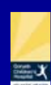
Capsule Endoscopy: When, Why and Why Not

Joel R. Rosh, MD
Goryeb Children's Hospital/Atlantic Health
Morristown, New Jersey



Disclosure

In the past 12 months, I have had the following relevant financial relationship with the following manufacturer of commercial products discussed in this CME activity:

- Given Imaging: consultant (received honorarium

I do not intend to discuss an unapproved or investigative use of commercial products or devices in my presentation.

Outline

- Indications and contraindications for capsule endoscopy(CE) in the pediatric population
- Lesions commonly detected by CE
- Common pitfalls and "pearls" in the pediatric use of CE

Imaging Small Intestine: The GI Holy Grail

- Significant length
- Contractility
- Overlying loops

Gastroenterology 1997;113:390–398

Imaging Small Intestine: Pediatric Issues

- Radiation
  - Increased sensitivity for complications?
  - Long-term burden
- QOL
  - Impact of imaging especially contrast
  - Impact of multiple tests
  - "Yuk vs. cool"

Hey Kids—Which would you prefer?

VS

ASGE Recommendations: Indications for Capsule Endoscopy

- Obscure GI bleeding
- Suspected/monitoring Crohn's disease
- Suspected small bowel tumors and surveillance in patients with polyposis syndromes
- Suspected or refractory malabsorptive syndromes

Why CE in Pediatrics?

The evolution of mucosal examination—

Move toward direct visualization:

- Contrast UGI series→ EGD
- Contrast enema→ colonoscopy
- Small bowel series→ CE
  - 2009: Approved ≥ 2 years

Mucosal Healing With Infliximab

SONIC: Mucosal Healing at Week 26

Proportion of Patients (%)

100
80
60
40
20
0

P<0.001
P=0.023
P=0.055

16.5
30.1
43.9

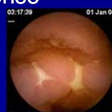
18/109
28/93
47/107

AZA + placebo
IFX + placebo
IFX+ AZA

Sandborn W et al. *Am J Gastroenterol.* 2008;103(Suppl 1):S436.

When: CE in Pediatric IBD

- Most common pediatric indication
- Diagnosis
  - Confirmation
  - Phenotyping (eg Crohn's vs. indeterminate)
  - Extent
    - If informs treatment choice
- Disease Monitoring/Treatment response
  - 15-30% with mid-small bowel
  - Post-operative



Mow et al. *Clin Gastroenterol.* 2004;2:31-40
Cohen et al. *J Pediatr Gastroenterol Nutr.* 2012;409-413
Gal et al. *Dig Dis Sci.* 2008;53:1933-1937

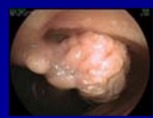
CE Impact on Pediatric IBD Management

- Single Center retrospective (N = 83)
- Poor growth/GI symptoms most common indication
- 86% positive CE; 75% treatment escalated
- 43% with greater CE > radiologic findings
- Significant one year improvements (height, BMI, ESR)

Minn S, et al. Inflamm Bowel Dis 2013:19:2139-2145

When: CE in Pediatric Polyposis

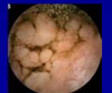
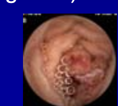
- Establish diagnosis in suspected cases
- Surveillance in known cases
- Change in symptoms of known case
  - Ongoing bleeding
  - Pain (assess size--?lead point)



Burke et al. *Am J Gastroenterol.* 2005;100(7):1498-1502.
Katsinelos et al. *World J Gastroenterol.* 2009; 8;15(48):6075-9.
Tescher et al. *Hereditary Cancer in Clinical Practice.* 2010;8:3.
Gunther. *Int J Colorectal Dis.* 2010;25:1377-82.
Will et al. *Pathol Res Prac.* 2008;204:449-58.

CE in Polyposis: Pluses and Pitfalls

- Pros
  - Less invasive than DBE
  - No radiation
- Cons—What/Where was that??
  - No biopsies (surveillance)
  - Sensitivities (tumbling, no second chance)
  - Specificities (lumps and bumps, eg LNH)

[25]Pennazio et al. *World J Gastroenterol.* 2008: 14(34): 5245-5253.

When: CE in Pediatric Obscure GI Bleeding

- Negative EGD and colonoscopy
- Approximately 5% of GI bleeding occurs between the ligament of Treitz and the ileocecal valve

SI Causes of Obscure Bleeding

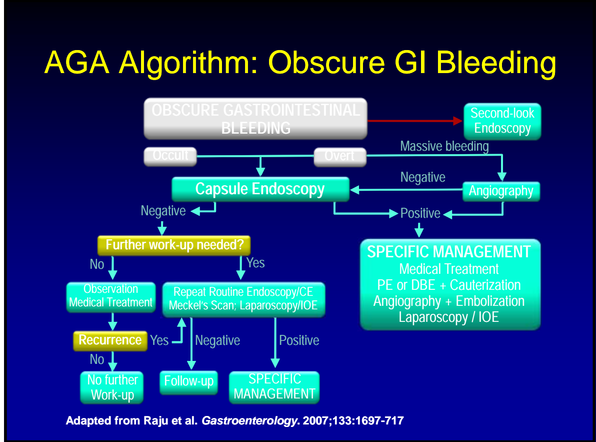
Angioectasia or vascular anomaly	20-55%
Small bowel tumors	10-20%
Crohn's disease	2-10%
Celiac disease	2-5%
Meckel's diverticulum	2-5%
NSAID enteropathy	5%
Dieulafoy lesion	1-2%
Ecotopic varicies	1-2%
Portal hypertension enteropathy	1-2% (60-70% in those with portal hypertension)
Radiation enteritis	<1%

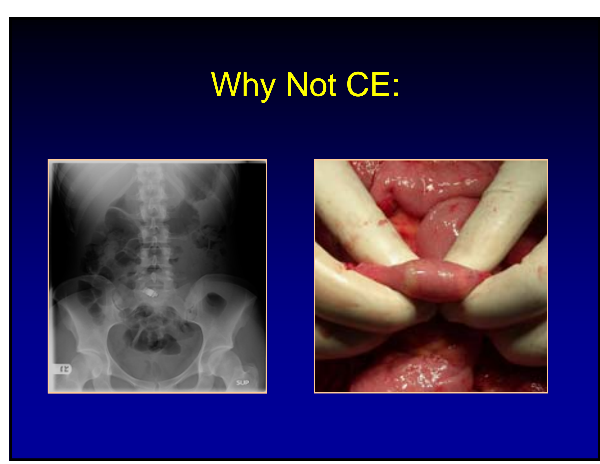
Liu et al. *Alimentary Pharmacology & Therapeutics. 2011;34:*416-423

Pediatric OGIB and CE

Meta analysis of pediatric capsule endoscopy
- N = 723
- 17% for OGIB (1.5-7.9 years; n=83)
- Overall CE yielded a specific diagnosis in 60% of patients with OGIB

Cohen et al. *Clin Gastroenterol Hepatol.* 2011:9:490-496





Capsule Retention

- Depends on indication
  - 1%in obscure gastrointestinal bleeding
    GIE 2008;68:174 –18
  - 10% in patients with known CD
    AJG 2006;101:2218 –2222
- Preceded by Agile Capsule

Pediatric Capsule Retention

- 1,013 pediatric CE exams
- Retention rate 2.3% (22/1013)
- Includes 5 with gastric retention
- Overall correlation with indication not age:
  - 2.2% Crohn's disease
  - 1.4% OGIB
  - 1.2% polyposis

Cohen, SA. Gastro Hepatol 2013;9:92-97

Agile™ Patency System

Agile Patency Capsule

RF Tag

Handheld Scanner

Dimension - Ø11 x 26 mm
Weight - 3.3gr
12 Month Expiry

RFID

Capsule Limitations

- Strictly diagnostic
  - No biopsies or therapeutics
- Limited to small bowel (for now)
  - does not replace EGD or Colonoscopy
- Diagnostic yield reduced in patients with poor bowel prep or delayed gastric emptying

Why Not CE ?

- Mucosal exam vs. anatomic exam
  - An age old decision
- Taking a look vs. taking tissue
  - A clinical decision
- Mucosal exam vs. transmural exam
  - An emerging decision

Pearls and Pitfalls of Pediatric CE

- Tolerability
  - Acceptance
  - Patency
- Sensitivity and Specificity
- Reproducibility
- None of the parameters are specific for any particular disease. i.e.Crohns, NSAIDS, Vasculitis, Radiation enteritis etc.

Summary

- CE provides full small bowel mucosal visualization without radiation or sedation
- Patency capsule, direct placement and carful patient selection limit capsule retention
- Pediatric CE plays a role in diagnosis and disease monitoring of IBD, OGIB and polyposis syndromes