant: Arena, Boston Pharmaceuticals, Gelesis, GI Supply, Shire/Takeda; Research Support: Ironwood, Urovant

Moderator:
Nitin K. Ahuja, MD, MS
Consultant: Consumer Healthcare, GlaxoSmithKline, Medtronic; Medical Advisory Board Member: Takeda, GI Supply; Research Support: Nestle, Vanda Pharmaceuticals

*All of the relevant financial relationships listed for these individuals have been mitigated

Chronic constipation: more than just bowel movements
American College of Gastroenterology
Virtual Grand Rounds, January 20, 2021
Kyle Staller, MD, MPH

Center for Neurointestinal Health
Clinical and Translational Epidemiology Unit
What is normal?

• Overall the “3 by 3” metric most understood by lay public:
  – Normal is from 3 bowel movements/day to 3 bowel movements/week

Abnormal? Depends who you ask

Figure created from: Dimidi E, Cox C, et al. Am J Gastroenterol. 2019 Jul;114(7):1116-1129.
What is constipation: Rome criteria

- Requires ≥2 of the following symptoms with chronicity:
  - Hard stools
  - Straining
  - Incomplete evacuation
  - Sensation of blocked evacuation
  - Vaginal or perianal pressure needed to facilitate defecation
  - <3 bowel movements per week
- No loose stools without laxatives
- No secondary cause of constipation (i.e. opioids)

Should patients worry about long-term consequences of constipation?

Table 4. Prevalence and Odds Ratio of Constipation in Patients With CRC and Siblings

<table>
<thead>
<tr>
<th>Group</th>
<th>CRC with constipation</th>
<th>Comparators with constipation</th>
<th>Odds ratio (95% CI)</th>
<th>Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>1254 (7.0)</td>
<td>2468 (6.8)</td>
<td>1.05 (0.97–1.13)</td>
<td>1.04 (0.97–1.13)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>736 (8.2)</td>
<td>1011 (8.2)</td>
<td>1.04 (0.91–1.18)</td>
<td>1.03 (0.91–1.18)</td>
</tr>
<tr>
<td>Male</td>
<td>518 (5.3)</td>
<td>957 (5.0)</td>
<td>1.05 (0.92–1.23)</td>
<td>1.07 (0.92–1.24)</td>
</tr>
</tbody>
</table>
Background

- Our current understanding of constipation based on physiology with 3 subtypes:
  - Slow-transit constipation
  - Pelvic floor dysfunction
  - Normal-transit constipation
Back to basics: the mechanism of intestinal peristalsis

Normal colonic motility patterns

Colonic propulsion via high-amplitude propagating contractions (HAPCs) with response to:
- Meals
- Waking up
- Chemical stimulation

Measuring colonic transit: using a Sitz marker study

- MGH protocol:
  - Patient ingests a pill containing 24 radio-opaque markers (Day 0)
  - Abdominal plain film (Day 5)

Stool form as a surrogate for colonic transit time

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Separate hard lumps, like nuts (hard to pass)</td>
</tr>
<tr>
<td>Type 2</td>
<td>Sausage-shaped but lumpy</td>
</tr>
<tr>
<td>Type 3</td>
<td>Like a sausage but with cracks on the surface</td>
</tr>
<tr>
<td>Type 4</td>
<td>Like a sausage or snake, smooth and soft</td>
</tr>
<tr>
<td>Type 5</td>
<td>Soft blobs with clear-cut edges</td>
</tr>
<tr>
<td>Type 6</td>
<td>Fluffy pieces with ragged edges, a mushy stool</td>
</tr>
<tr>
<td>Type 7</td>
<td>Watery, no solid pieces, entirely liquid</td>
</tr>
</tbody>
</table>
Constipation is likely a spectrum of disease

Normal-transit constipation

Isolated slow-transit constipation

Mixed physiology

Obstructed defecation

Irritable bowel syndrome (IBS-C)

Visceral hypersensitivity

Pelvic floor physiology

At rest

Pubis

Puborectalis

External anal sphincter

Internal anal sphincter

Anorectal angle

Coccyx

During straining

Descent of the pelvic floor

A

B

When to order anorectal manometry

- Retained markers frequently seen in patients w/ pelvic floor dysfunction undergoing transit testing
- Presumed symptoms of dyssynergic defecation:
  - Painful defecation
  - Straining
  - Incomplete evacuation
  - Sensation of blocked evacuation
- Multiple studies have shown that the positive and negative predictive value of symptoms alone is inadequate for the diagnosis of dyssynergic defecation

Can I get away with only doing a Sitz marker study?

- No correlation between rectosigmoid localization of markers and findings on anorectal manometry


Testing for rectal evacuation disorders: anorectal manometry


Anorectal manometry

Image source: https://quizlet.com/525002658/clin-lab-gi-flash-cards/
Evolution of anorectal manometry technology

Water perfusion

Image sources: https://silos.tips/download/reflux-manometry-solutions

Anorectal manometry

Role of biofeedback/physical therapy in constipation

Table 1. Biofeedback treatment of defection disorders in adults: summary of clinical trials

<table>
<thead>
<tr>
<th>Author</th>
<th>Sample size</th>
<th>Study type</th>
<th>Comparison made</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pourmamony et al. (82)</td>
<td>65</td>
<td>RCT</td>
<td>Balloon defecation training vs BF</td>
<td>BF superior</td>
</tr>
<tr>
<td>Hart et al. (83)</td>
<td>21</td>
<td>RCT</td>
<td>EMG-based BF vs sham BF</td>
<td>BF superior</td>
</tr>
<tr>
<td>Charroni et al. (11)</td>
<td>99</td>
<td>RCT</td>
<td>PEG vs BF</td>
<td>BF superior</td>
</tr>
<tr>
<td>Heyman et al. (73)</td>
<td>84</td>
<td>RCT</td>
<td>BF vs disapep vs placebo</td>
<td>BF superior to disapep and placebo</td>
</tr>
<tr>
<td>Rao et al. (120)</td>
<td>77</td>
<td>RCT</td>
<td>BF vs sham vs medical care</td>
<td>BF superior to sham and medical care</td>
</tr>
<tr>
<td>Rao et al. (133)</td>
<td>26</td>
<td>RCT</td>
<td>BF vs usual medical care</td>
<td>BF superior</td>
</tr>
<tr>
<td>Simon and Buono (84)</td>
<td>30</td>
<td>RCT</td>
<td>EMG-based BF vs control</td>
<td>BF superior</td>
</tr>
<tr>
<td>Simon and Buono (85)</td>
<td>20</td>
<td>RCT</td>
<td>EMG-based BF vs control</td>
<td>BF superior</td>
</tr>
</tbody>
</table>

BF, biofeedback; EMG, electromyography; PEG, polyethylene glycol; RCT, randomized controlled trial.
When all else fails: surgery for constipation


Surgical options for constipation

Refractory constipation: colectomy

- Growing acceptance of surgical treatment of constipation
  - 14.4% of colectomies for constipation
- High complication rate:
  - ED visits or hospitalizations in 1/3 of patients undergoing colectomy for chronic constipation
- High healthcare resource utilization: surrogate for well-being?

Breakdown of constipation at a tertiary care center

- 26.3% Slow transit + Outlet obstruction
- 28.1% Outlet obstruction
- 17.2% Slow transit
- 28.4% No abnormality
Why not treat everyone with laxatives?

- Chronic constipation is more than stool frequency

![](chart.png)

Patients with constipation + bloating are not easy

- Bloating associated with ↓ QOL
- Bloating associated with ↓ treatment satisfaction
- Is there a disconnect between bloating and constipation? – a sensory phenotype driving symptoms?
How does patient history suggest sensory phenotype?

1. What is the time course of your bloating?

“I wake up with little or no bloating, but it gets worse as the day goes on then goes away by the time I wake up the next day to start the cycle again.”

Circadian rhythm changes in distention are common (and real)

Intra-abdominal gas generally does not account for distention

1. Does passing stool improve bloating?

“Yes, a little bit. But the improvement only lasts until I eat again.”
What happens to colonic stool burden in bloaters?

- No difference in colonic stool volume between bloaters (orange) and controls (green) in fasting or fed states.

How does patient history suggest sensory phenotype?

1. Do you have symptoms after eating?

   “Always. My bloating starts within minutes of eating—regardless of what I eat. Some foods are worse than others.”
Most bloaters have a disproportionate response to meal ingestion

Distention can arise from abnormal viscerosomatic reflexes

Pathophysiology of constipation

Early Life
- Genetics
- Culture
- Environment
- Trauma
- Infection
- Parental behaviors

Psychosocial Factors
- Life stress
- Personality traits
- Psychologic state
- Coping/cognitions
- Social support

Brain CNS ENS

Physiology
- Motility
- Sensation
- Immune dysfunction/inflammation
- Altered microflora
- Food/diet

FGID Presentation
- Symptoms
- Severity
- Behaviors

Outcome
- Health Care Use
- Daily function
- Quality of life
- Health Care Costs

What about IBS?

Recurrent abdominal pain
> 1 day/week in last 3 months

Related to defecation

Associated with change in frequency of stool

Associated with change in form of stool


Drossman DA. Gastroenterology May;150(6):1262-1279.
IBS subtypes

Type 1: Separate hard lumps, like nuts (hard to pass)
Type 2: Sausage-shaped but lumpy
Type 3: Like a sausage but with cracks on the surface
Type 4: Like a sausage or snake, smooth and soft
Type 5: Soft blobs with clear-cut edges
Type 6: Fluffy pieces with ragged edges, a mushy stool
Type 7: Watery, no solid pieces, entirely liquid

IBS-C and functional constipation are a spectrum

- Functional constipation and IBS-C have many overlapping features
- These entities cannot be reliably distinguished
- Likely more in common than we realize
Psychosocial factors in constipation

- Prevalence of comorbid psychiatric disease ranges from 40-90% among IBS patients at a tertiary care center
- Eating disorder prevalence almost 20% in tertiary constipation
- Women with IBS are more likely to have experienced childhood verbal, sexual, or physical abuse
  - Leads to persistent changes in the brain-gut axis
  - Resultant abnormal perception of input from GI tract

How sensory signals from the colon reach consciousness: ascending pathways

How sensory signals from the colon reach consciousness: descending pathways


What type of constipation patient am I seeing today?

<table>
<thead>
<tr>
<th>Clinical feature</th>
<th>Mild (40%)</th>
<th>Moderate (35%)</th>
<th>Severe (25%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological factors</td>
<td>Primarily bowel dysfunction</td>
<td>Bowel dysfunction and CNS pain dysregulation</td>
<td>Primarily CNS pain dysregulation</td>
</tr>
<tr>
<td>Psychosocial</td>
<td>None or mild psychosocial distress</td>
<td>Moderate psychosocial distress</td>
<td>Severe–high psychosocial distress, catastrophizing, abuse history</td>
</tr>
<tr>
<td>Sex</td>
<td>Men = women</td>
<td>Women &gt; men</td>
<td>Women &gt;&gt; men</td>
</tr>
<tr>
<td>Age</td>
<td>Older &gt; younger</td>
<td>Older = younger</td>
<td>Younger &gt; older</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>Mild/intermittent</td>
<td>Moderate, frequent</td>
<td>Severe/very frequent or constant</td>
</tr>
<tr>
<td>Number of other symptoms</td>
<td>Low (1–3)</td>
<td>Medium (4–6)</td>
<td>High (≥7)</td>
</tr>
<tr>
<td>Health-related quality of life</td>
<td>Good</td>
<td>Fair</td>
<td>Poor</td>
</tr>
<tr>
<td>Health care use</td>
<td>0–1/y</td>
<td>2–4/y</td>
<td>≥5/y</td>
</tr>
<tr>
<td>Activity restriction</td>
<td>Occasional (0–15 days)</td>
<td>More often (15–50 days)</td>
<td>Frequent/constant (≥50 days)</td>
</tr>
<tr>
<td>Work disability</td>
<td>&lt;5%</td>
<td>6%–10%</td>
<td>≥11%</td>
</tr>
</tbody>
</table>

Adapted from Drossman DA. Gastroenterology. May;150(6):1262-1279.
Explaining the biopsychosocial model of constipation to patients

1. Start with slow transit
   - Most intuitive → how most people (including MDs) think about constipation
2. Rectal evacuation disorders
   - Perfect your rectal exam and use it to explain rationale for PT/biofeedback
3. Visceral hypersensitivity
   - Abnormal sensory response to normal colonic stool burden, normal gut activity
   - Abnormal viscerosomatic reflex
4. Psychologic/psychiatric overlay
   - Recognize roles of trauma, disordered eating, chronic pain

Thank you

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- Mentors: Braden Kuo, MD and Andrew Chan, MD, MPH
- Grant support from NIH NIDDK
- American College of Gastroenterology

Questions?

Speaker:
Kyle Staller, MD, MPH

Moderator:
Nitin K. Ahuja, MD, MS
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