Stanford MEDICINE

MYOTONIC DYSTROPHY & THE GI TRACT

OVERVIEW & SYMPTOM MANAGEMENT

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Overview

- GI symptoms in DM
- Diagnostic testing
- Treatment options
  - Symptom specific therapies
  - DM specific treatments (if available)

GI Involvement in Myotonic Dystrophy

- GI symptoms present in approximately 30-60% of patients
  - Similar between DM1 vs DM2
- GI symptoms may precede myotonia by > 10 years
  - Severity of GI symptoms do no correlate with severity of striated muscle dysfunction or CTG repeat
- 25% felt GI symptoms most disabling problem related to DM
- Different pathophysiologic abnormalities described
  - Atrophy of striated and smooth muscle, degeneration of the myenteric neurons

Ronnblom A et al. Scand J Gastroenterol 1996;31:654-647
Bellini M et al. World J Gastroenterol 2006;12:1821-1828

Common GI Problems

Symptoms	Clinical Conditions
Difficulty Chewing, Swallowing or Coughing while eating (52-62%)	- Oropharyngeal dysphagia - Esophageal dysmotility - Acid reflux
Heartburn, Nausea and/or Vomiting	- Gastroparesis - Acid reflux
Abdominal pain or fullness (45-62%)	- IBS - Gastroparesis/Pseudoobstruction - Gallstones or SOD dysfunction
Constipation (55-62%)	- Slow transit constipation - Anal spasm - Megacolon
Diarrhea (up to 33%)	- Bacterial overgrowth - Bile salt malabsorption
Fecal incontinence (10-66%)	- Weak anal sphincter - Overflow

Dysphagia

- Difficulty swallowing/choking
  - Most commonly reported symptom
- Differentiate oropharyngeal vs. esophageal
  - Oropharyngeal = difficulty initiating swallow, coughing with swallows
    - Myotonia of the face, tongue, Pharyngeal muscle weakness (Weak swallow)
  - Esophageal = food difficult/slow to pass after swallow initiated
    - Esophageal stricture/narrowing (Complication of acid reflux), Muscle spasms of the lower esophagus, Weak esophageal contractions

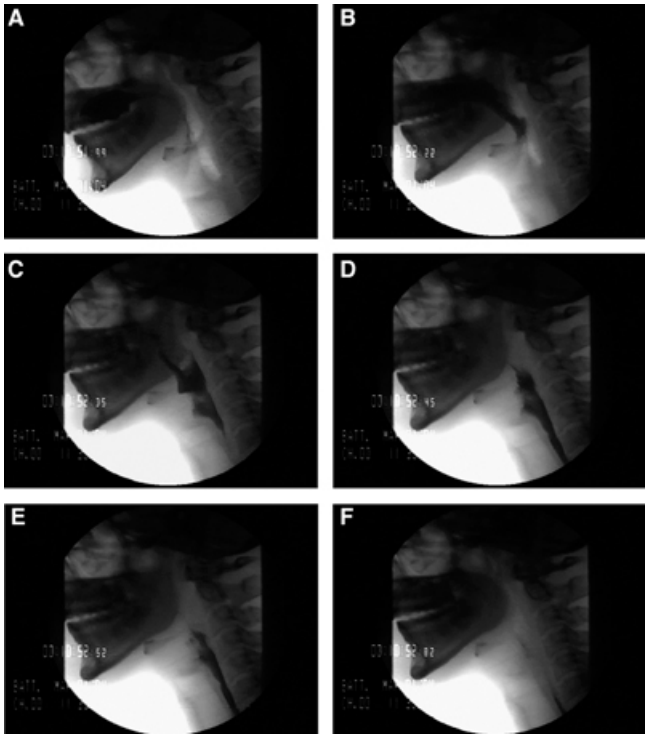
Ronnblom A et al. Scand J Gastroenterol 1996;31:654-647

Other Symptoms of Pharyngeal Esophageal Dysfunction

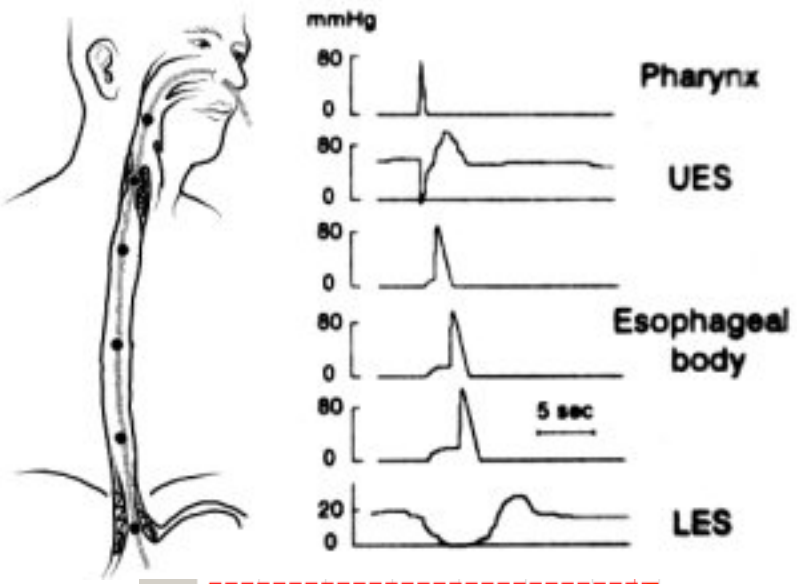
- Aspiration: Coughing/Pneumonia
  - Pharyngeal weakness (weak swallow)
  - Weak Upper esophageal sphincter
  - Acid Reflux
- Chest pain
  - Acid reflux
  - Esophageal spasms
  - Neuropathic (nerve pain)

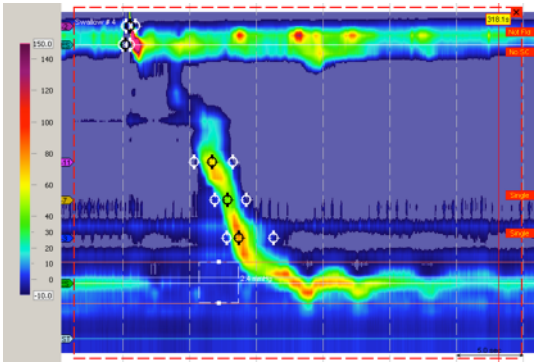
Pharyngeal Esophageal Testing

- Video fluoroscopy (Swallow Study)



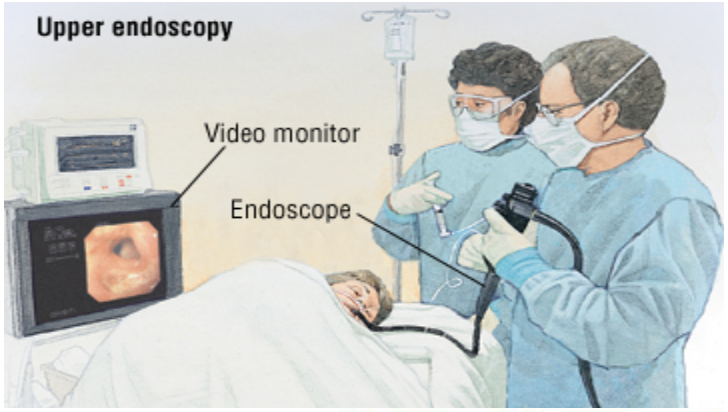
- Esophageal Manometry

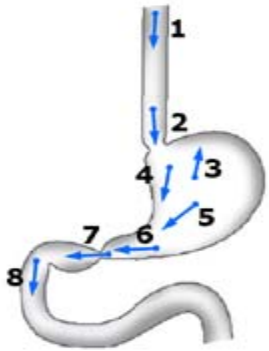


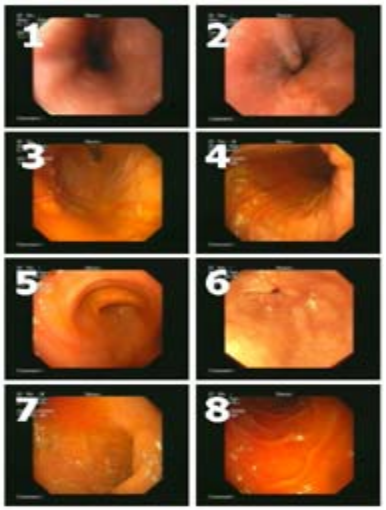


Esophageal Testing

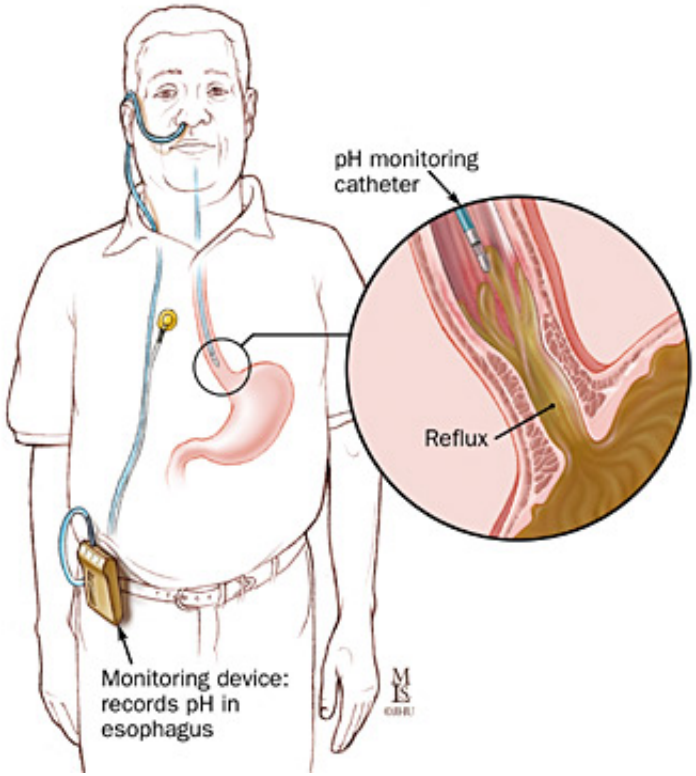
- Endoscopy





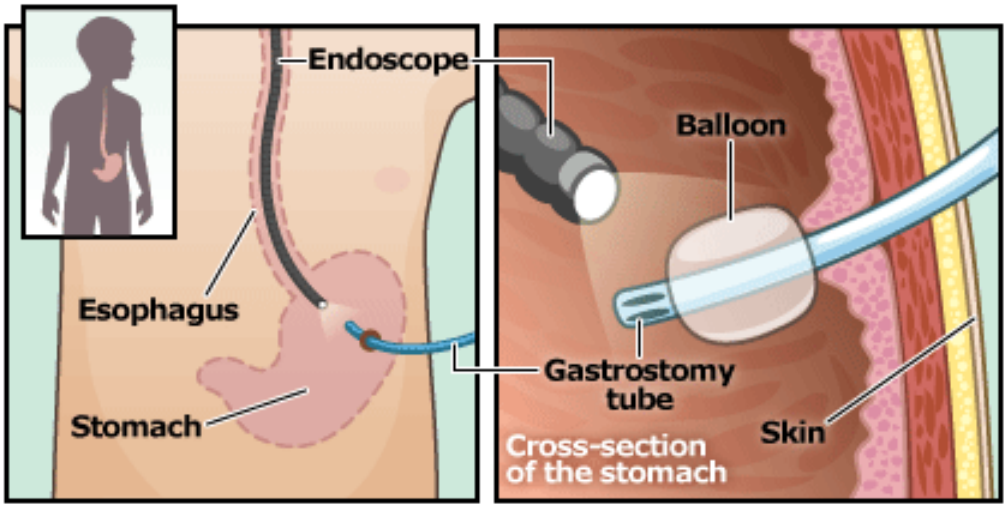


- Esophageal pH testing



Treatment of Swallowing Problems

- Speech therapy
- Dietary changes: mechanical chopped, soft, thick liquids
- Feeding tube (especially if aspirating, weight loss)



PEG Procedure

Treatment of GERD

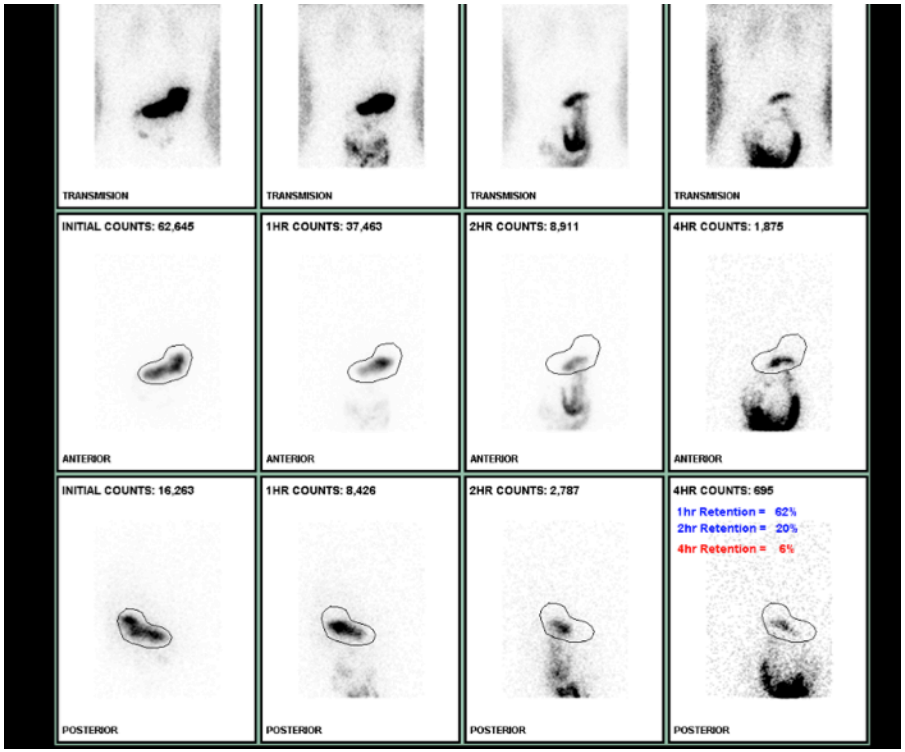
- Dietary changes
  - Avoid: acidic foods, spicy foods, fatty foods, caffeine, alcohol
  - Remain upright 3 hours after eating
- Elevate the head of the bed (> 30 degrees, wedge)
- Acid suppression therapy
- Metoclopramide (Reglan)

Gastroparesis

- Slow stomach emptying
- DM patient have slower gastric emptying compared to healthy controls
  - Even in the absence of symptoms
- Symptoms:
  - Nausea and/or vomiting,
  - Fullness or Bloating
  - Abdominal pain (after eating)
  - Refractory acid reflux
- Testing
  - Gastric emptying scintigraphy
  - Wireless capsule motility (Smartpill
  - Gastric emptying breath test

Gastric Emptying Scintigraphy

Delayed Gastric Emptying



Normal Gastric Emptying

Wireless Capsule Motility (SmartPill)

Treatment of Gastroparesis

- Dietary changes
  - Low fat diet (fat slower to digest)
  - Low fiber (avoid “roughage”)
  - Small frequent meals
- Stay hydrated with electrolytes
  - Gatorade
  - Pedialyte
- If diabetic, maintain glucose control

Available Treatment Options for Gastroparesis

- Herbal blend: STW5 (Iberogast)
- Dopamine antagonists (D_2-receptor): metaclopramide, domperidone
- Serotonin agonist 5-HT_4 (i.e. tegaserod, cisapride)
- Cholinergic agonists (i.e. Neostigmine, bethanechol)
- Macrolides-motilin agonist: erythromycin, azithromycin
  - Improves gastric emptying with minimal affect on symptoms
    Meganty et. al. Am J Gastroenterol 2003
- Intrapyloric Botulinum Toxin
- Jejunal feeding tube
- Gastric electrical stimulation

Treatment of Gastroparesis

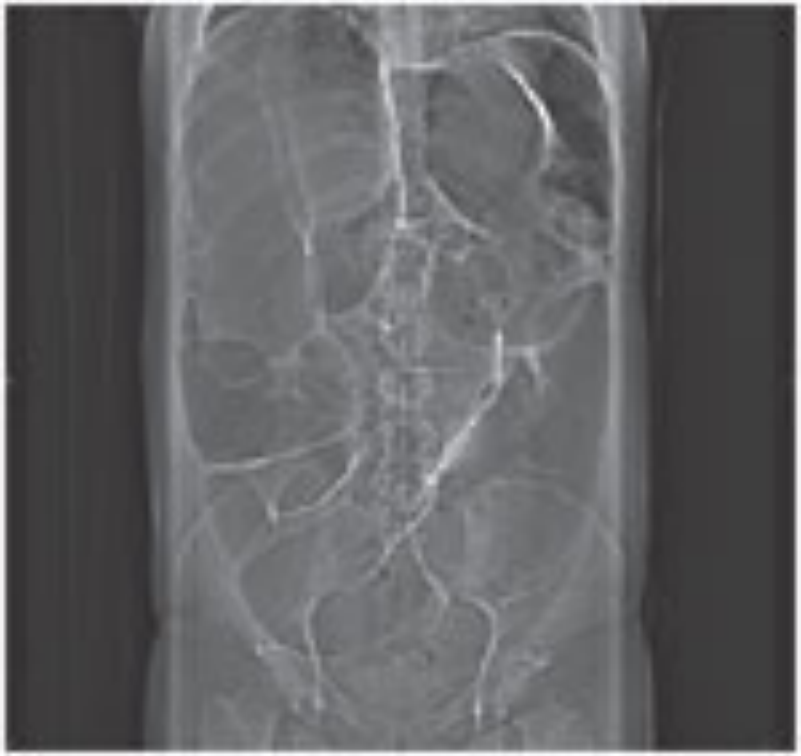
- Therapies reported/studied in DM
  - Metoclopramide (N=16): increases gastric emptying
  - Erythromycin (N=10): did not improve gastric emptying or symptoms except diarrhea
  - Cisapride (no longer available)
    - Caused QT prolongation
  - Bethanechol (N=2): improved symptoms

Treatment of Nausea

- Non-medical:
  - Ginger, Ginseng
  - Acupressure band
- Anti-emetics

Antiemetic Class	Example
H1 antagonist	Diphenhydramine, Meclizine, cyproheptadine, Promethazine
Muscarinic (cholinergic) M1 antagonist	Scopolamine
D2 antagonist	Prochlorperazine (Compazine) Trimethobenzamide (Tigan)
5-HT3 antagonist	Ondansetron, Granisetron, Dolasetron
Neurokinin NK1 antagonist	Aprepitant, Fosaprepitant
Cannabinoid CB1 agonist	Dronabinol

Intestinal Pseudoobstruction



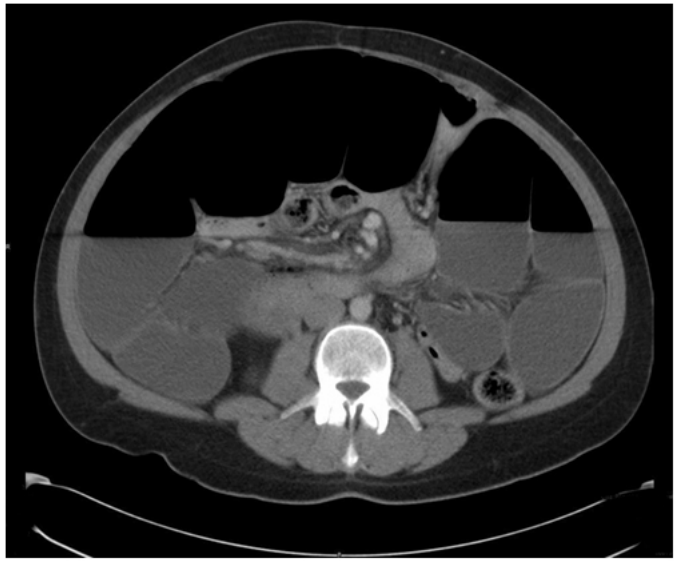
Chronic Intestinal Pseudoobstruction

- Disordered small bowel motility (neuropathic or myopathic) leading to obstructive-like symptoms and dilated bowel
  - Distension – 75%
  - Abdominal pain – 58%
  - Nausea - 49%
  - Constipation - 48%
  - Heartburn/regurgitation – 46%
  - Fullness – 44%
  - Epigastric pain/burning – 34%
  - Early satiety – 37%
  - Vomiting – 36%

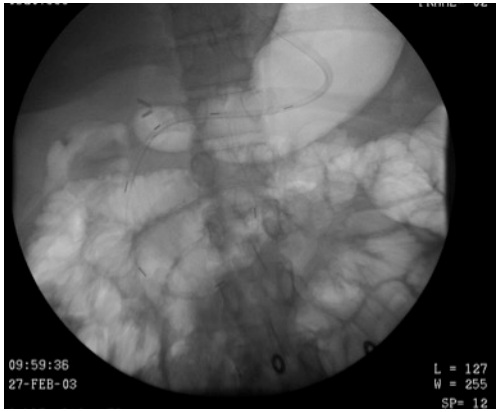
Stanghellini V et al. Gut 1987

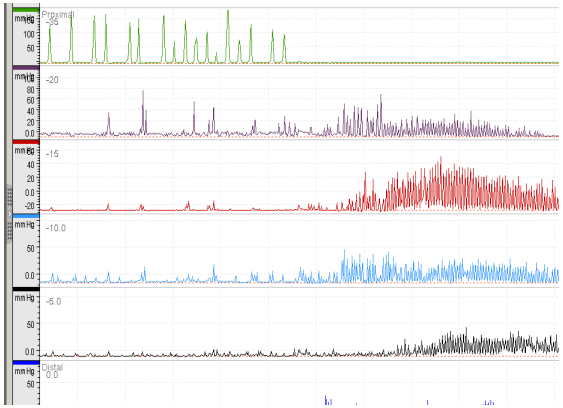
Diagnosing CIP

- Imaging (Xray, CT)
  - Avoid barium studies



- Small bowel manometry





Treatment of CIP

- **AVOID UNNECESSARY SURGERY**
- Nutritional support, IV hydration, decompression
- Evaluate and treat small intestinal bacterial overgrowth (if present)
- Promotility agents
  - Erythromycin/Azithromycin
  - Domperidone or metoclopramide
  - Octreotide
  - Cholinergic agonist: Neostigmine, pyridostigmine, bethanechol

Constipation

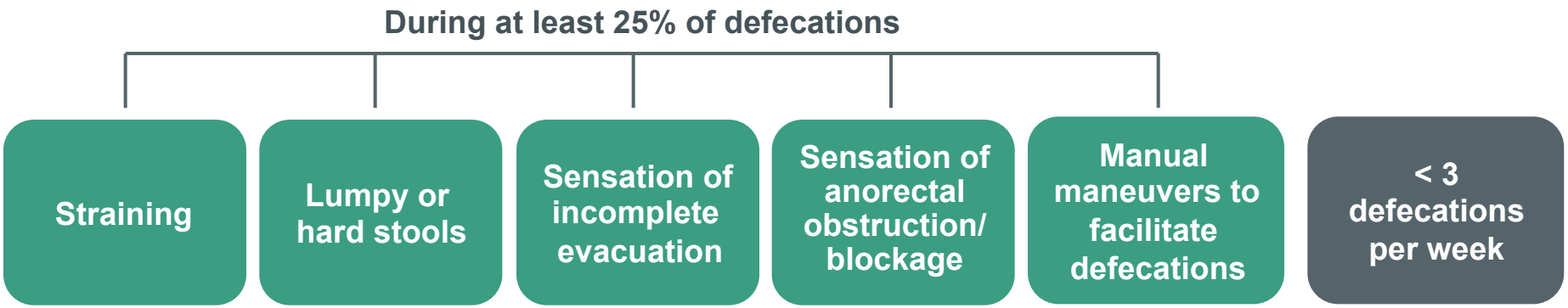
Constipation Impairs Quality of Life

- HRQoL is impaired in patients with DM
- GI Factors associated with decreased QOL
  - Constipation
  - Gallstones

Peric S et al. Clinical Neurology and Neurosurgery 2013;115:270

Defining Constipation

Chronic constipation must include 2 or more of the following:



- Loose stools are rarely present without the use of laxatives
- Insufficient criteria for irritable bowel syndrome

*Criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis

Longstreth GF et al. *Gastroenterology*. 2006;130:1480-1491.

Bristol Stool Chart

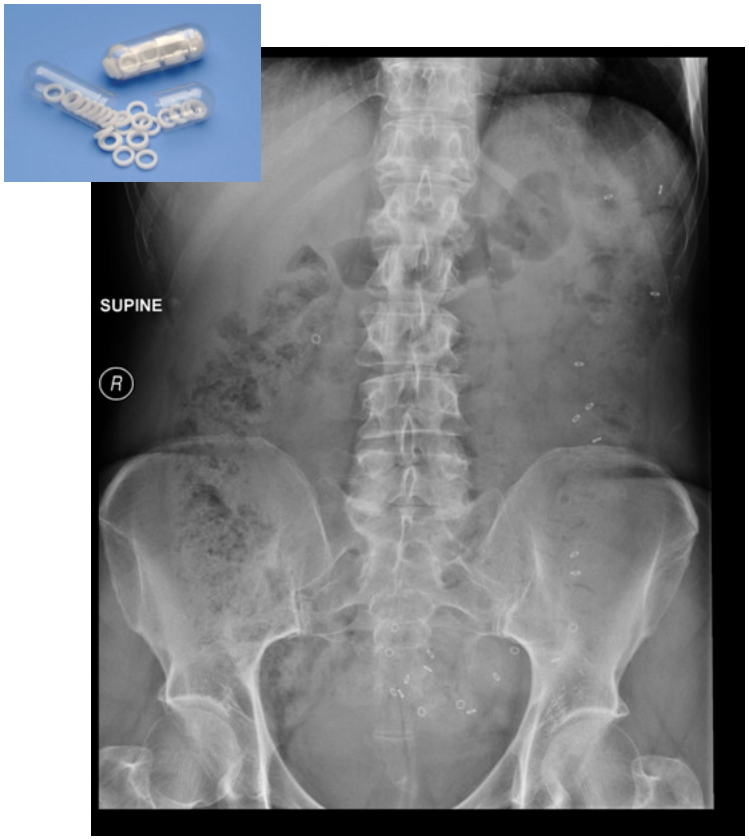
Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on its surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool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

Causes of Constipation in DM

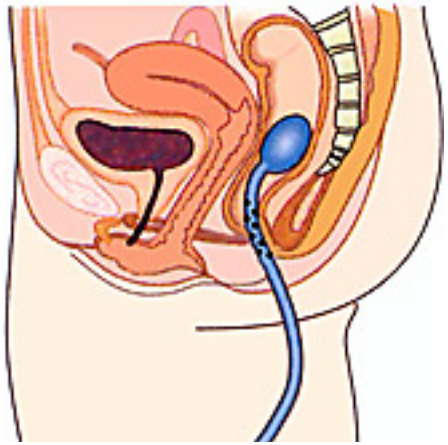
- Slow colon transit (~25% patients)
  - Altered colonic smooth muscle activity
  - Abnormal enteric nervous system function
  - Autonomic dysfunction
  - Decreased mobility
- IBS with constipation
- Anal sphincter dysfunction (up to 90%)
  - Inability to relax anal sphincter with straining
  - Difficulty with defecation/excessive straining

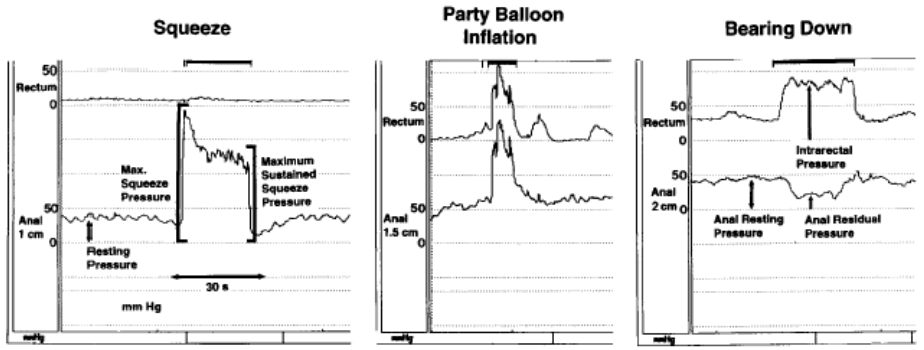
Diagnostic Testing

- Sitz marker study



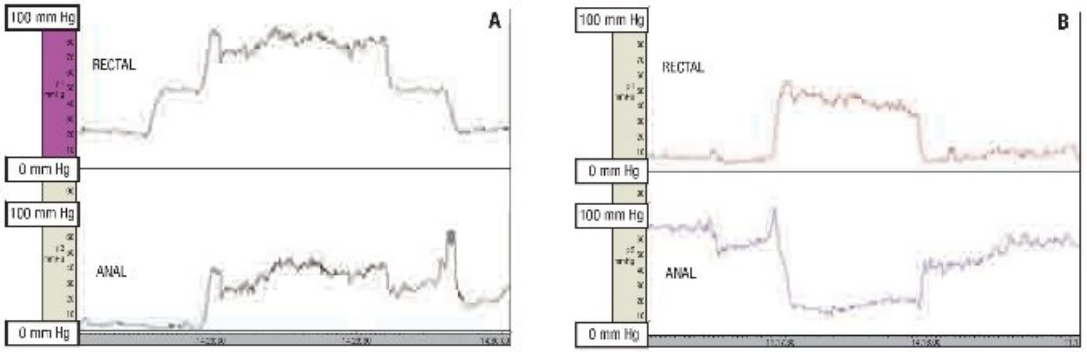
- Anorectal manometry





Pelvic floor function in DM

- Low to Normal resting sphincter pressure
- Weaker squeeze pressure
- Myotonic contraction of the anal sphincter following the rectoanal inhibitory reflex (RAIR)
- Pelvic dyssynergia (Anismus)



Lecointe-Besancon et al. Dig Dis Sci 1999;44:1090

Treatment of Constipation

- Non-medical Therapy
  - Exercise
  - Diet: adequate fluids, fiber
  - Squatty Potty
- Medical Therapy
  - Fiber
  - Laxatives/Stool softeners
  - Promotility or prosecretory agents
- Surgery

Soluble vs. Insoluble Fiber

- Total Fiber intake 20-30 grams per day
  - Too much fiber can cause excessive bloating and gas
- Soluble Fiber = attracts water and forms a gel slowing gastric emptying
  - Dried beans, oats, oat bran, rice bran, barley, citrus fruits, apples, strawberries, peas, potatoes
- Insoluble Fiber = adds bulk to stool increasing colonic transit
  - Wheat bran, whole grains, cereals, seeds, skins on fruits and vegetables

Medical Therapies

- Fiber (if diet insufficient)- not to exceed 25 grams total per day
- Osmotic laxatives (lactulose, magnesium citrate, Miralax)
- Stimulant laxative (bisacodyl, senna, glycerin)
- Prosecretory agents (lubiprostone, linaclotide)
- Suppositories/Enema- help with rectal evacuation

Treatment of Defecatory Disorders

- Pelvic floor dysfunction
  - Biofeedback therapy
    - Teach relaxation of pelvic floor
  - Squatty potty
  - Digital stimulation/scheduled defecation
  - Enemas/suppository
  - Colostomy
- Rectocele or Rectal Prolapse
  - Surgery

Principles of Biofeedback

- Push with <50% of maximal force
- Kegel exercises
  - Helps develop awareness of pelvic floor muscles
- Abdominal exercises
- Timing BMs after meals and when urge present
- Forward leaning or Squatting position
  - Facilitates whole body relaxation
- Stop trying after 10-15 minutes

Diarrhea

- Malabsorption
  - Bacterial overgrowth (up to 60%)
    - Treatment: Antibiotics and probiotics
  - Bile salt malabsorption
    - Treatment: cholestyramine
- IBS-D
- Fecal impaction with overflow
  - Treatment: fiber, laxatives
- Medications
- Diet: high fructose, artificial sweeteners, dairy

Gallstones

- Present in 25-50% of DM patients
- Results from poor gallbladder function
- Causes abdominal pain after eating
- Treatment
  - Surgery (cholecystectomy)
  - Ursodeoxycholic acid (Ursodiol): 8-10 mg/kg/d
    - Dissolves small gallstones at a rate of 1 mm/month
    - Prevents complications i.e. cholecystitis

Causes of Abdominal Pain

- Functional dyspepsia or Gastroparesis
- IBS
- Pseudoobstruction
- Constipation
- Gallstones

Treatment of Abdominal Pain

- Dietary
  - Low FODMAP diet for functional dyspepsia or IBS
  - Low Fiber diet for Gastroparesis
- Anti-spasmotics
  - Peppermint
  - Anti-cholinergics (use with caution, prefer shorter acting)
    - Hyoscyamine
- Anti-neuropathic agents
  - Gabapentin, lyrica
  - Tricyclic antidepressants (desipramine, nortriptyline, etc)
  - SNRIs (duloxetine, venlafaxine)
  - Mexiletine

Summary

- GI symptoms are common in patients with DM
- GI symptoms can precede the diagnosis of DM
- Symptoms can present gradually
- DM can affect the GI tract from the mouth to the anus
- Treatments should be based on symptoms while taking into account potential side effects that may be unique to DM

Take Home Points

- GI symptoms are common and affect quality of life (QOL)
- Symptomatic treatment can improve symptoms and QOL
- Targeted testing can help guide therapy
- Avoid testing that requires anesthesia or sedation unless there are no other alternatives
- Routine GI questionnaires/assessments should be a part of regular DM care