Data Collection

In order to support the growth of the ECHO movement, Project ECHO® collects participation data for each teleECHO™ program. This data allows Project ECHO to measure, analyze, and report on the movement’s reach. It is used in reports, on maps and visualizations, for research, for communications and surveys, for data quality assurance activities, and for decision-making related to new initiatives.
Recording

Today’s session will be recorded and distributed by Intermountain Healthcare both within Intermountain and to Intermountain’s outreach/telehealth customers and others for educational and quality improvement purposes.

By participating in this session, you consent to Intermountain’s inclusion and use of your name, likeness, and voice in this session’s recording.

Please do not reproduce or distribute this presentation.

Email questions or concerns to IntermountainProjectECHO@imail.org
“GI symptoms in Eating Disorders: Are there Needles in the Haystack? (GI disorders and Compression Syndromes)”

July 15, 2021

W. Daniel Jackson, MD
Clinical Professor
Pediatric Gastroenterology and Nutrition
University of Utah School of Medicine
Disclosure

The content of this presentation does not relate to any product of a commercial entity; therefore, I have no relationships to report.

Off-label indications will not be discussed.
Disclosure

This presentation is motivated by personal experience with patients that I wish were “just” Nutrition and GI disorders:

Of those who present with inability to eat or retain sufficient nutrients to maintain body composition and growth---These are the ones who don’t respond to my optimistic nutrition support and GI functional support to have the nourished brain and happy gut they need to access Psychosocial support for recovery.
Objectives:

At the conclusion of this activity, participants should be able to:

• 1. Discuss the intersection between Disordered Eating Behavior and Gastrointestinal Functional Disorders.

• 2. Integrate the medical treatment of Functional GI Disorders with Nutritional Management of patients with Disordered Eating.

• 3. Discuss emerging surgical intervention on anatomic compression features ascribed roles in chronic Pain syndromes and GI, Nutritional and Autonomic dysfunction.

• 4. Review the potential role of early and effective Nutritional resuscitation and restoration in avoiding GI dysfunction and compression syndrome effects.
Complex Biology of Brain-Gut within PsychoSocial Context

ALTERATIONS IN HYPOTHALAMUS AND MESOCORTICOLIMBIC CIRCUITS
- bradycardia, bradygastria
- hypotension,
- impaired feeding behaviours

DYSFUNCTIONAL MICROBIOME-GUT-BRAIN AXIS
- reluctance to eat,
- increased physical activity,
- anxiety

PREDOMINANCE OF PARASYMPATHETIC NERVOUS SYSTEM
- hypothermia,
- lower bone mineral density,
- starvation

appetite controlling metabolites

ENTERO-ENDOCRINE DYSREGULATION
- postprandial fullness,
- bloating,
- nausea, vomiting,
- constipation

Eating Disorders DSM-5

Anorexia Nervosa (AN)
Bulimia Nervosa (BN)
Binge Eating Disorder (BED)
Pica
Rumination
Avoidant/Restrictive Food Intake Disorder (ARFID)
Also:
   Many Mixed forms
   OSFED
   Secondary DOE
**GI tissue pathology causes:**

- Digestive dysfunction: malabsorption, distention
- Altered gut motility: cramping, early satiety
- Altered gut sensation: hypersensitivity, hyperalgesia
- Net energy deficit: low intake vs increased losses and demand

**Consequences:**

- Impaired eating and nutrition
- Altered body composition
- Altered neuroendocrine feedback
- Impaired CNS cognitive function
FGIDs → GI distress of eating/elimination → conditioned avoidance/restriction → Malnutrition
75% of vagus nerve afferent input to the brainstem nuclei and the CNS is from the Gut
Nutritionally relevant GI disorders

- Esophagitis: GERD-reflux-vomiting; Allergic Eosinophilic
- Gastroparesis – bloating, early satiety (restricting), reflux, vomiting (purging)
- Malabsorption: celiac, lactose intolerance, small intestinal bacterial overgrowth
- Obstruction: Crohns, SMA compression-duodenum
- Inflammatory disease: IBD(Crohn), celiac, pancreatitis, diverticulitis
- Stool Retention/Colonic Inertia/Constipation
  - Gastro-Colic reflex ➞ meal stimulated colonic motility: cramping, nausea, urgency
  - Colo-Gastric Reflex: recto-colonic distention ➞ slows gastric emptying: early satiety, bloating, nausea
- Dysbiosis-microbiome with methanogens affecting GI function
  - Methane inhibits motility ➞ stasis and bacterial proliferation
- Consequences vs Causes of inadequate intake/malnutrition:
  - neurogastroenterologic dysfunction
  - rare anatomic- compression syndromes:
    - SMA (duodenum, Left Renal Vein), ? MALs (celiac artery)
EDO features in Diet Related Chronic Health/GI Conditions

Table 5. Disordered eating practices and risk factors of young people with irritable bowel syndrome

<table>
<thead>
<tr>
<th>Irritable bowel syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of disordered eating behaviors documented:</td>
</tr>
<tr>
<td>food preoccupation and dietary restriction (76)</td>
</tr>
<tr>
<td>Potential factors increasing risk of disordered eating</td>
</tr>
<tr>
<td>Preoccupation with dietary management (avoidance of foods that cause gastrointestinal discomfort) (76)</td>
</tr>
<tr>
<td>Fear of abdominal discomfort from eating food (76)</td>
</tr>
<tr>
<td>Poor emotional well-being (e.g., depression, low self-esteem) (74)</td>
</tr>
<tr>
<td>Body shame (gastrointestinal problems from health condition) (79)</td>
</tr>
<tr>
<td>Limited social functioning (74)</td>
</tr>
<tr>
<td>Impaired interpersonal relationships (peers and significant others) (74)</td>
</tr>
<tr>
<td>Physical limitations (decreased energy levels)</td>
</tr>
</tbody>
</table>

Conditions with EDO phenotypes:
- Type 1 DM
- Celiac Disease
- Cystic Fibrosis
- Inflammatory Bowel Disease
- Irritable Bowel Syndrome (FGID):
  - Constipation
  - Diarrhea
- Lactose Intolerance

Prevalence of EDO in Chronic Constipation patients

Patients with Constipation
N=279 (79% F)
EAT test, anxiety/depression scale, visceral sensitivity, and Anorectal manometry or colonic transit
Results: 19% met ED criteria, with OR 1.2 for anxiety
No difference in anorectal or colonic motility.

GI Symptom Spectrum in Eating Disorders

FGID prevalent in EDOs:
Irritable Bowel Syndrome: > 50%
All FGID: 98%
- Bloating
- Functional Constipation
- Dysphagia
- Proctalgia-prolapse


Figure 2. The most prevalent GI symptoms are shown taking into account different anatomical regions from esophagus to intestine in the three main ED disorders: AN, BN and BED.
Eating Restriction Behavior

Under-Nutrition

GI Disease/Dysfunction
GI dysfunction/Malnutrition Meets EDO Behavior

1. GI disease/dysfunction → EDOB → Malnutrition
   • Celiac, Crohn Disease, CF, FGID

2. GI disease/dysfunction → Malnutrition → EDOB
   • CF, Celiac, Crohns, FGID

3. EDOB → GI disease/dysfunction → Malnutrition
   • ARFID: selective, nausea, bloat, Stool Retention-IBS, retching; Oral-Esophageal injury, Gastric Distention/gastroparesis

4. EDOB → Malnutrition → GI disease/dysfunction
   • Dysmotility; fatty liver, T2DM, villus atrophy, medications,
   • SMA compression (Duodenal obstruction, ?LRV obstruction)
Prevalence: ARFID features in GI motility/functional disorders: FGID

Patients referred for Neurogastroenterology exam
N=410 (18-90 yr; 73% F) retrospective chart review
DSM 5 criteria applied:
6.3% met full criteria for ARFID
17.3% had avoidant or restrictive behaviors: partial ARFID.
93% of these: GI symptoms motivated avoidance/restriction

ARFID versus AR-FGID? *(Haystack or Iceberg)*

**DSM-V ARFID criteria:**

- An eating or feeding disturbance (e.g., apparent lack of interest in eating or food; avoidance based on the sensory characteristics of food; concern about **aversive consequences of eating**) as manifested by persistent failure to meet appropriate nutritional and/or energy needs associated with one (or more) of the following:
  - Significant **weight loss** (or failure to achieve expected weight gain or **faltering growth** in children).
  - Significant nutritional deficiency.
  - Dependence on **enteral feeding** or oral nutritional supplements
  - Marked interference with psychosocial functioning

- The disturbance is not better explained by lack of available food or by an associated culturally sanctioned practice

- The eating disturbance does not occur exclusively during the course of anorexia nervosa or bulimia nervosa, and there is no evidence of a disturbance in the way in which one’s body weight or shape is experienced

- The eating disturbance is not attributable to a concurrent medical condition or not better explained by another mental disorder. When the eating disturbance occurs in the context of another condition or disorder, the severity of the eating disturbance exceeds that routinely associated with the condition or disorder and warrants additional clinical attention.
FGID

Somatic Symptom DO

ARFID
Compression syndromes: Crossing the Alps

Superior Mesenteric Artery (SMA)
- Duodenal compression syndrome: paradigm
- Left Renal Vein “Nutcracker” syndrome

Median Arcuate Ligament (MALs)
- Celiac artery compression

Others:
- Left iliac vein compression- May-Thurner
Classic Superior Mesenteric Artery Syndrome

Fraser, J et al. Laparoscopic Duodenojejunostomy for Superior Mesenteric Artery Syndrome. JSLS. 2009 Apr-Jun; 13(2): 254–259; PMID: 19660228
Superior Mesenteric Artery Compression: Wilkie

SMA Pathogenetic Controversy

Nutritional Theory:
Undernutrition \( \rightarrow \) reduced visceral fat pad/spacer
Restore visceral fat pad \( \rightarrow \) relieve obstruction
Provide nutrition support to restore function \( [73\% \text{ response to NJ}] \)

Structural Theory:
Short ligament of Treitz
Low SMA takeoff
Abnormal 3\textsuperscript{rd} part of duodenum
Congenital Susceptibility- lordotic spine, spinal surgery
Failure of nutritional support—Surgery required \( [27\%?] \)
Superior Mesenteric Artery Duodenal Surgery

Duodenojejunostomy

Strong Procedure
Superior Mesenteric Compression: Duodenum and LRV

Left Renal Vein Compression: Loin pain-hematuria

*Figure 6.* Nutcracker syndrome in a 19-year-old woman with hematuria and left-sided flank pain. Sagittal (a) and axial (b) CT angiograms demonstrate compression of the left renal vein (arrow in a) between the aorta and superior mesenteric artery, with proximal venous dilatation and multiple perirenal collateral vessels (dotted circle in b).

Left Renal Vein Compression – “Nutcracker”

Symptomatic

Asymptomatic

24% of normal Asymptomatic Adults (28% F, 19% M)

“Nutcracker” Left Renal Vein Surgery

Stent

Re-implantation

Renal AutoTransplantation for LRV Compression
Median Arcuate Ligament Compression: Celiac Artery

Prevalence: 10-25% of Normal Asymptomatic
Left Iliac Vein Compression: May-Thurner

15.7% of normal asymptomatic Adults (24% F, 3% Male)

Eating Restriction Behavior

GI Disease/Dysfunction

Under-Nutrition
Eating Restriction Behavior

Under-Nutrition

Intervention

GI Disease/Dysfunction
Conclusions and Hypothesis

In our patients with Disordered Eating Behavior:
Early and Effective Sustained intervention in factors that we can control that affect eating behavior and nutritional homeostasis will help prevent the progression of cognitive (learned), autonomic (entrained), and anatomic impediments to recovery.
Hypotheses for Strategy:

1. Identify and intervene in Pathological GI conditions that impair nutrient intake, digestive function, and energy balance as well as create aversive associations with eating and digesting, and altered body composition and neuro-endocrine regulation.

   a. Gastroesophageal Reflux Disease/Esophagitis
   b. Lactose intolerance
   c. Celiac disease
   d. Inflammatory bowel disease
   e. Peptic Ulcer disease
Hypotheses:

2. Recognize and address Functional GI symptoms promptly and effectively—especially those affecting nutrient intake and aversive associations with eating and digesting.
   a. Functional Constipation/stool retention
   b. Gastroparesis
   c. Functional Dyspepsia
   d. Irritable Bowel Syndrome
Hypotheses:

3a. Aggressive early and complete restorative nutrition support $\rightarrow$ recovery of body composition--may reduce frequency of SMA compression of LRV and duodenum obstruction complications.

3b. Effect on MALs and May-Thurner(LIV) anatomic compression syndromes and interventions is unknown;
References:


Post-session survey: EDO- Echo IHC 7-15-21

1. Are Functional GI disorders prevalent in Eating Disorders?
2. Do Eating Disorder Behaviors affect most patients with Pathological and Functional GI Disorders?
3. Which of the following statements is false about SMA Compression syndromes?
   a. Most patients are female
   b. Both the duodenum and the left renal vein may be compressed.
   c. Weight loss is a factor in the development of SMA compression.
   d. Surgery is the first line treatment for SMA compression of the duodenum.
Post session survey answers

1. Yes—ranging from 16 to 30% exhibit FGID symptoms
2. No – limited study data suggests that 16% of various GI disorders (pathologic and functional) have EDO behaviors.
3. d. is false. Enteral nutrition support to restore body composition is the first line treatment for duodenal obstruction due to SMA compression.