open.michigan

Author(s): Rebecca W. Van Dyke, M.D., 2012

Attribution Key

for more information see: http://open.umich.edu/wiki/AttributionPolicy

Use + Share + Adapt

{ Content the copyright holder, author, or law permits you to use, share and adapt. }

Public Domain – Government: Works that are produced by the U.S. Government. (17 USC § 105)

Public Domain – Expired: Works that are no longer protected due to an expired copyright term.

Public Domain – Self Dedicated: Works that a copyright holder has dedicated to the public domain.

Creative Commons – Zero Waiver

Creative Commons – Attribution License

Creative Commons – Attribution Share Alike License

Creative Commons – Attribution Noncommercial License

Creative Commons – Attribution Noncommercial Share Alike License

GNU – Free Documentation License

Make Your Own Assessment

{ Content Open.Michigan believes can be used, shared, and adapted because it is ineligible for copyright. }

Public Domain – Ineligible: Works that are ineligible for copyright protection in the U.S. (17 USC § 102(b)) *laws in your jurisdiction may differ

{ Content Open.Michigan has used under a Fair Use determination. }

Fair Use: Use of works that is determined to be Fair consistent with the U.S. Copyright Act. (17 USC § 107) *laws in your jurisdiction may differ

Our determination **DOES NOT** mean that all uses of this 3rd-party content are Fair Uses and we **DO NOT** guarantee that your use of the content is Fair.

To use this content you should **do your own independent analysis** to determine whether or not your use will be Fair.

Introduction

Introduction to M2 GI Sequence

Rebecca W. Van Dyke, MD

Winter 2012

University of Michigan
Medical School

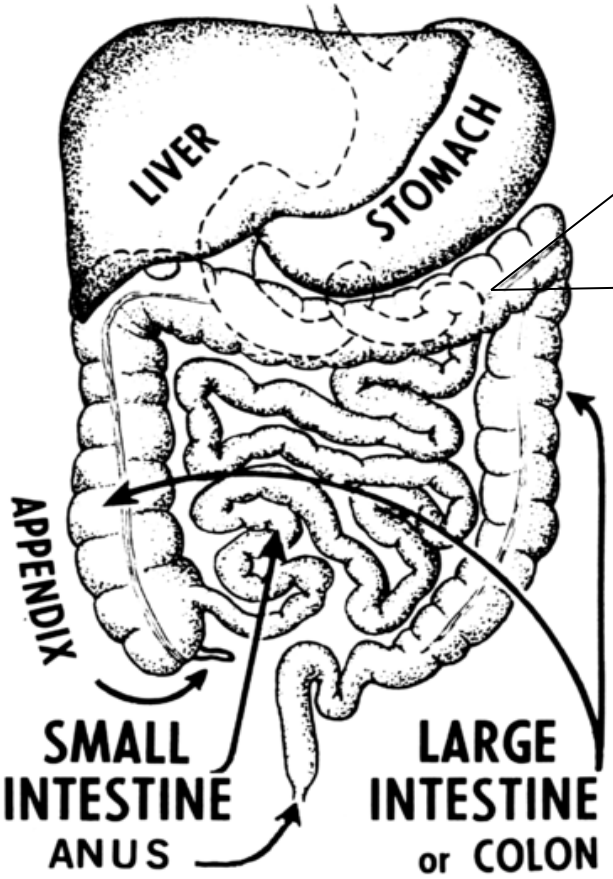
Industry Relationship Disclosures Industry Supported Research and Outside Relationships

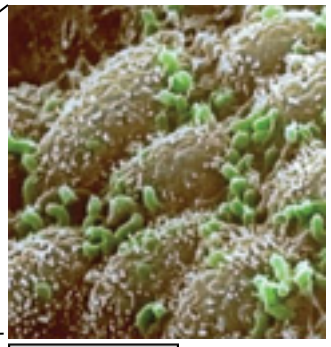
- None

Learning Objectives

- 1. Students will describe tools to evaluate the GI tract.
- 2. Students will view endoscopic pictures and videos (available on line) as a tour of the GI tract.
- 3. Students will describe specialized forms of endoscopy (capsule endoscopy, double-balloon endoscopy)
- 4. Students will describe principles of GI motility from educational video on the subject which they will view on line.

The GI Tract: Multiple organs and endogenous flora (bacteria)





PD-INEL

PD-SELF Pearson Scott Foresman, Wikimedia Commons

Address to a Haggis

Robert Burns

Fair fa' your honest sonsie face
Great chieftain o' the pudding race…

The groaning trencher there ye fill
Your hirdies like a distant hill…..

But mark the Rustic, haggis-fed
The trembling earth resounds his tread……

Ye Pow'rs wha mak mankind your care;
And dish them out their bill o'fare
Auld Scotland wants nae skinking ware That jaups in luggies;
But, if ye wish her gratefu' prayer, Gie her a haggis!

 Robert Burns, "Address to a Haggis," 1786.

Course Information

- Course content/MDC
- Syllabus and information about the course
- Web sites for additional materials
- Introduction to Gastroenterology
- Morning question/problem periods

M2 GI Sequence Jan 25-Feb 10, 2012

Your syllabus has the complete course schedule and it is also posted on-line.

Please check for your small group and pathology lab assignments as well.

We will work through modules:

1. Stomach/esophagus: esophagitis, peptic ulcer disease
2. Motility disorders of the tubular GI tract
3. Small intestine/colon: diarrhea, inflammatory bowel disease, cancer
4. Abdominal pain
5. Liver physiology and disease
6. GI cancers: pancreatic, colorectal
7. Pancreatic disease
8. GI bleeding and miscellaneous topics
9. Nutrition
10. Introduction to ENT (otolaryngology)

Web-Based Information

- PowerPoint presentations of lectures are available on-line as are streaming videos.
- Copy of GI Pathology lab syllabus will also be put on on-line
- Copy of Pathology Slide Guide is found at:
- http://www.med.umich.edu/lrc/students/m2/gastrointestinal/index.html

GAS608 Final Exam

(3 hour course exam and 1 hour pathology exam)

Online access Friday Feb 10, 5:00 p.m. – Sign-on deadline for both exams: Sunday Feb 12, 10:00 p.m..

Queries due by during the week after the exam. Exact times will be posted.

Tools for Evaluating the GI Tract

Capsule endoscopy

PD-SELF Euchiasmus, Wikimedia Commons

Endoscopy

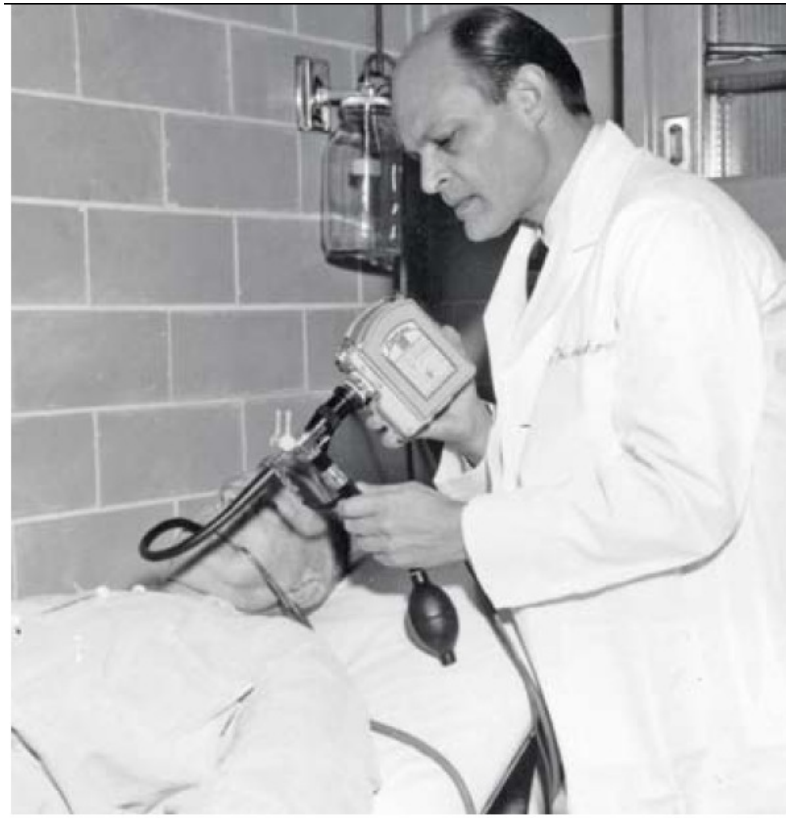
- Biopsy
- Endoscope

Radiology

CC BY jcjack, Flickr

CC BY brainsik, Flickr

Dr. Basil Hirschowitz and an early fiberoptic endoscope at the University of Michigan

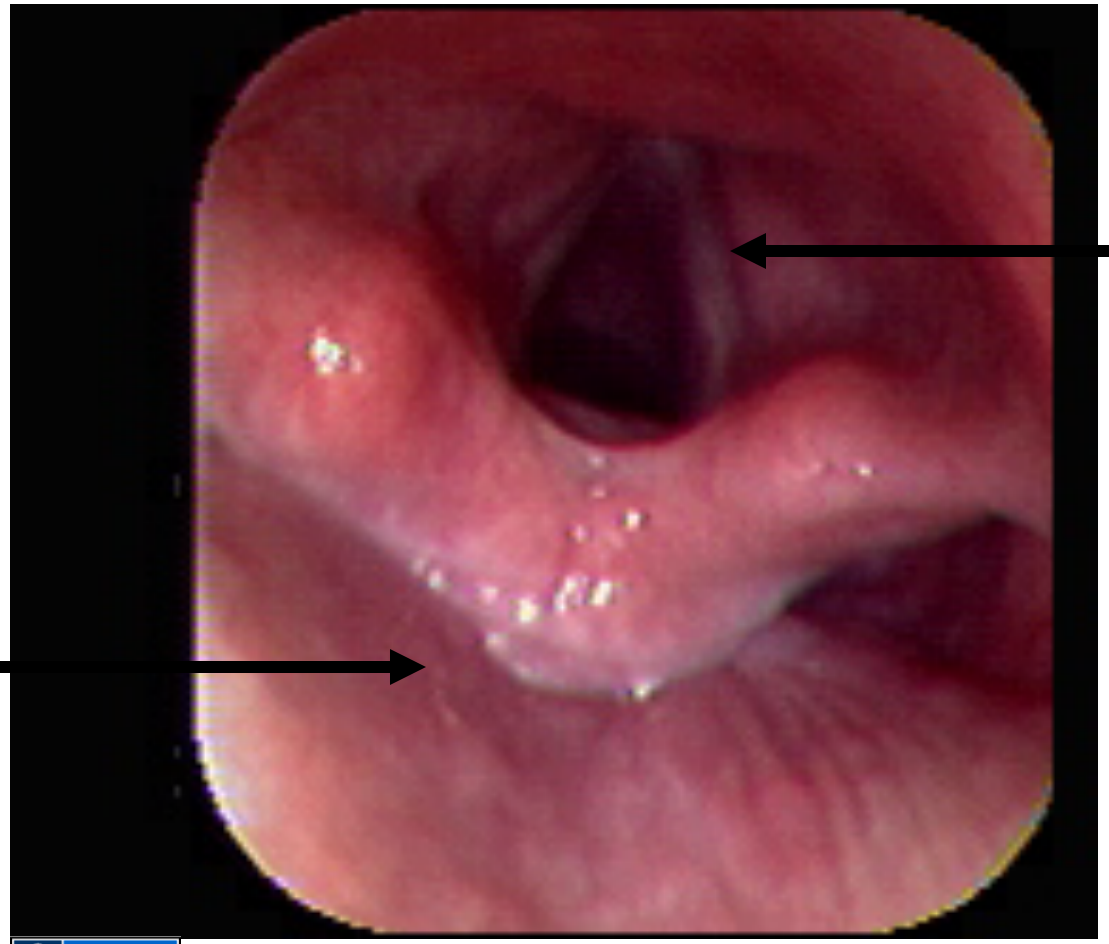


Hirschowitz using an early gastroscope

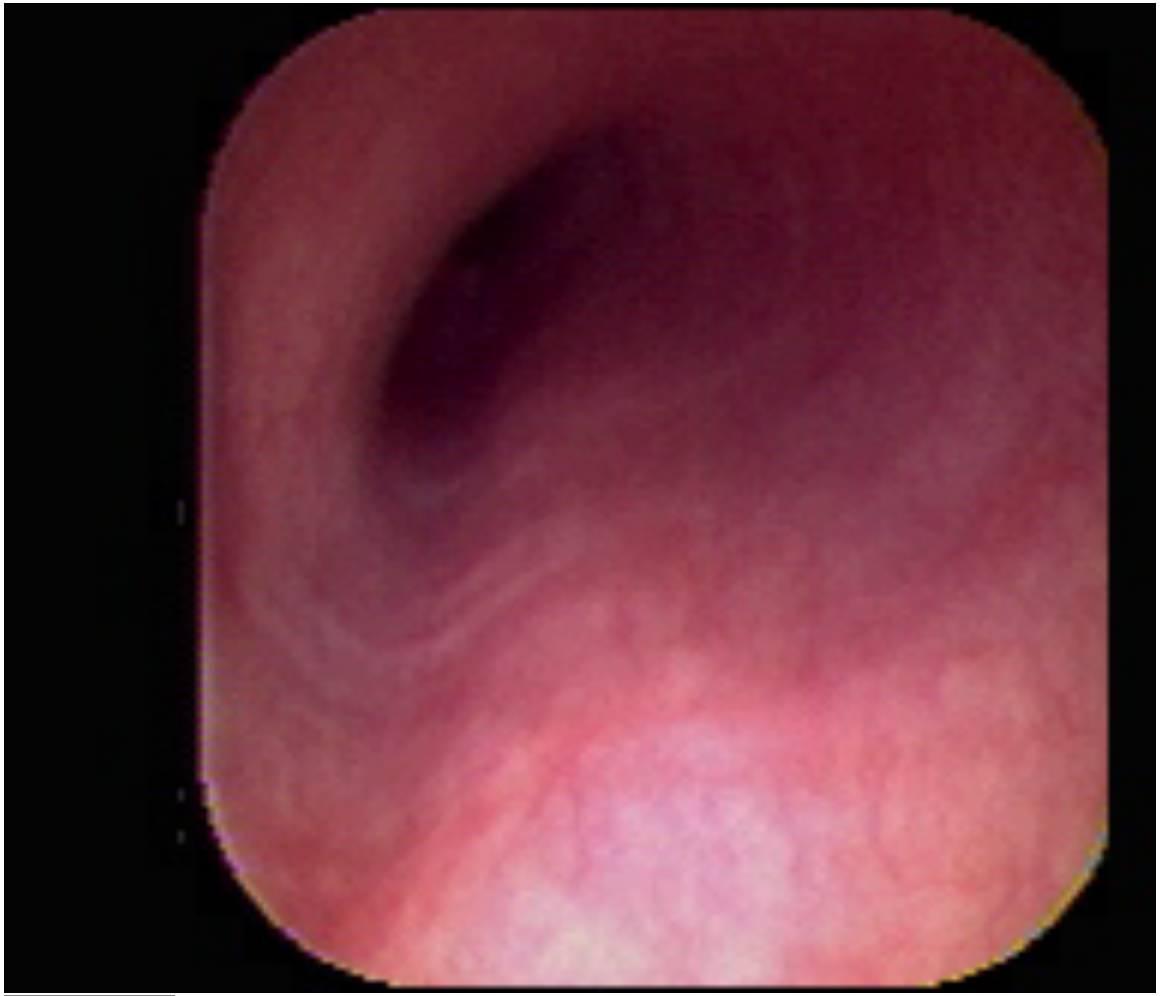
Tour of the Lumen of the Tubular Gastrointestinal Tract: Structures Within Reach of the Endoscope

A Lumen with a View

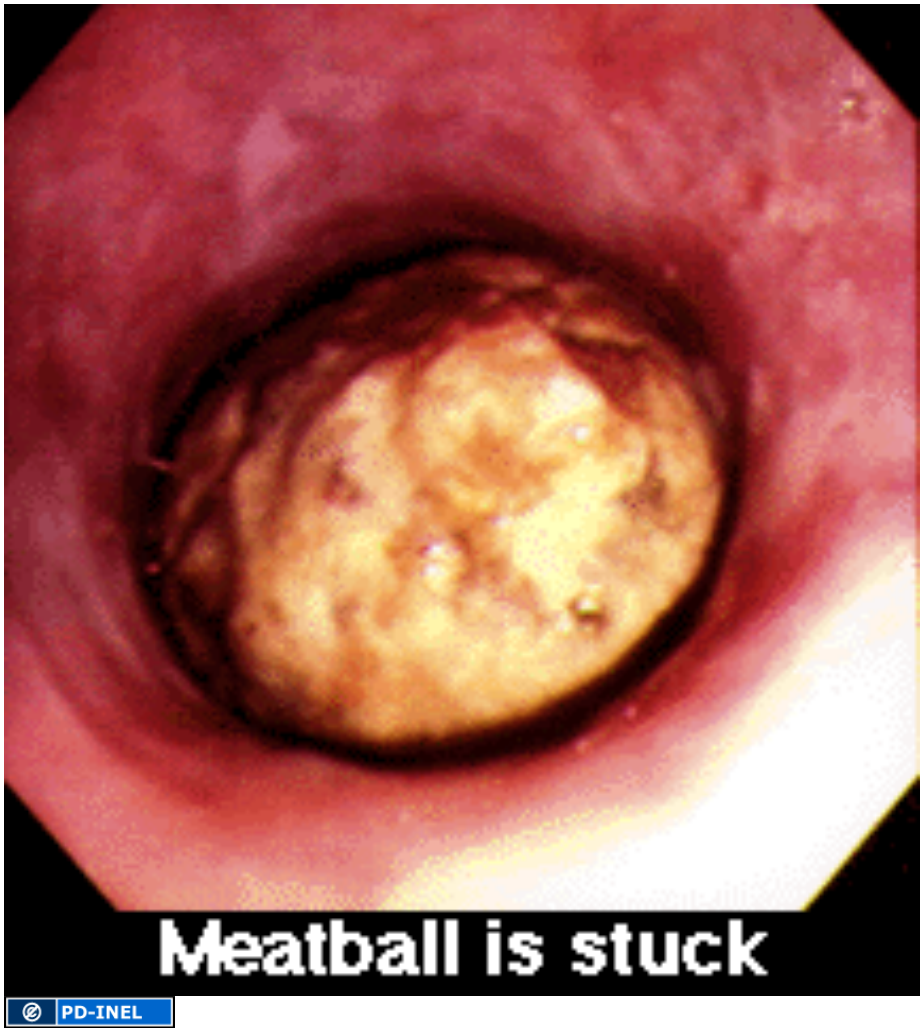
Normal Vocal Cords

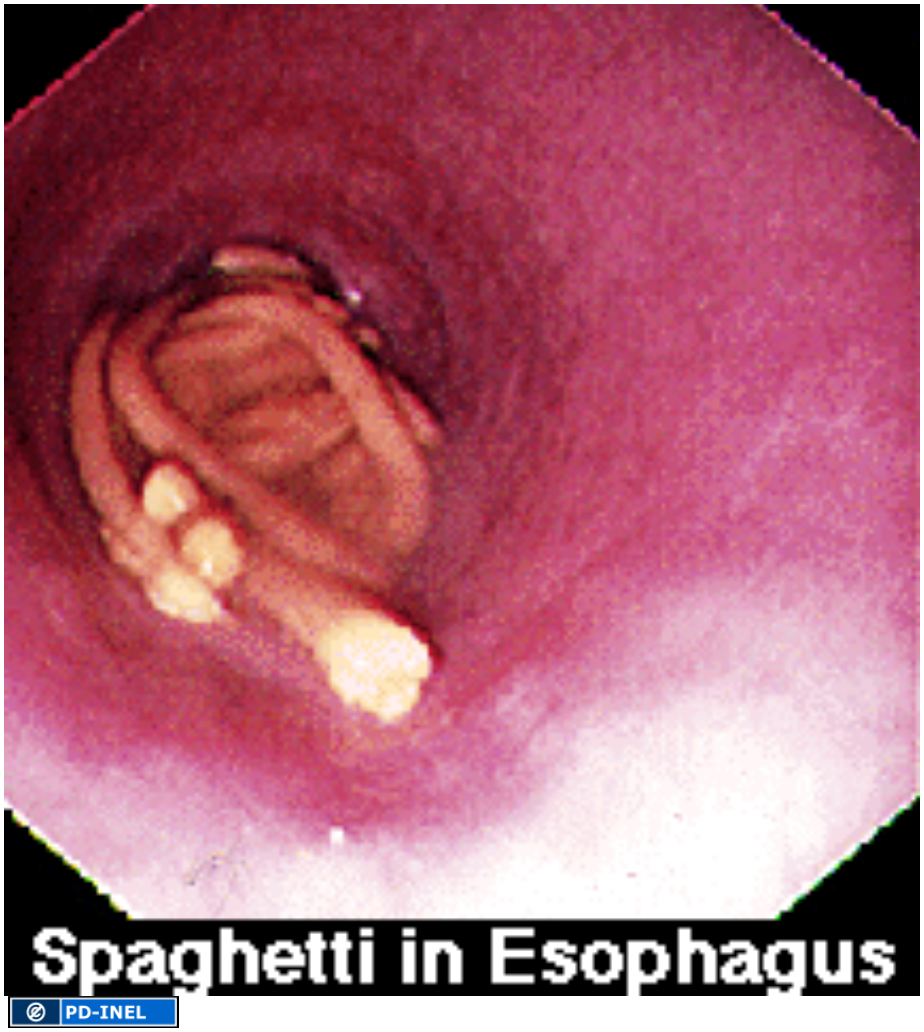


Normal Esophagus



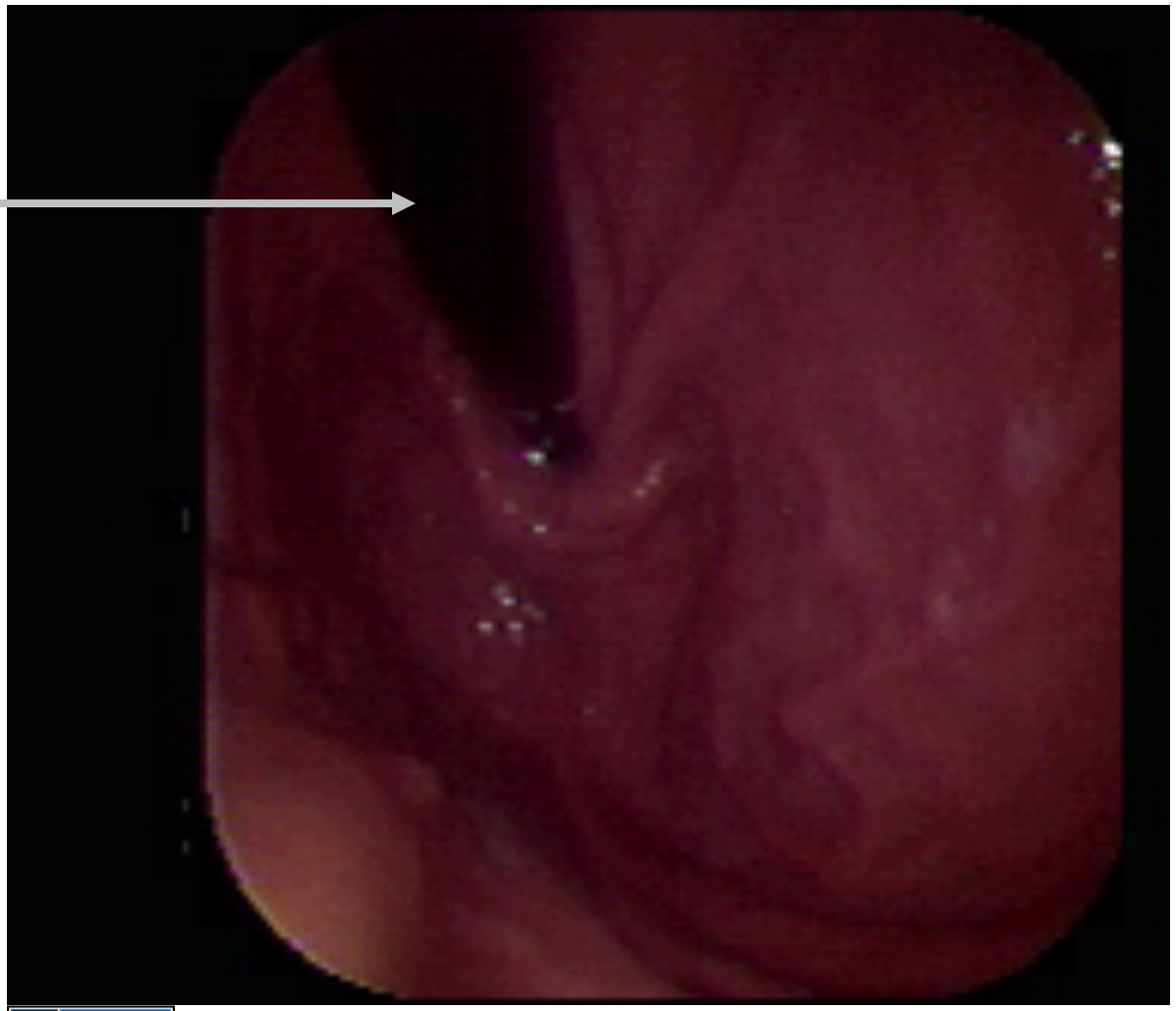
A Funny Thing Happened on the Way to the Stomach





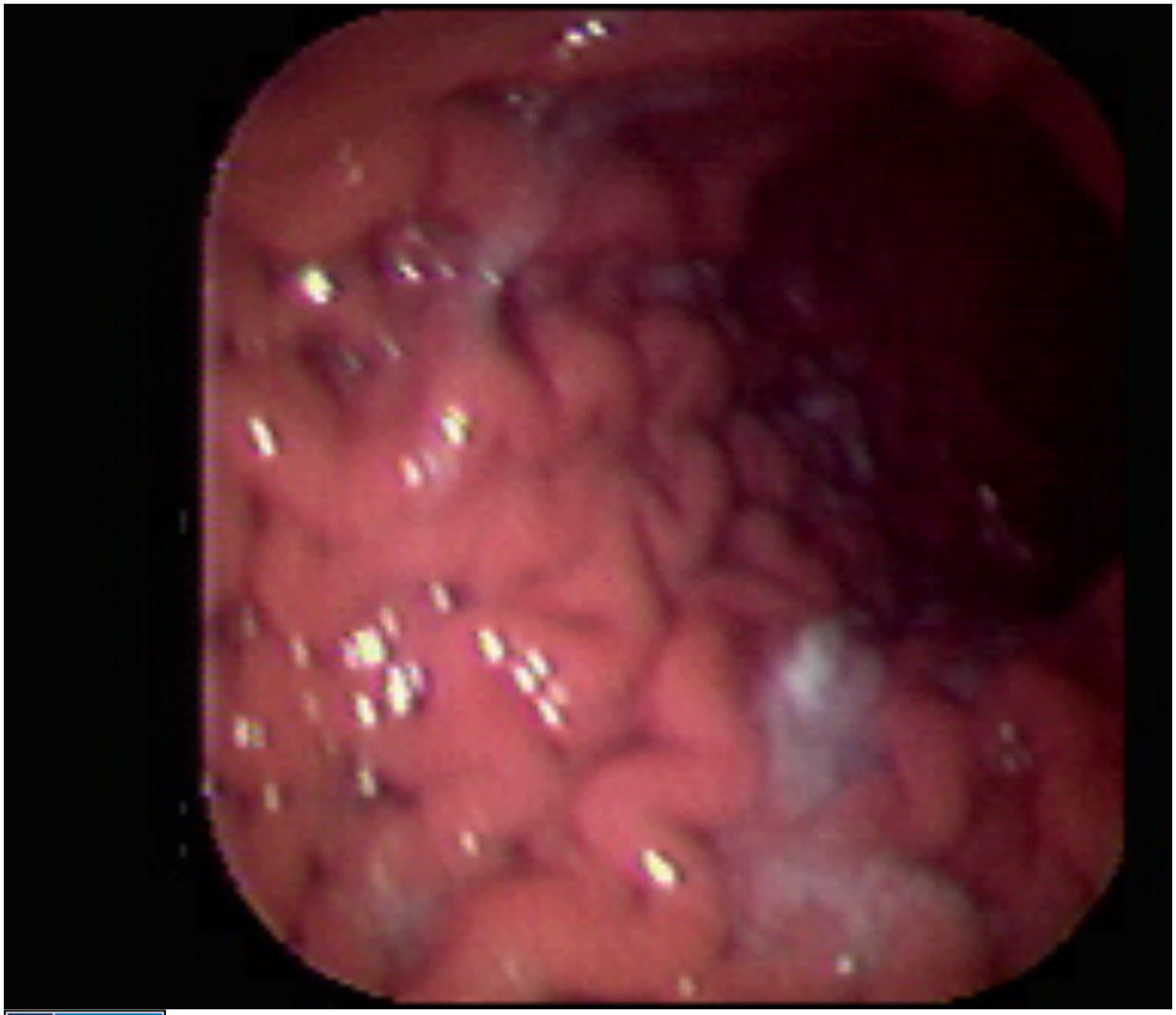
Retroflex View of Gastro-esophageal Junction from inside the stomach

Endoscope

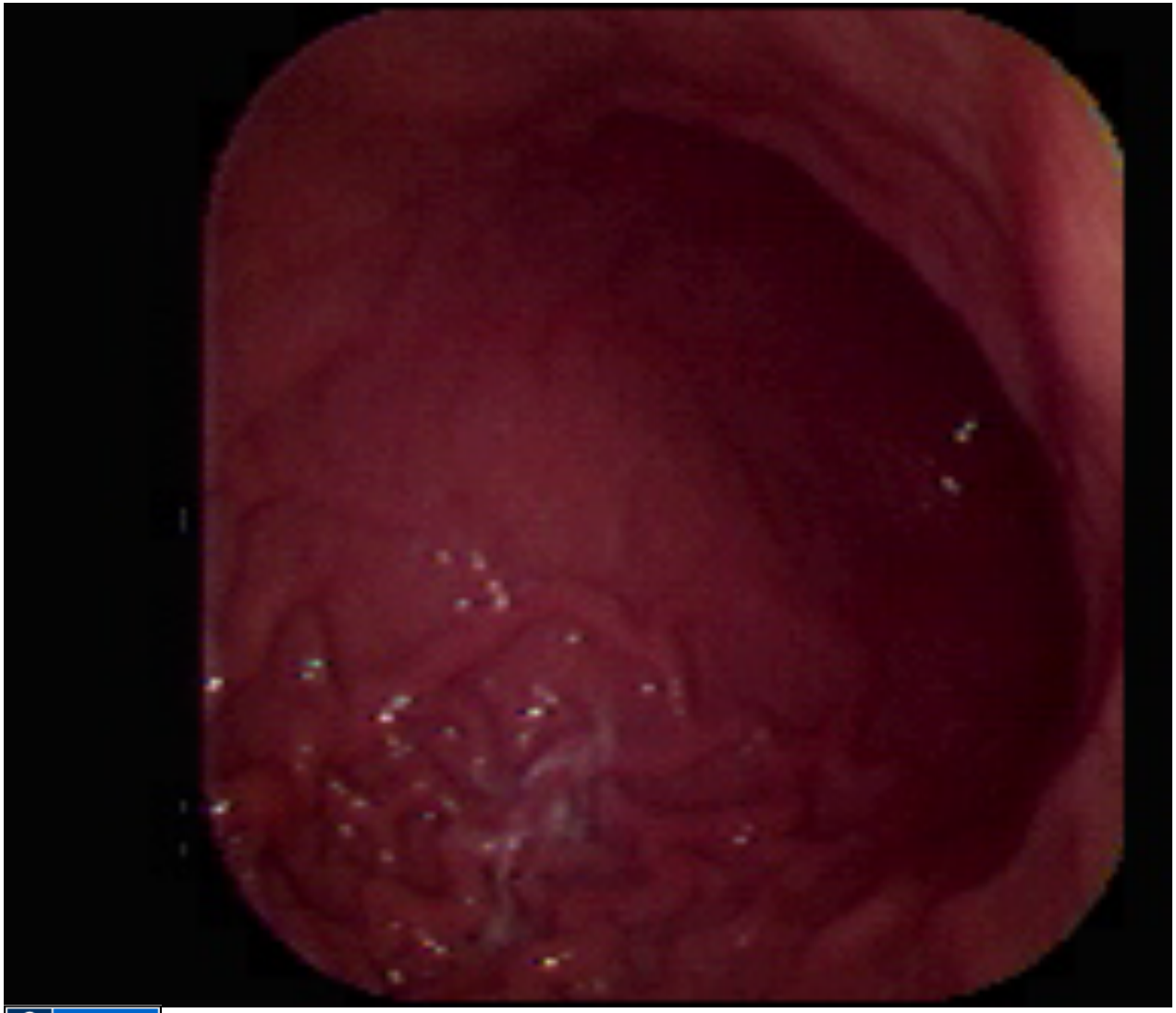


Normal Stomach

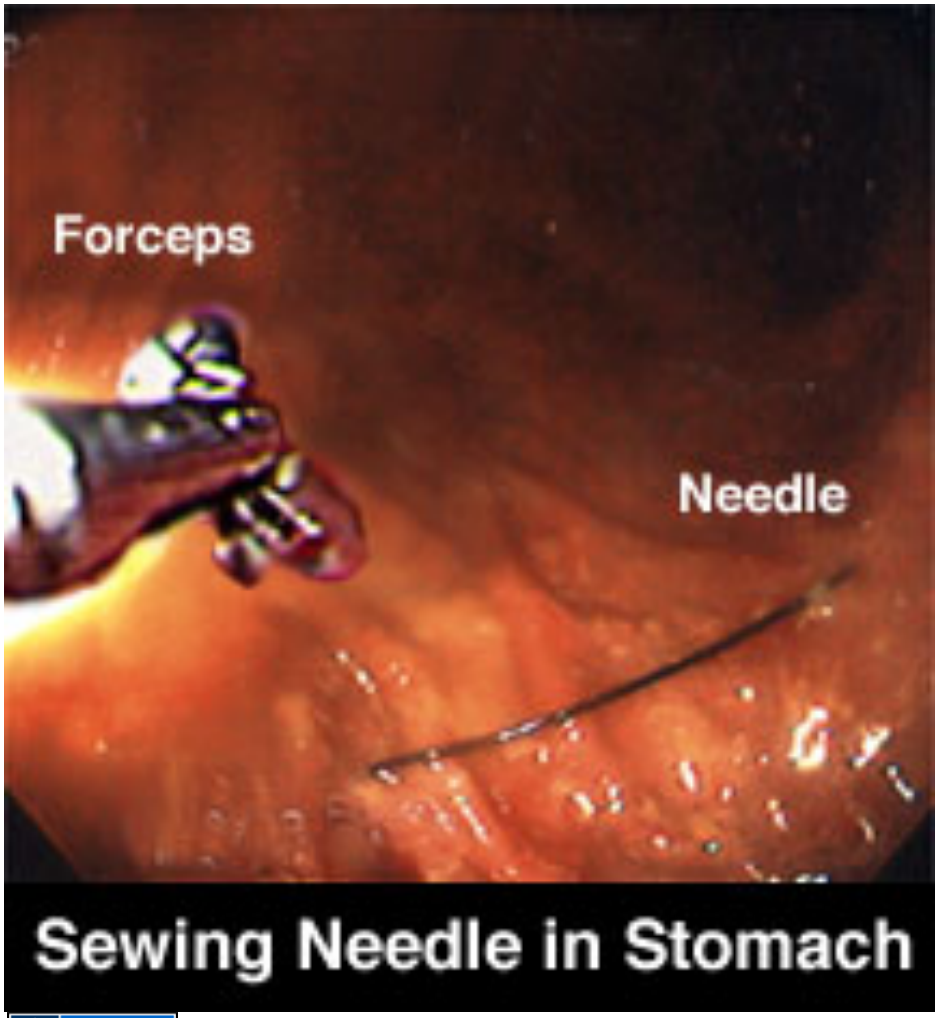
Large rugal folds of proximal stomach (fundus)



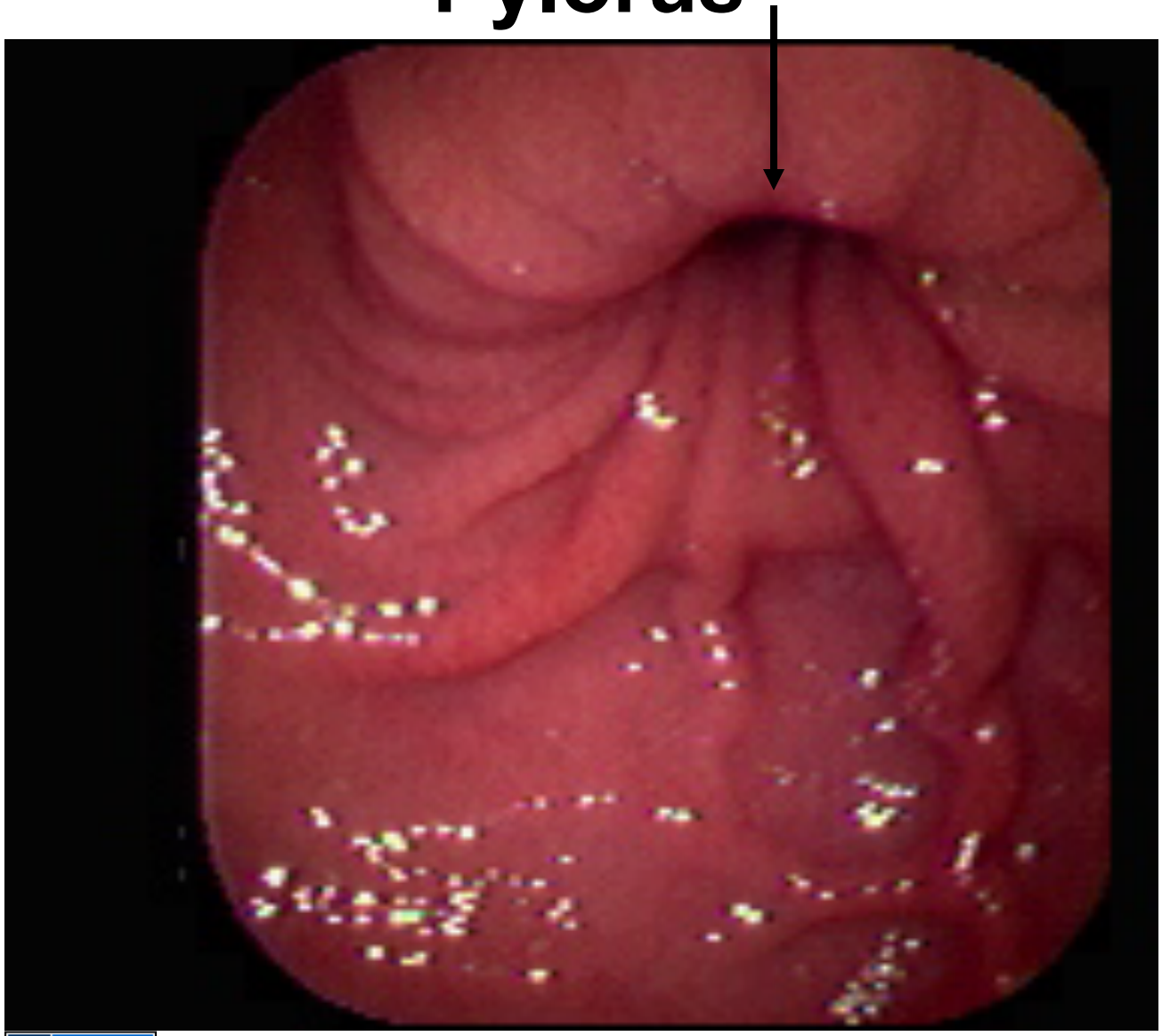
Normal Distal Stomach/Antrum



Strange Encounters of the Endoscopic Kind

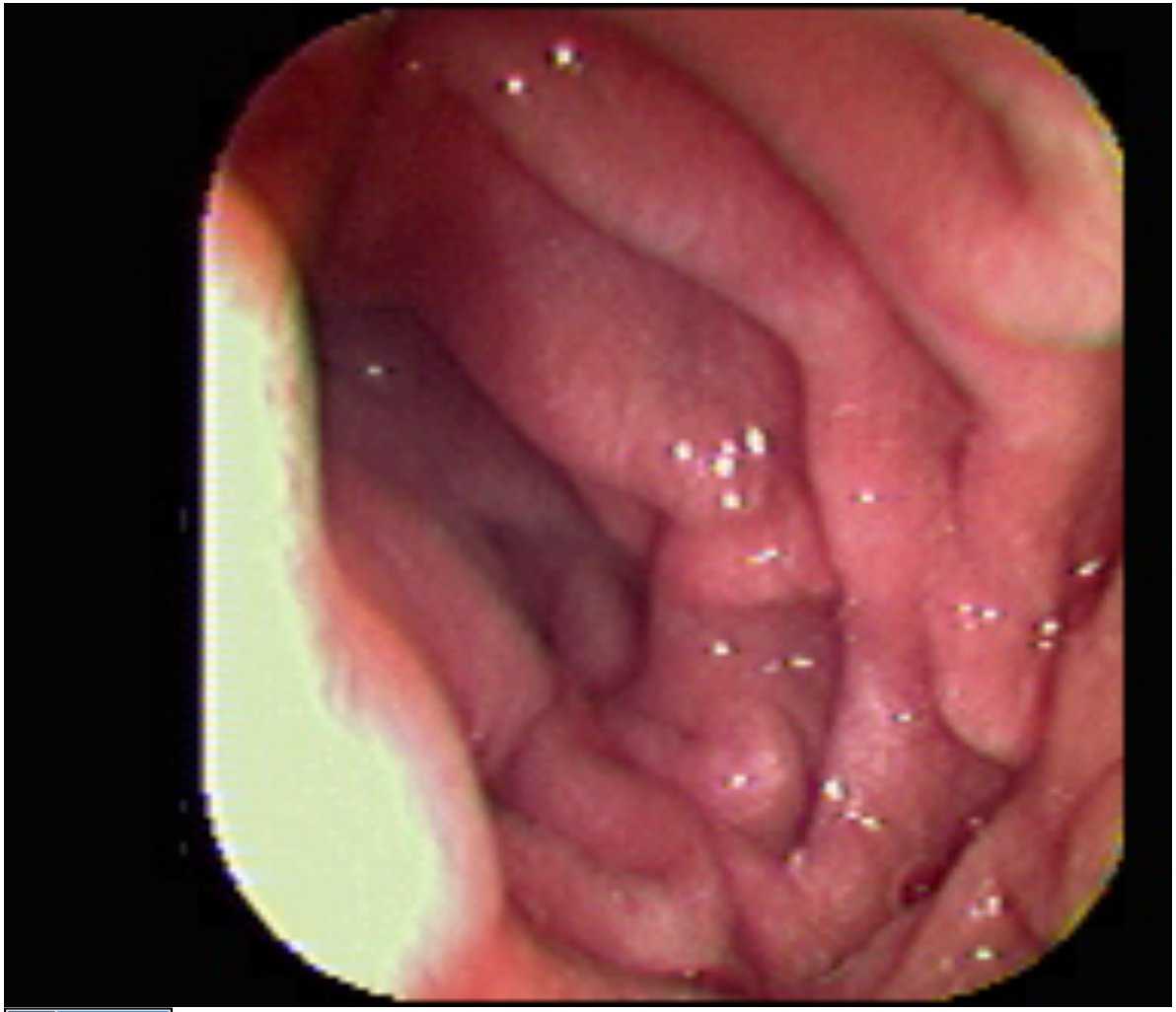


Normal Antrum (foreground) and Pylorus

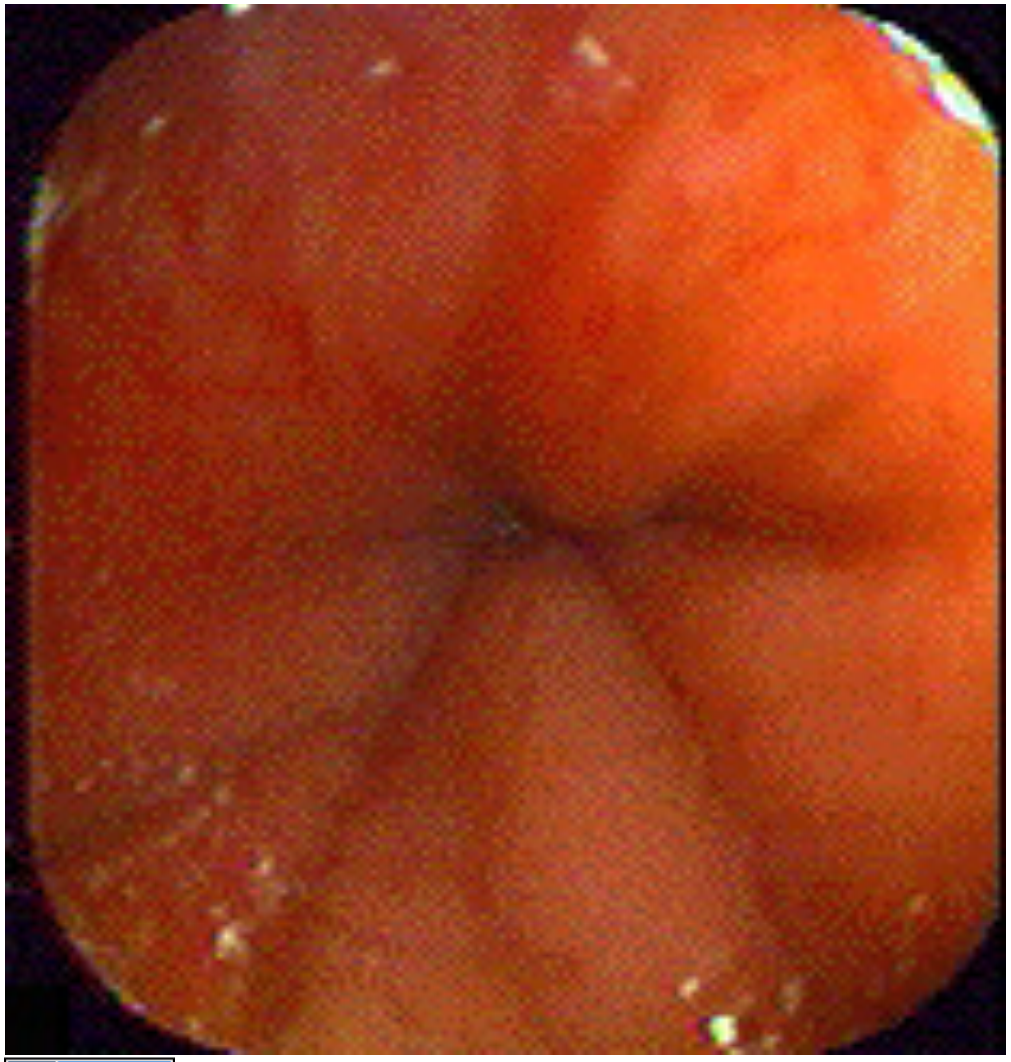


Normal Duodenum

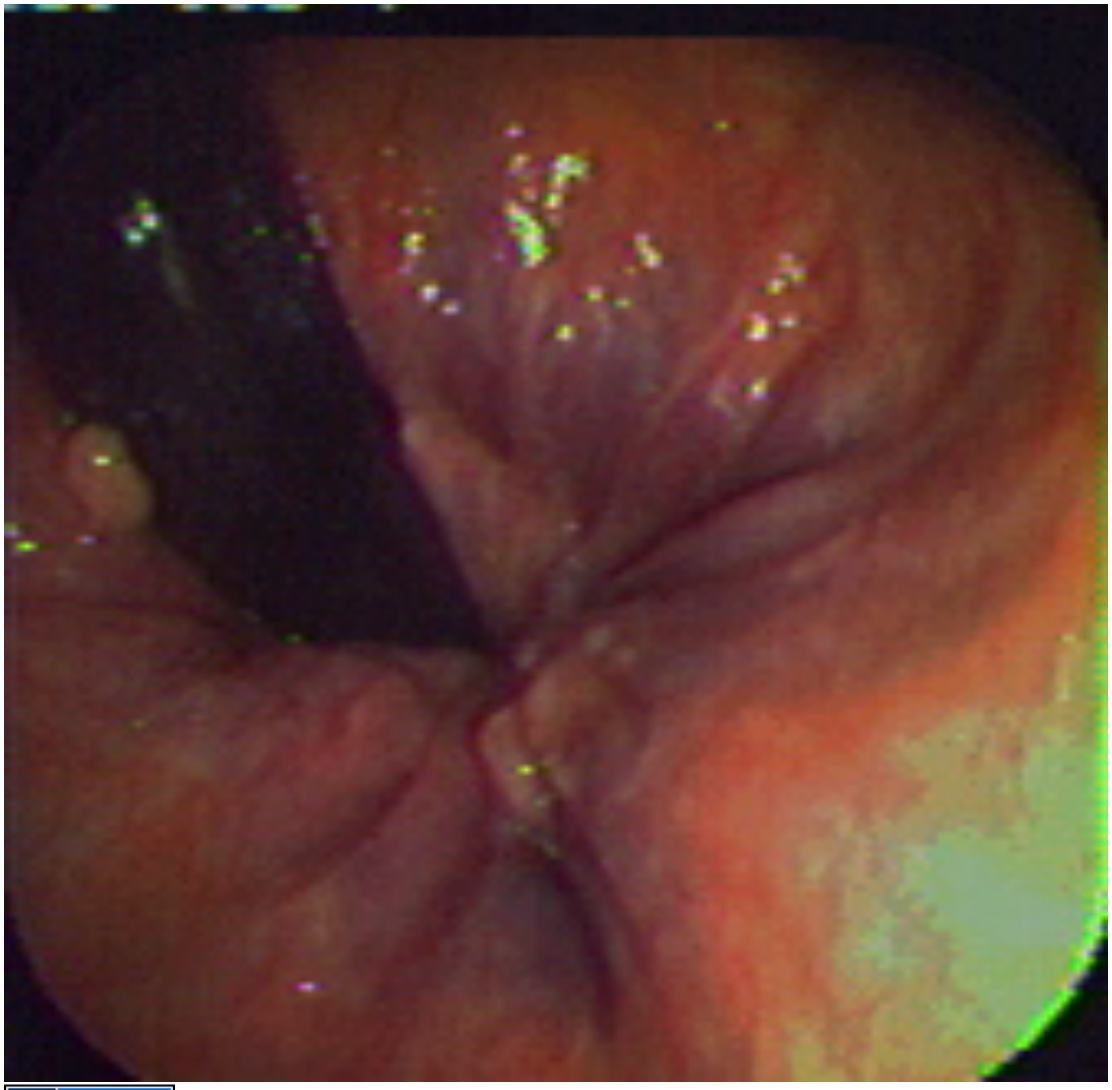
Not distended so valvulae conniventes appear thickened



External View of Normal Anus

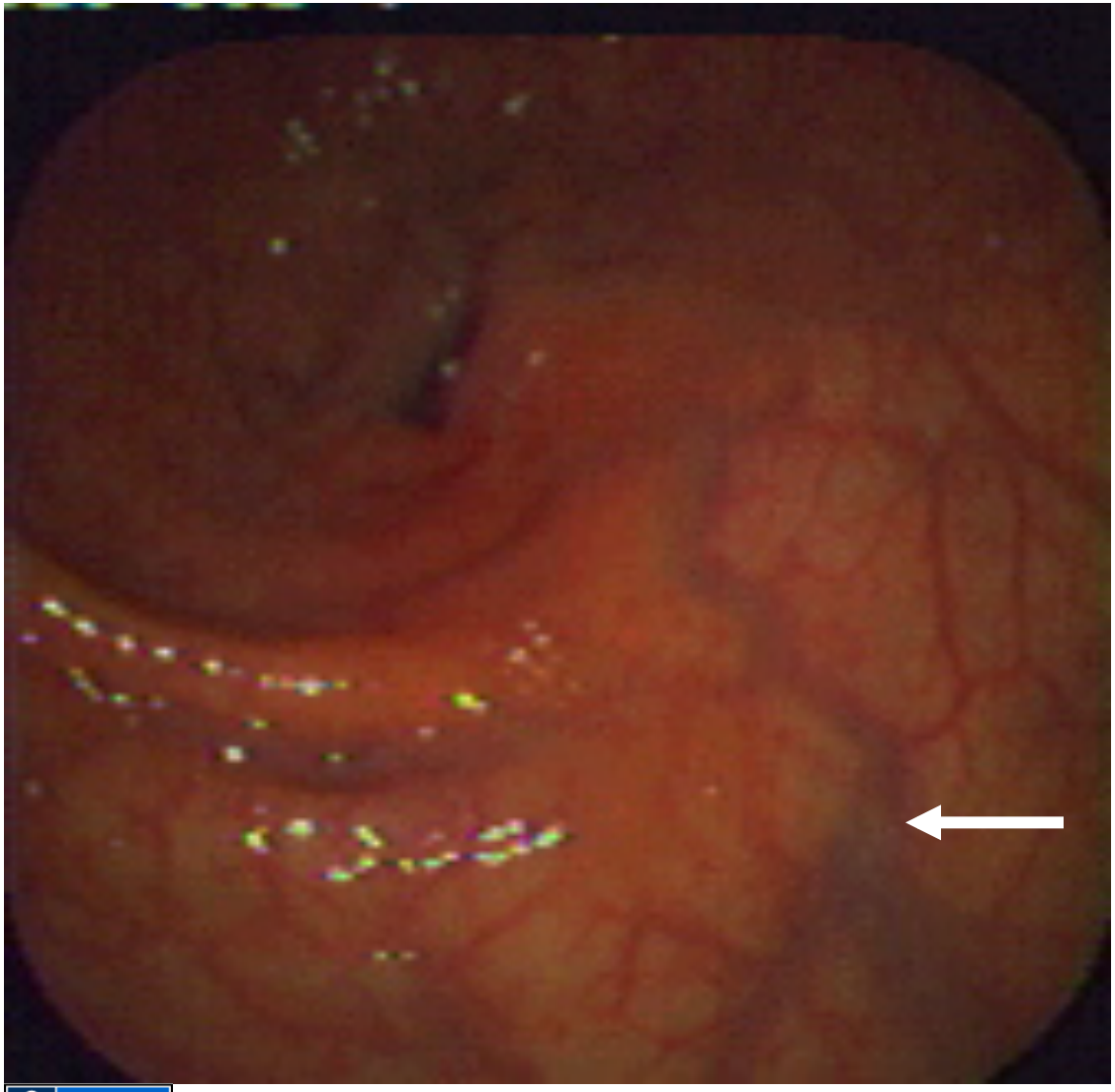


Retroflex View of Anus/Anal Sphincter from inside the colon

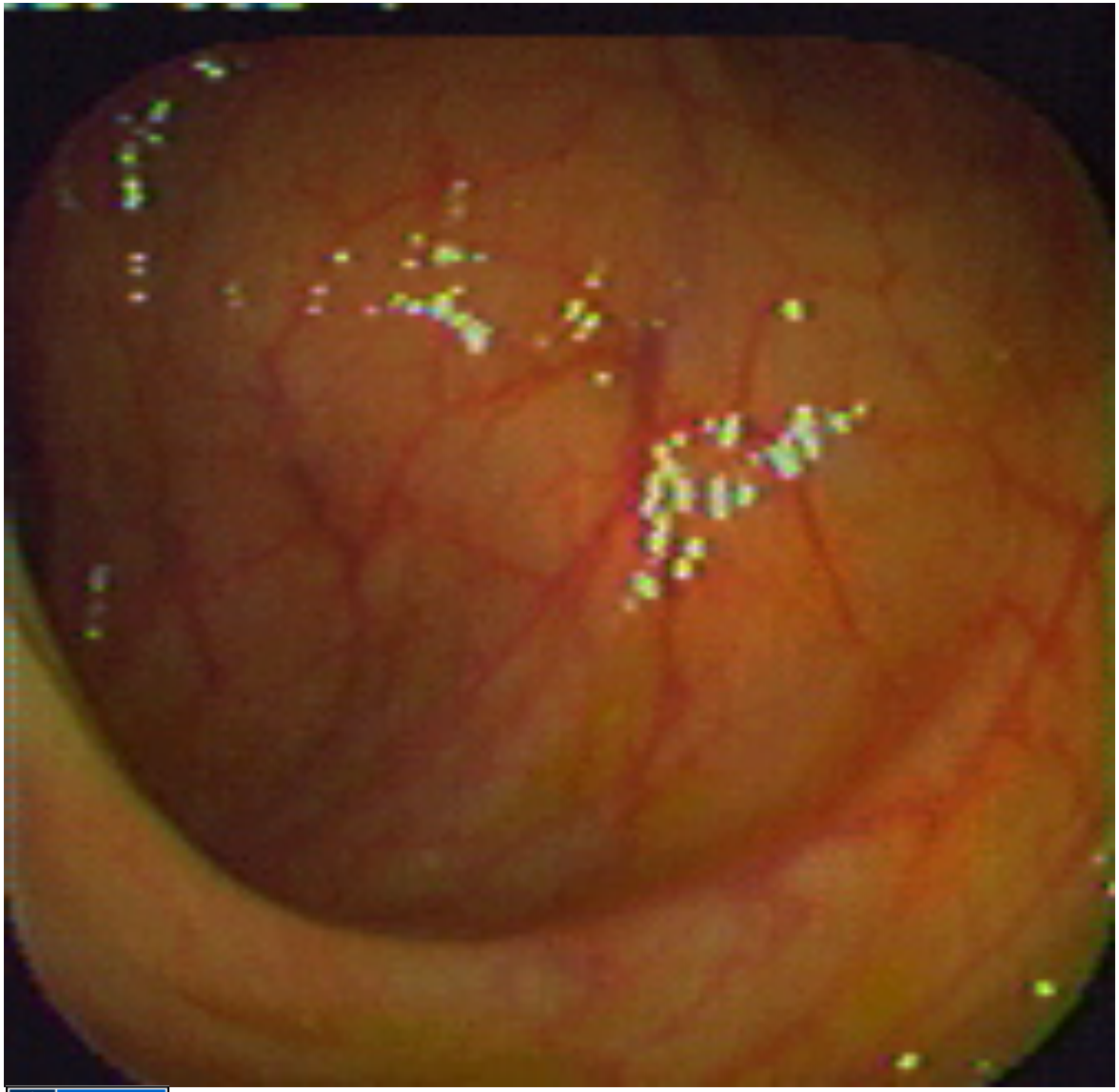


Normal Rectum

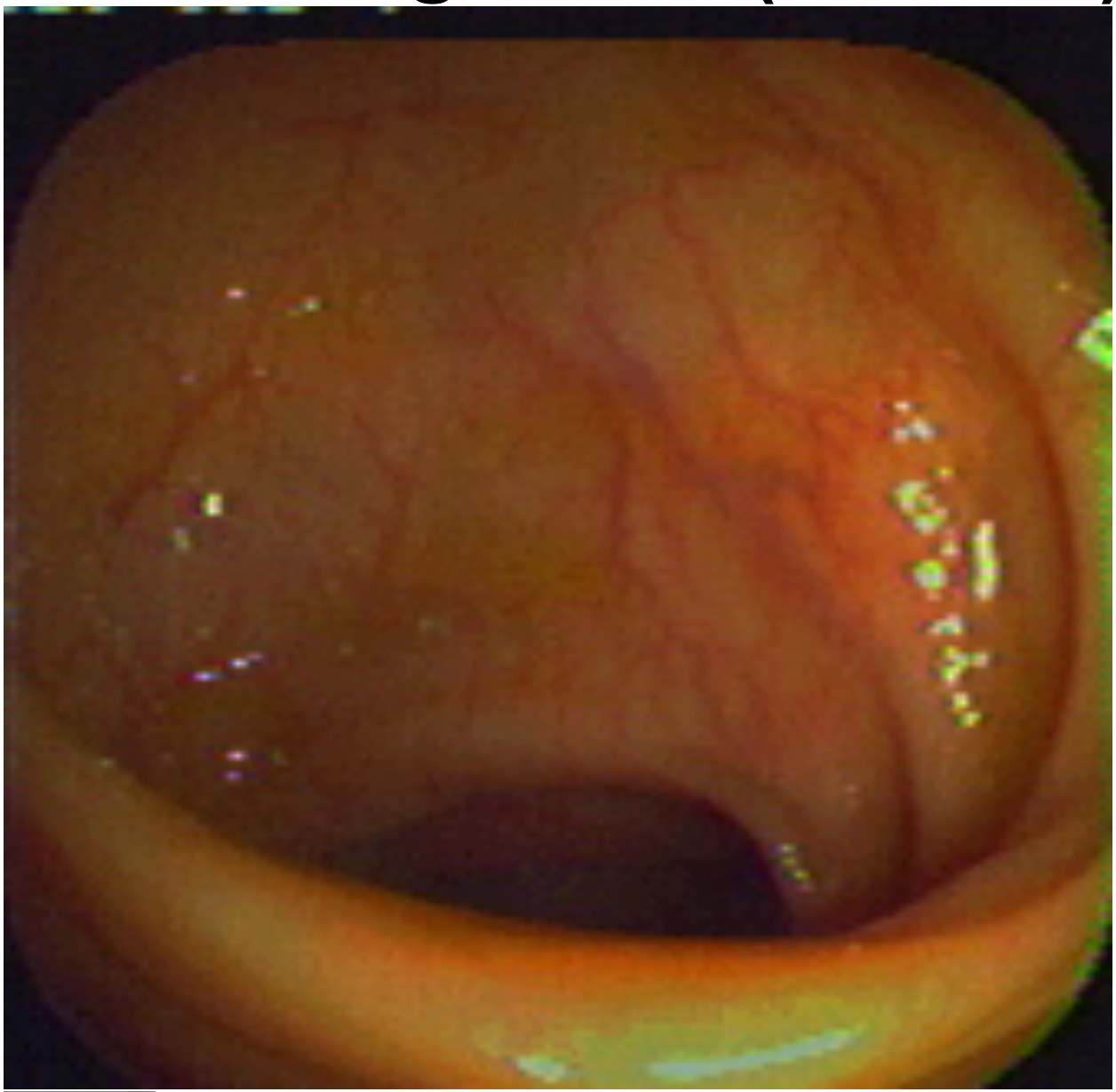
prominent vasculature



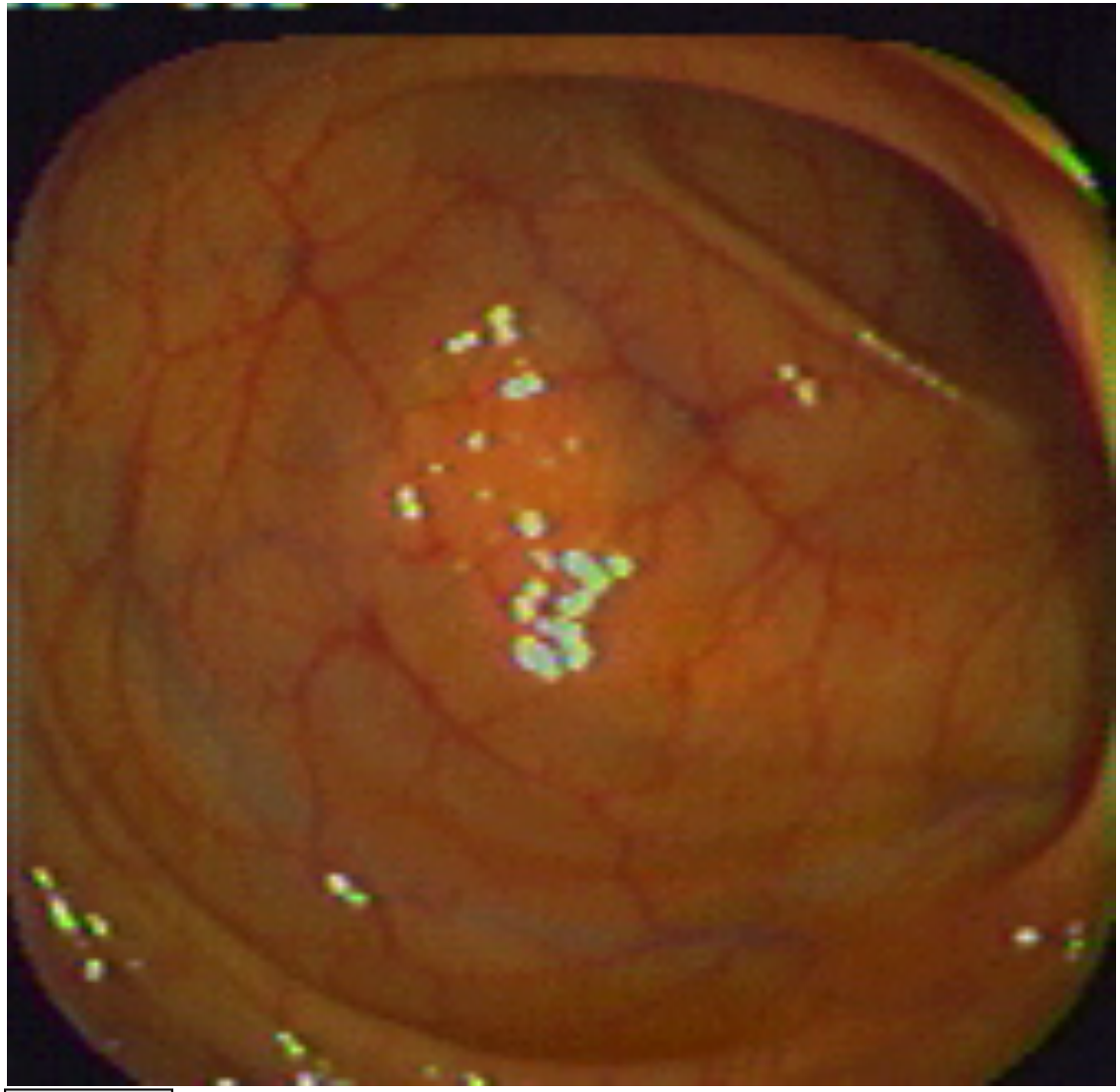
Sigmoid Colon



Descending Colon (left side)

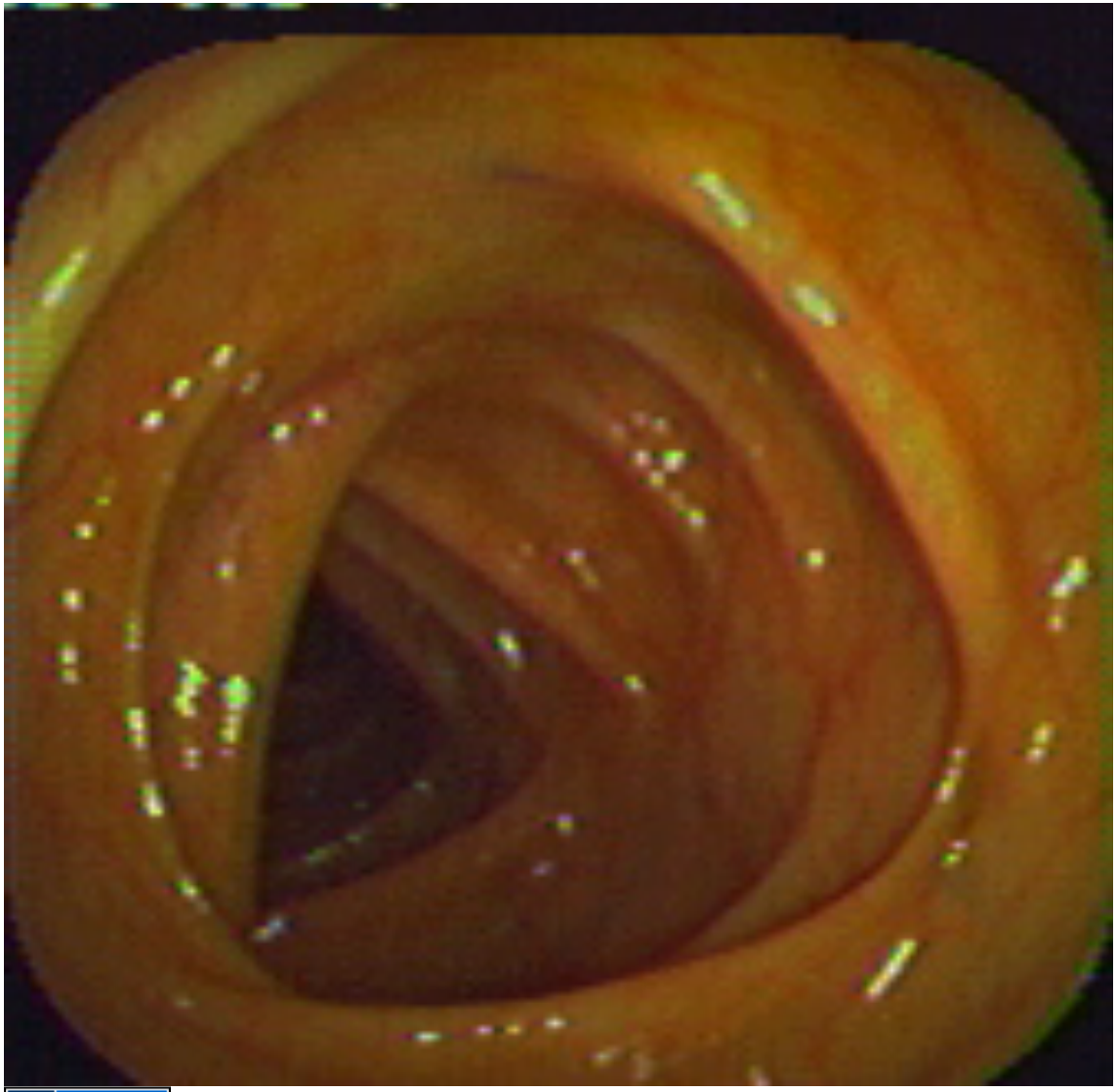


Splenic Flexure of Colon

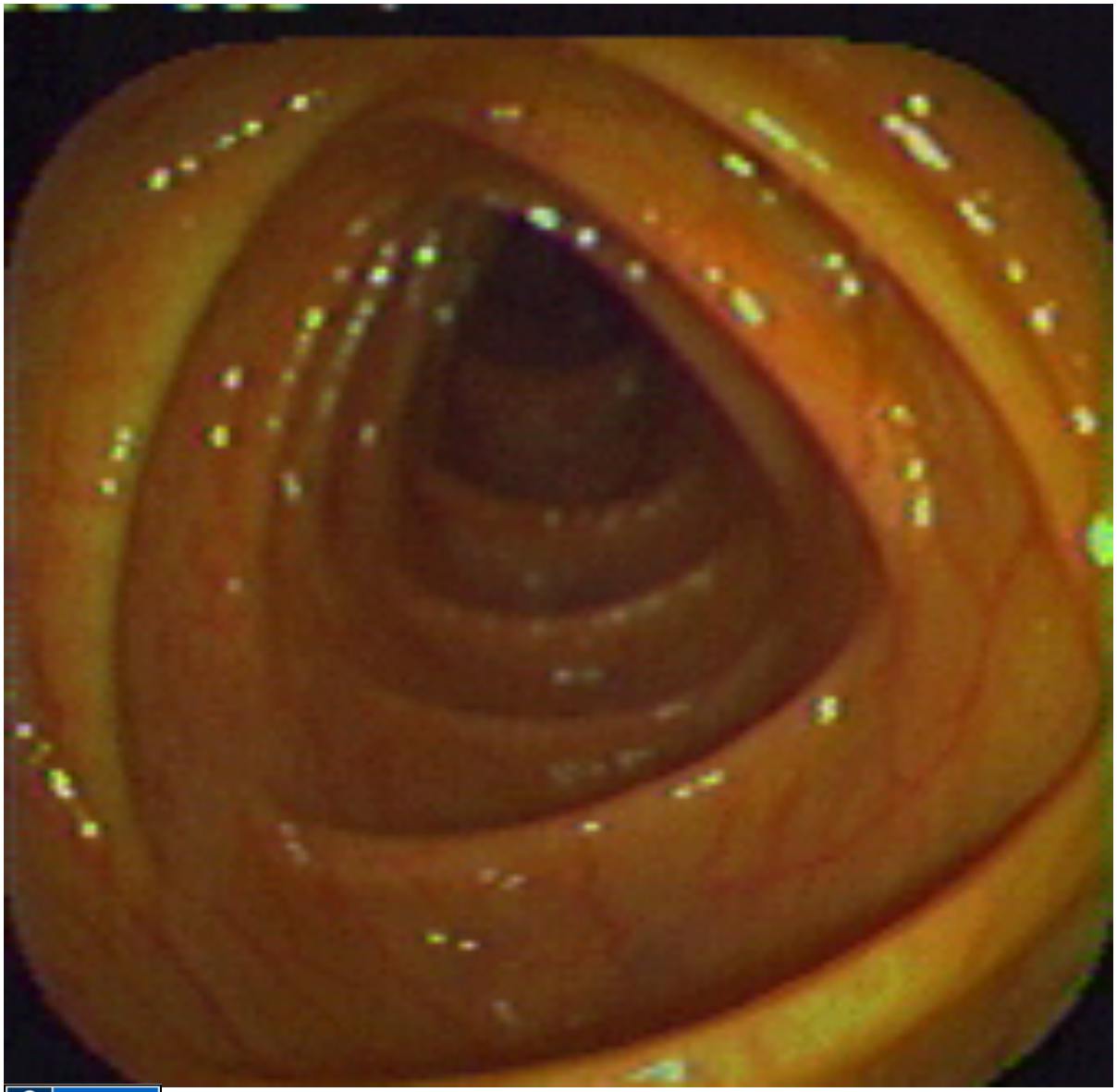


Transverse Colon

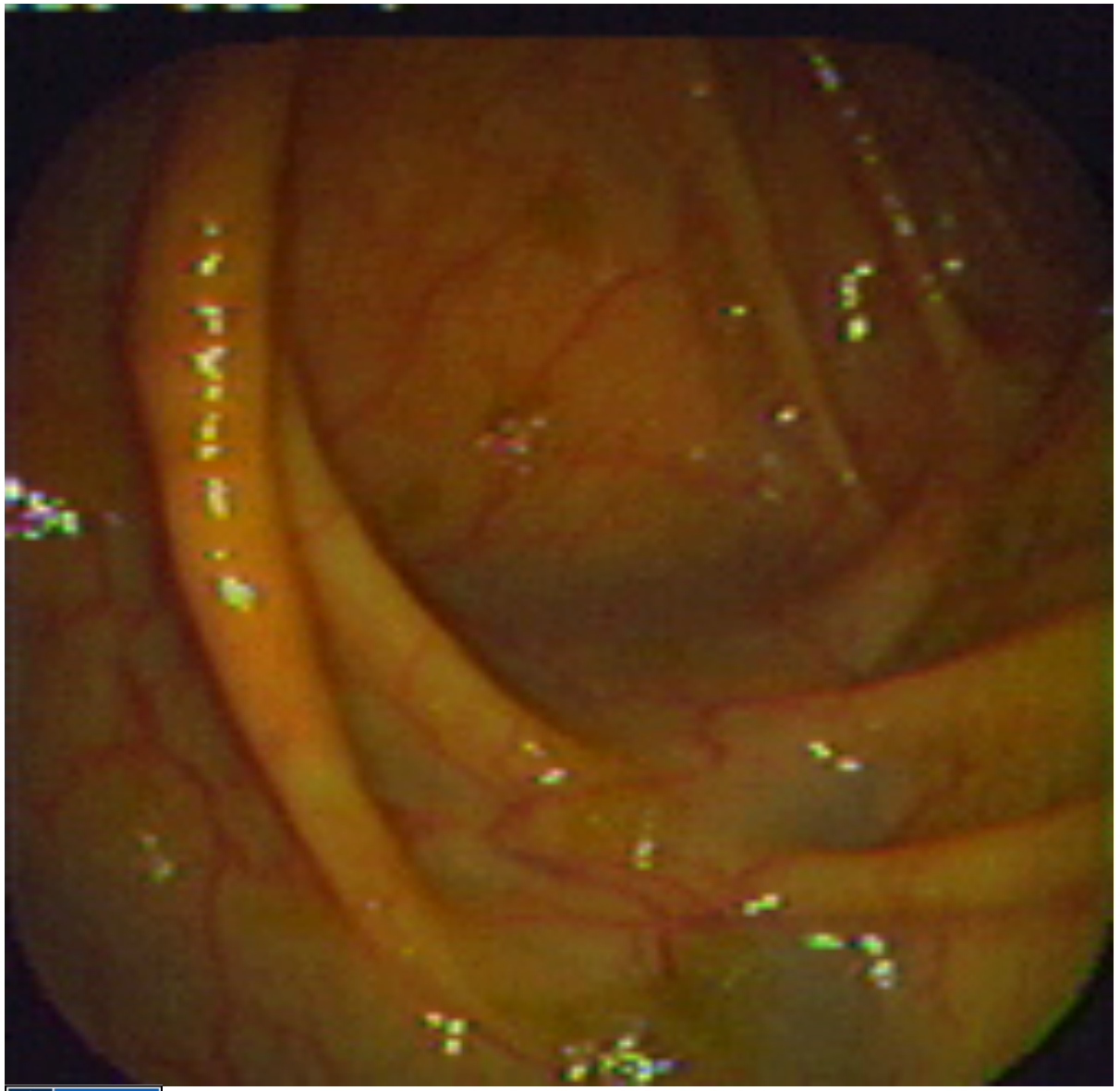
characteristic triangular folds



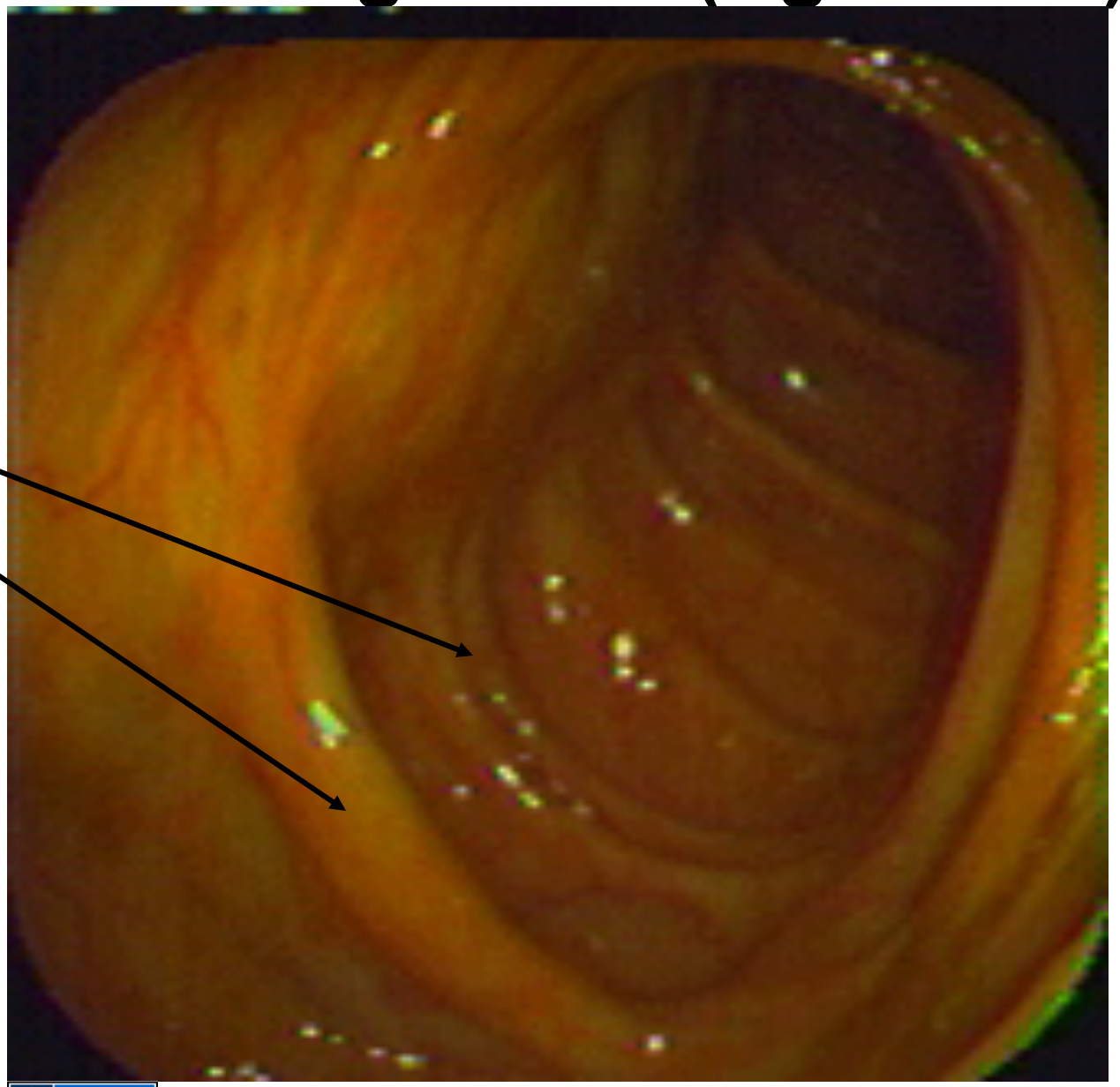
Transverse Colon



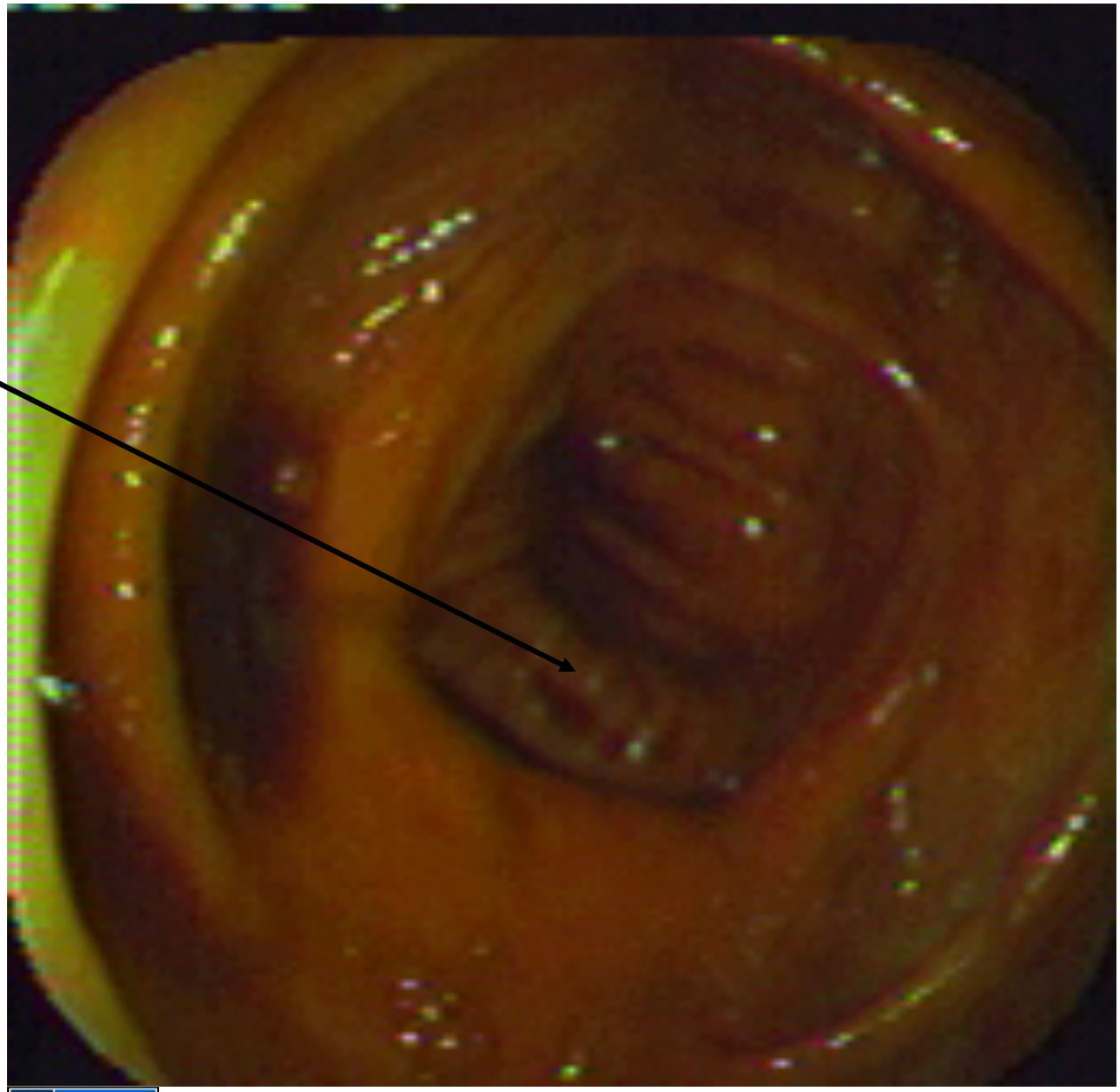
Hepatic Flexure of Colon



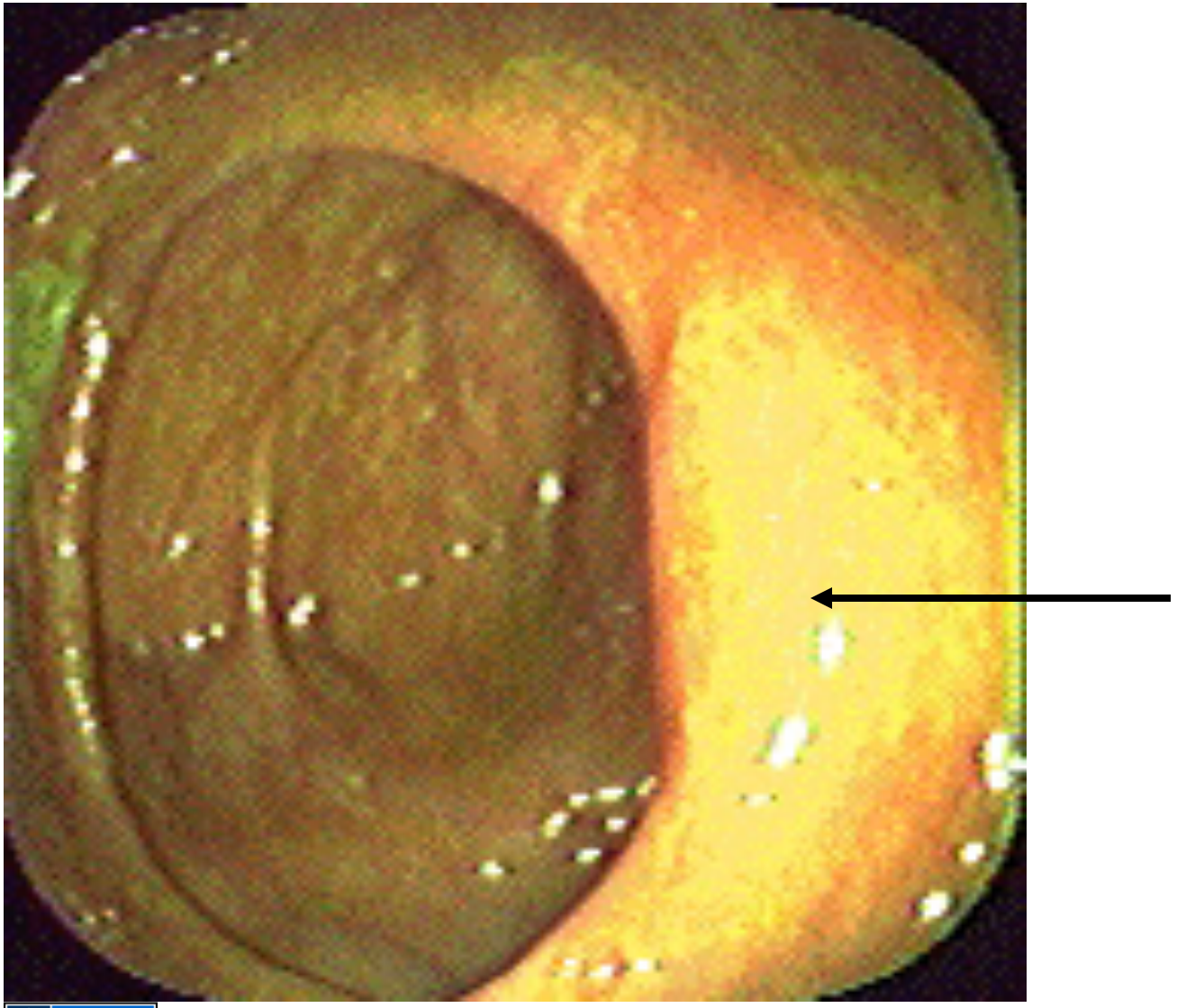
Ascending Colon (right side)



Cecum



Close-up of Ileocecal Valve in the Cecum

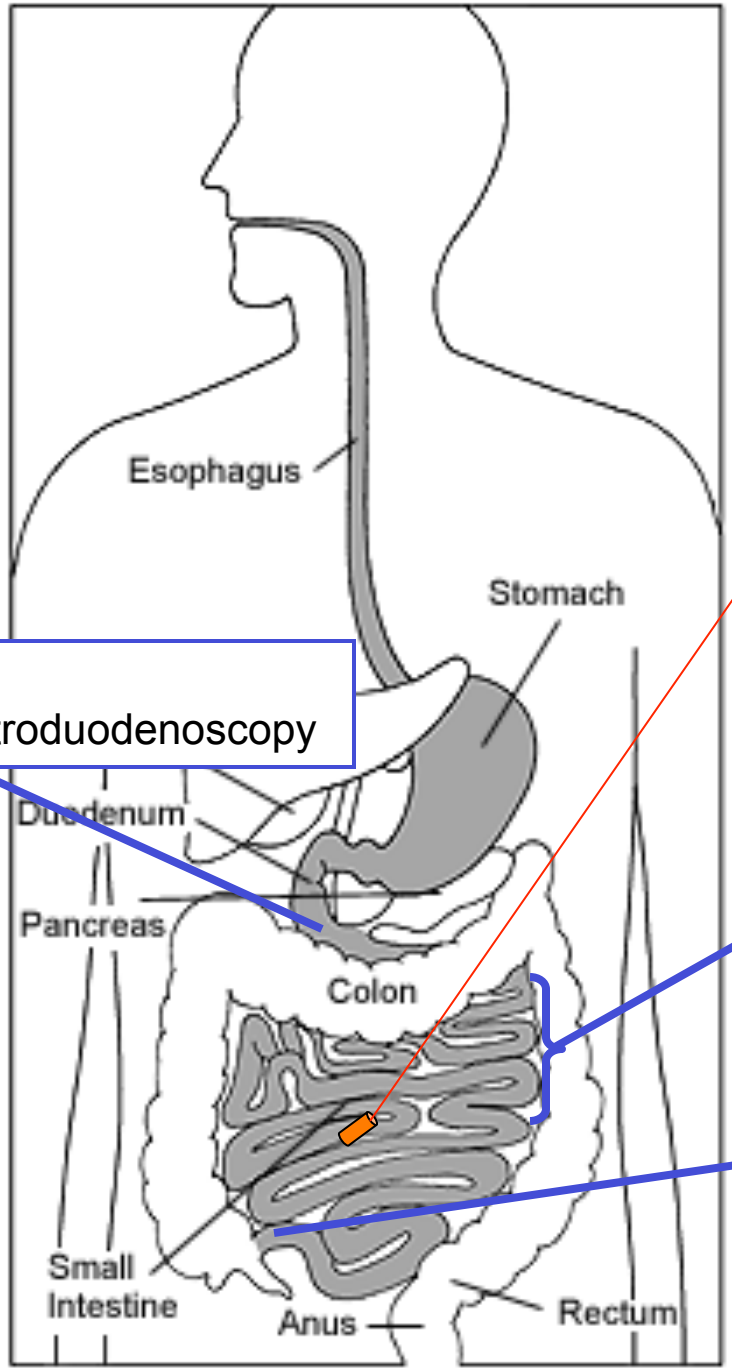


Ileum as viewed after passing through the ileocecal valve from the colon

Valvulae conniventes

Endoscopy

- View from mouth to mid-duodenum
  - Upper endoscopy
  - EGD = esophagogastroduodenoscopy
- View from anus to cecum/terminal ileum
  - Lower endoscopy
  - Colonoscopy
- What does this leave?
  - Small bowel
  - Capsule endoscopy



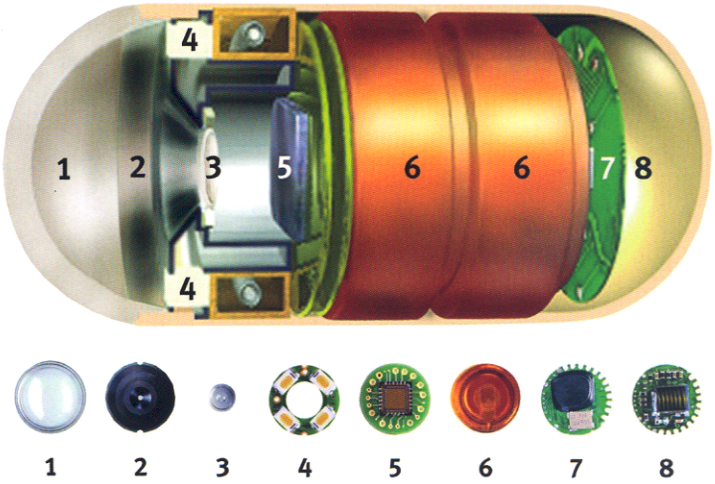
Capsule can be used to easily visualize rest of the small intestine.

Extent of esophagogastroduodenoscopy

Extent of push endoscopy (80-120 cm past ligament of Trietz). Uncomfortable and time-consuming.

Extent of colonoscopy

Capsule endoscopy

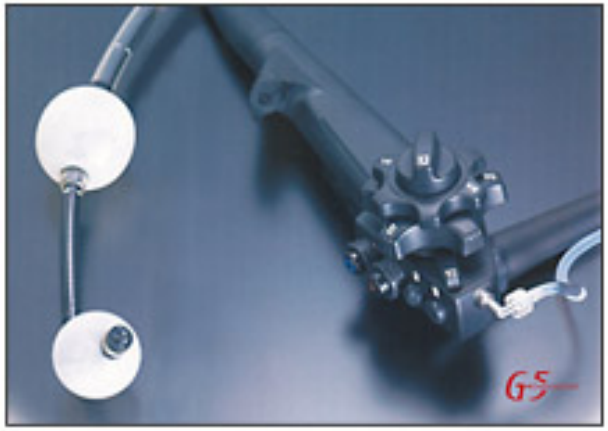


Inside the capsule:

1. Optical dome
2. Lens holder
3. Lens
4. Illuminating LEDs (Light Emiting Diodes)
5. CMCS (Complementary Metal Oxide Semiconductor) imager
6. Battery
7. ASIC (Application Specific Integrated Circuit) transmitter
8. Antenna

PD-INEL

Double Balloon Endoscopy



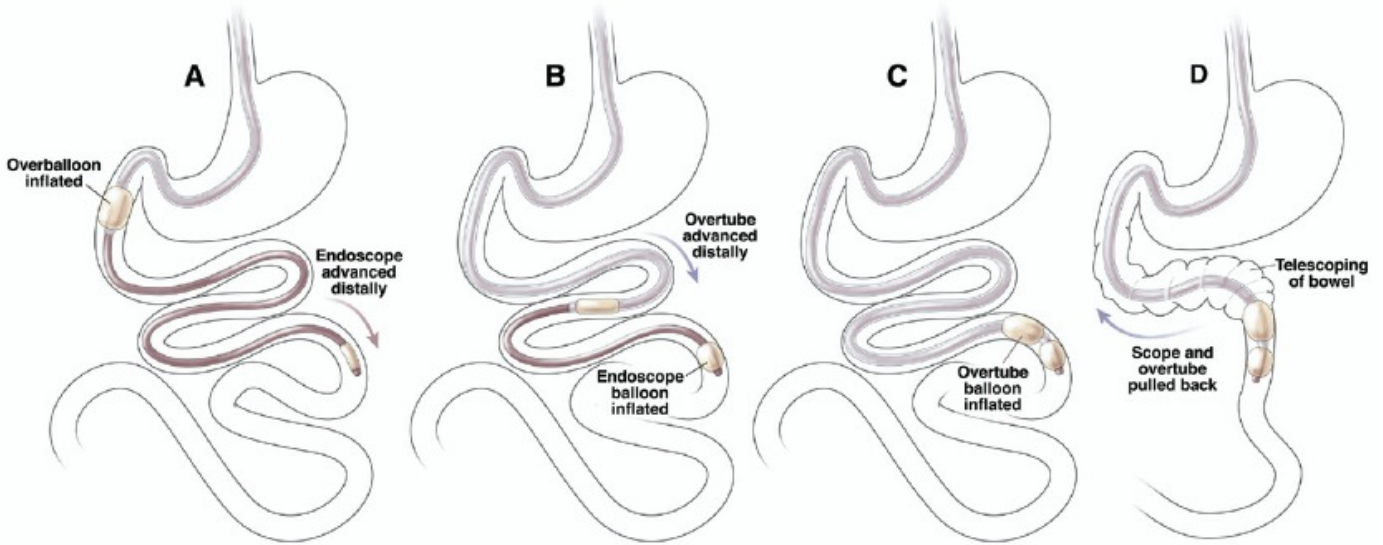


Figure 2. Double balloon enteroscopy. The drawings above show the technique of "push and pull enteroscopy" using the double-balloon enteroscope with overtube to facilitate examination of the SB.

Capsule Views
normal small bowel

Lymphoid hyperplasia

Capsule Views
Diseases

Ulcers from Crohn’s disease or non-steroidal anti-inflammatory Drugs (NSAIDs)

Capsule Views
Disease

Bleeding

Arteriovenous Malformation (AVM)

Stricture (NSAIDs)

Further images and endoscopic videos of GI/Liver diseases

- **daveproject**.org/

- This is a free website established and updated by gastroenterologists and sponsored by the American Society of Gastrointestinal Endoscopists and one of the endoscopy equipment manufacturers

- Feel free to wander…….

Videos

- Animations of upper and lower endoscopy
- Examples of normal endoscopy – these will be posted on CTools
- GI motility video – physiology and pathophysiology. This is about 30 minutes in regular speed. It is on CTools and I suggest you watch it at the usual 1.5-2x speed.

Additional Source Information

for more information see: http://open.umich.edu/wiki/CitationPolicy

Slide 6, Image 1 (left): Pearson Scott Foresman, "Intestine," Wikimedia Commons, http://commons.wikimedia.org/wiki/File:Intestine_(PSF).png.

Slide 12, Image 1 (left, top): Euchiasmus, "CapsuleEndoscope", Wikimedia Commons, http://commons.wikimedia.org/wiki/File:CapsuleEndoscope.jpg.

Slide 12, Image 3 (left, bottom): jcjack, "Radiology 2-R," Flickr, http://www.flickr.com/photos/48497052@N04/5058467485/#/, CC: BY 2.0, http://creativecommons.org/licenses/by/2.0/deed.en

Slide 12, Image 4 (middle, bottom): brainsik, "CAT scan sofa," Wikimedia Commons, http://www.flickr.com/photos/brainsik/168596881/sizes/z/in/photostream/, CC: BY 2.0, http://creativecommons.org/licenses/by/2.0/deed.en