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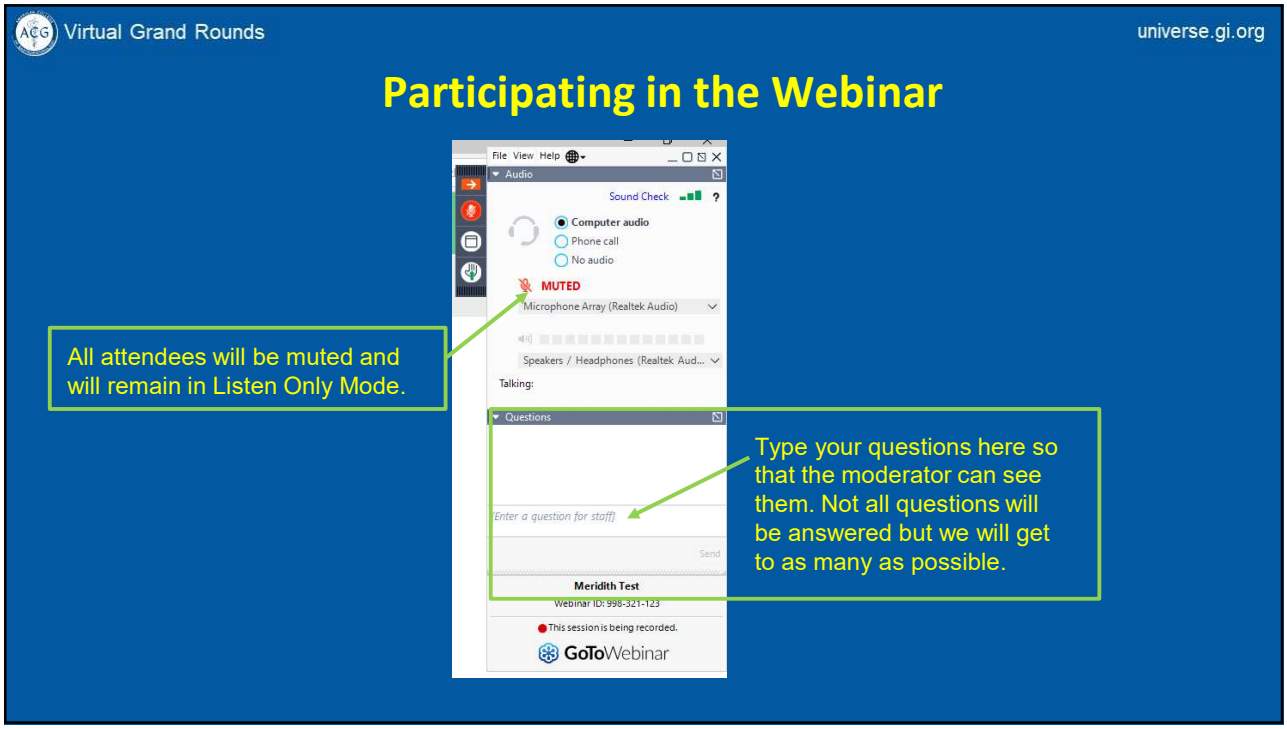
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How to Receive CME and MOC Points

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, 2023 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, 2024 for this activity.

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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.

6

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ACG Virtual Grand Rounds

Join us for upcoming Virtual Grand Rounds!


Week 17 –Thursday, April 27, 2023
Gut Directed Hypnotherapy for IBS: What Gastroenterologists and Patients Should Know
Faculty: Olafur Palsson, PsyD
Moderator: Megan E. Riehl, PsyD, MA
At Noon and 8pm Eastern

There will be no webinar on Thursday May 4th

Week 19 – Thursday, May 11, 2023
Global Health in Gastroenterology: Establishing a Program, Challenges and Solutions
Faculty: Akwi W. Asombang, MD, MPH, FACG
At Noon and 8pm Eastern

Visit **gi.org/ACGVGR** to Register

7

8

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Disclosures

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Jonathan A. Leighton, MD, FACG
Alimentiv: *Research Grant*
CheckCap: *Research Grant*
Docbot: *Consultant*
Iterative Scopes: *Consultant*
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Pfizer: *Research Grant*
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Carol E. Semrad, MD, FACG

Dr. Semrad has no financial relationships with ineligible companies.

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

9

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Quality Indicators for Capsule Endoscopy and Deep Enteroscopy: Joint ACG/ASGE Publication

Jonathan A. Leighton, MD, FACG
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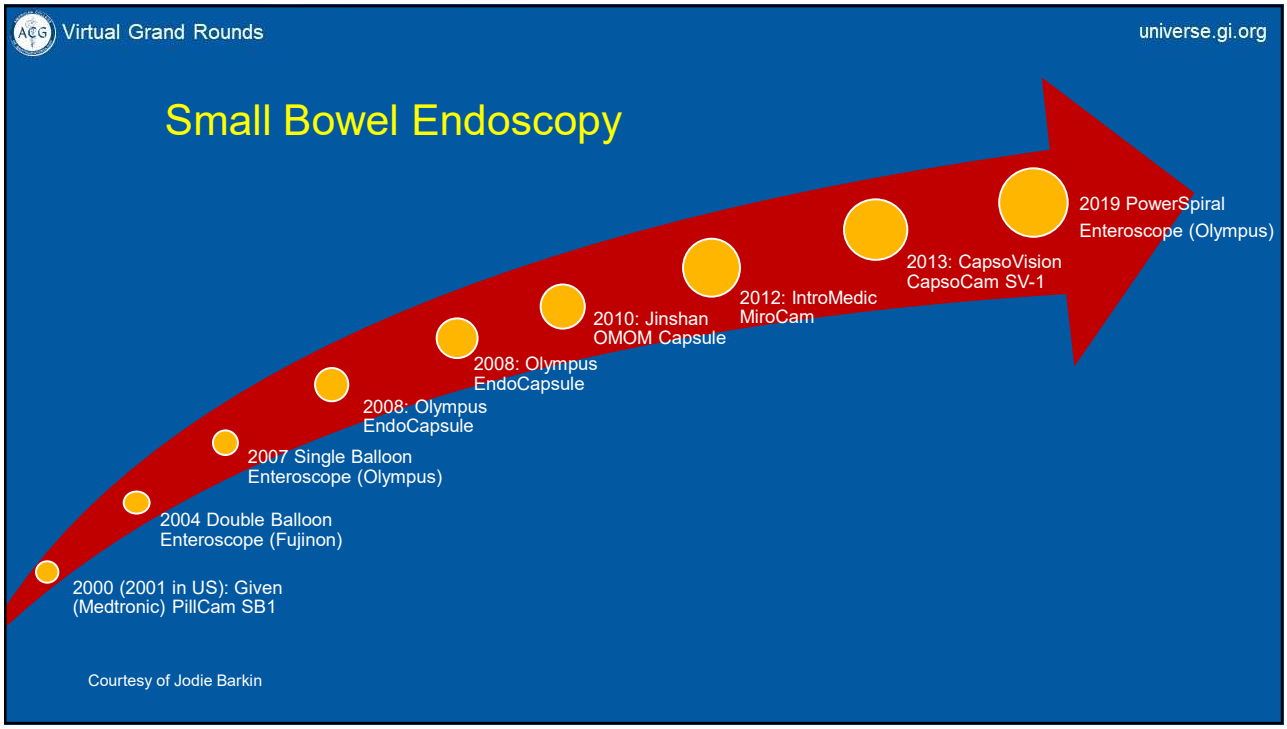
10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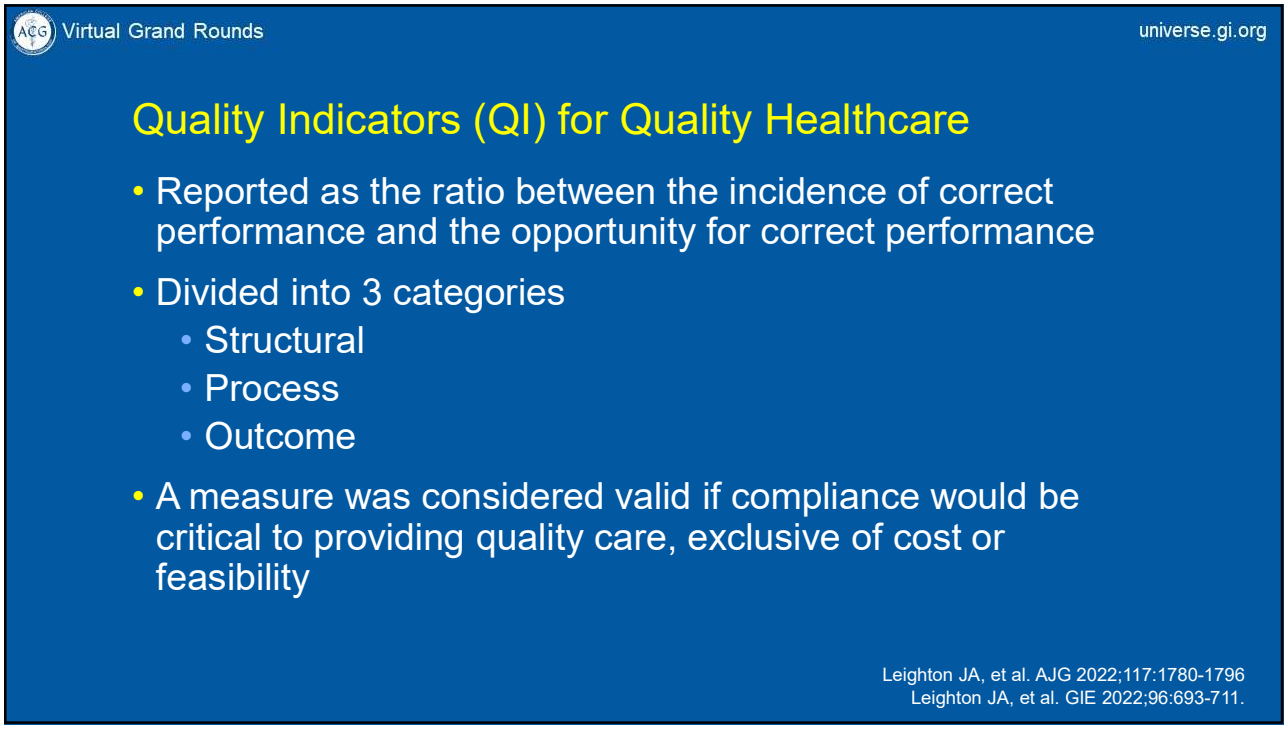
Small Bowel Endoscopy
2000 (2001 in US): Given (Medtronic) PillCam SB1
2004 Double Balloon Enteroscope (Fujinon)
2007 Single Balloon Enteroscope (Olympus)
2008: Olympus EndoCapsule
2008: Olympus EndoCapsule
2010: Jinshan OMOM Capsule
2012: IntroMedic MiroCam
2013: CapsoVision CapsoCam SV-1
2019 PowerSpiral Enteroscope (Olympus)
Courtesy of Jodie Barkin

11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Quality Indicators (QI) for Quality Healthcare
• Reported as the ratio between the incidence of correct performance and the opportunity for correct performance
• Divided into 3 categories
◦ Structural
◦ Process
◦ Outcome
• A measure was considered valid if compliance would be critical to providing quality care, exclusive of cost or feasibility
Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711.

12

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Study Design and Methods

- The RAND/UCLA Appropriateness method (RAM) was used to develop Qis
- 7-member panel
- QIs were defined as applicable to the preprocedure, intraprocedure and post procedure intervals of care
- We classified each QI as an outcome or process measure and included performance targets, designed to inform quality improvement (not necessarily reflective of standard of care)

Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711

13

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Definitions

- Preprocedure period for CE and DE includes the time of all contact between members of the endoscopy team and the patient before the procedure begins and up to the time of sedation for DE
- Intraprocedure period for CE extends from oral ingestion or sedation for endoscopic deployment until the monitoring equipment is returned; for DE, the intraprocedure period extends from the start of sedation to enteroscope removal
- Postprocedure period for CE extends from procedure completion, including video interpretation, to subsequent follow-up. In DE, this period extends from enteroscope removal to subsequent follow-up

Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711.

14

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Capsule Endoscopy (CE)

Two Main Types of Capsule Endoscopes

1. Wireless capsules that transmit images to a receiver
2. Wire-free capsules that store images in the device itself

No significant difference in head to head comparison trials

Pioche M: Gastrointest Endosc 2011;73:1181; Koulaouzidis A: World J Gastroenterol 2013;19:3726
Image Sources: Medtronic, Olympus, Intromedic, CapsoVision

15

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Optimizing CE in Clinical Practice: Preprocedure CE QIs

- Demonstrate competency
- Perform for an indication that is documented and appropriate
- Identify risk factors for retention and assess luminal patency
- Document informed consent
- Perform in a timely manner

Bowel prep was not felt to be an appropriate quality indicator

Leighton JA, et al. GIE 2022;96:693-711.

16

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Demonstrate Competency in CE

- Need for formal training and minimum number of procedures [1]
- Formal training options: structured course with direct observation, proctored study interpretation, test videos, and/or written assessment [2]
- Minimum number of VCE studies to achieve competence:
  - 30-50 (European Guidelines)[2] vs. 20 (ASGE 2017 Guidelines)[3]
  - In a prospective study with structured VCE training and supervised interpretation:
    - Significant differences present in yield between attendings (8) and fellows (39) if fellows had ≤ 20 studies experience[4]
    - Learning curve flattens at 25 VCE studies[5]
- Unclear if minimum number of studies required to maintain competency[2]

1. Leighton JA, et al. Am J Gastroenterol 2022; 1780-1796
2. Spada C, et al. Endoscopy 2019;51(6):574-598.
3. Faulx AL, et al. Gastrointest Endosc 2017;85(2):273-281.
4. Rajan E, et al. Gastrointest Endosc 2013;78:617-622.
5. Rajan E, et al. Gastroeintest Endosc 2020;91:1140-5. A38.

17

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Perform For An Indication That Is Appropriate

Appropriate Indications for VCE	Low Yield Indications
Obscure GI Bleeding/Small Bowel Bleeding	Abdominal Pain
Iron Deficiency Anemia	Diarrhea
Crohn's Disease (Known or Suspected)	Malabsorption
Inherited Polyposis Syndromes (FAP, Peutz-Jeghers Syndrome)	Iron Deficiency Anemia without Evidence of GI Bleeding
Abnormal Small Bowel Imaging	
Complicated/Refractory Celiac Disease	

Appropriate indications markedly increase diagnostic yield!
If CE is performed for a nonstandard indication, justification should be documented

Courtesy of Jodie Barkin

Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711.

18

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Know the Contraindications to CE and Obtain Informed Consent

- Absolute Contraindications:
  - Known stenosis/Intestinal obstruction or ileus
- Relative Contraindications:
  - Implantable cardiac devices although based on literature, risks appears to be low
  - Pregnancy
  - Swallowing disorders: If significant, perform endoscopic placement
  - If patient requires MRI after capsule, recommend documenting capsule passage before MRI
  - Children < 2 years of age
- Always obtain written informed consent and document: include risk of retention, missed lesions, battery expiration, avoid MRI until capsule has passed

Surgically altered anatomy does not appear to increase the risk of complications with CE

Leighton JA, et al. Am J Gastroenterol 2022; In Press.
Bandorski D, et al. World J Gastroenterol 2016;22:9898-9908.
Barkin JA, et al. Gastrointest Endosc Clin N Am 2017;27:15-27.

19

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Identify Risk Factors for Retention and Test for Luminal Patency

- Retention is defined as presence of capsule in SB for >2 weeks
- Incidence: 2.1% SB bleeding/2.4% suspected CD/4.6% known CD
- Potential risk factors: Crohn's disease, history of SBO, previous resection, radiation therapy, chronic NSAIDs, known stricture or mass or presence of symptoms
- If positive, strongly recommend patency capsule, CTE and/or MRE

Incomplete Examinations
Refers to lack of passage for capsule into the cecum before battery expires
Occurs in 16-20% due to slow transit
Rates can be decreased by using capsules with longer battery life or by endoscopic placement into the small bowel

Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711
Pasha SF et al. IBD 2020:26:33-42

20

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Diagnostic Yield and Timing of CE

Indication	Diagnostic Yield % Range[1]
Mixed Indications	27-77.3%
Suspected GI Bleeding	31-68%
Suspected Crohn's Disease	6-38%
Active Crohn's Disease	39%

Timing of VCE[2,3]:

- Improved yield if closer to bleeding episode
- Inpatients: 90% yield if within 48 hours of bleeding onset
- Outpatients: Recommended within 14 days of bleeding episode
- 64 pts with OGIB[4]:
  - VCE yield 91% (≤ 15 days) vs. 34% (>15 days)

1. Spada C, et al. Endoscopy 2019;51(6):574-598.
2. Pennazio M, et al. Endoscopy 2015;47:352-376.
3. Leighton JA, et al. Am J Gastroenterol 2022; In Press
4. Bresci G, et al. J Gastroenterol 2005;40:256-9.

21

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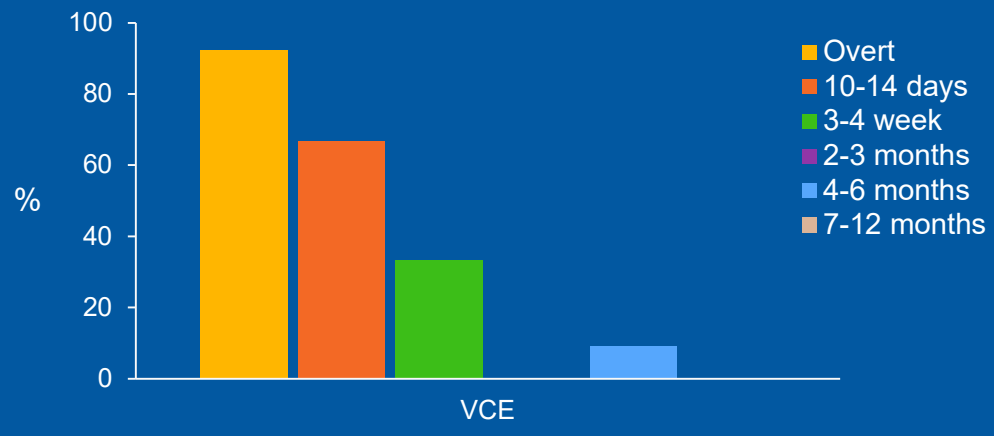
Diagnostic Yield of CE Deteriorates Over Time



Pennazio et al: Gastroenterol 126:643, 2004

22

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Performing CE in a Timely Manner After Bleed

- CE should ideally be performed within 48 hours for hospitalized patients with overt, suspected SB bleeding to improve diagnostic yield
- For outpatients, performance of CE within 14 days of a bleeding episode should be the goal

Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711.

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Preprocedure CE Research Questions

- Is the use of a purgative bowel prep necessary?
- If so, what is the optimal regimen?
- Does improved SB mucosal visualization improve diagnostic yield?
- Can an effective scoring system for quality of SB prep be developed and validated?
- Are other technologies available to predict capsule retention in high-risk patients?

24

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Bowel Prep Use Not An Appropriate Quality Indicator Due To Conflicting Data

- Antifoaming Agents (Simethicone): Potentially helpful ✓
  - Improves quality of visualization by significantly decreasing bubbles
  - Combining laxatives and antifoaming agents does not change yield but does improve mucosal visualization
- Prokinetics: Not Recommended X
  - No improvement in completion rate or diagnostic yield
- Laxatives: Controversial +/-
  - No significant improvement in diagnostic yield or completion rate
  - Improvement in quality of mucosal visualization

Spada C, et al. Endoscopy 2019;51(6):574-598.
Rondonotti E, et al. Endoscopy 2018;50:423-446.
Leighton JA, et al. GIE 2022;96:693-711.

25

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Update: Clinical Utility of Purgative Bowel Prep Before CE

- Multicenter, blinded, randomized controlled trial
- 299 patients with suspected SB bleeding
  - Compared clear fluids only for 18 hours vs 2L prep vs 1L prep
  - No significant difference in diagnostic yield of highly relevant lesions (48.7%, 48%, 45.9%; P=.94)
  - Visualization quality was equal
  - Better patient tolerability with clear fluids only

The use of a purgative bowel preparation before SBCE does not improve diagnostic yield or visualization

Lamba M et al. GIE 2022;96:822

26

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Intraprocedure QI: Perform proper placement with risk of gastric retention or contraindications to swallowing

- Endoscopic Deployment

  Recommended:
  - Swallowing difficulties
  - Delayed gastric emptying (Gastroparesis, Opioids)
  - Altered mental status

  Consider:
  - Inpatients/Bedbound Patients
  - Concern for or prior incomplete VCE study

  Not Necessary:
  - Prior gastro-duodenal surgery

Barkin JA, et al. Gastrointest Endoscopy Clin N Am 2017;27:15-27.
Leighton JA, et al. Am J Gastroenterol 2022; 96:693-711.
Image: http://www.usendoscopy.com/products/advance-delivery-device

27

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Intraprocedure Research Questions

- What is the diagnostic miss rate of CE when clinically significant lesions are found on DE only?
- Does real-time CE monitoring in the ED improve triaging and diagnostic yield in acute GIB?
- Is delayed gastric emptying of the capsule an indication of a motility disorder?
- What are optimal methods to improve CE completion rates in the OP and IP setting?
- What is needed to improve localization of lesions on CE?
- Will controllable capsules improve the diagnostic yield and management of SB lesions?

Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711.

28

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Postprocedure CE QIs

- Perform photodocumentation and document SB transit times
- Use a standardized CE reading method for video interpretation
- Recommend appropriate management plan based on findings
- Document completeness and adequacy of visualization
- Track CE complications and appropriate management
- Perform an xray 2 weeks or more if incomplete exam or capsule not observed to pass
- Generate a complete report in the electronic health record

Leighton JA, et al. Am J Gastroenterol 2022; In Press.
Bandorski D, et al. World J Gastroenterol 2016;22:9898-9908.
Barkin JA, et al. Gastrointest Endosc Clin N Am 2017;27:15-27.

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Perform Photodocumentation of Landmarks and Document Transit Times

- Identify Anatomic Landmarks:
  - First gastric image
  - First duodenal image
  - First cecal image
- Small Bowel Transit Time (SBTT):
  - < 2 hours suggests Rapid Transit and may lead to missed lesions[3]
- Lesion Localization for Enteroscopy Approach:
  - Photo document lesions & describe with standard terms
  - Anterograde DE if in first 60% of SBTT
  - Retrograde DE if in over 60% of SBTT

1. Leighton JA, et al. Am J Gastroenterol 2022; In Press.
2. Barkin JA, et al. Gastrointest Endoscopy Clin N Am 2017;27:15-27.
3. Barkin JA, et al. Gastroenterological Endoscopy. 3rd Ed. Stuttgart: Thieme; 2018. Ch 14; p. 96-100.
4. Buscaglia JM, et al. Int J Med Sci 2008;5(6):303-8.

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Use a Standardized Reading Method for Video Interpretation

- Single Frame: max 10 images per second
- Dual or Multi-Frame: max 20 images per second (>20/sec → increased miss rate[4])
- No compromise in yield between single and multi-frame viewing[4-7]
- Consider slowing reading speed in proximal small bowel due to increased miss rate
- Automated software algorithms:
  - Helpful to decrease reading times but may miss single-frame lesions (Miss rate 6.5-12%)[8-10]
  - Currently, not recommended as an acceptable substitute to conventional reading
- Remember: Reader Fatigue: time of day, multiple consecutive studies[11]
- Recommend appropriate management plan based on findings

1. Leighton JA, et al. Am J Gastroenterol 2022; In Press.
2. Spada C, et al. Endoscopy 2019;51(6):574-598.
3. Rondonotti E, et al. Endoscopy 2018;50:423-446.
4. Zheng Y, et al. Am J Gastroenterol 2012;107:554-560.
5. Kyriakos N, et al. Eur J Gastroenterol Hepatol 2012;24:1276-1280.
6. Nakamura M, et al. Dig Dis Sci 2015;60:1743-1747.
7. Günther U, et al. Int J Colorectal Dis 2012;27:521-525.
8. Hosoe N, et al. Clin Res Hepatol Gastro 2012;36:66-71.
9. Saurin JC, et al. Dig Liver Dis 2012;44:477-481.
10. Westerhof J, et al. Gastrointest Endosc 2009;69:497-502.
11. Barkin JA, et al. Gastrointest Endoscopy Clin N Am 2017;27:15-27

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Document Adequacy of Visualization and Completeness of Exam

- Poor bowel preps: perform global assessment of adequacy of bowel preparation
- Incomplete studies
  - Occur in 20-30% of patients
  - Risk factors: hospitalization, SB surgery, narcotic use, delayed gastric transit and decreased physical activity
  - Solutions: ambulation, endoscopic placement
- Ideal bowel preparation is not known: recent multicenter, blinded, randomized controlled trial suggested that a purgative bowel prep does not improve diagnostic yield or visualization and is associated with lower patient tolerance.

Avoid gastric and SB biopsies before CE

Lamba M et al. GIE 2022; 822-8
Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711.

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Completeness of Procedure

- Completeness: Visualization of Cecum (or colon if post-cecectomy) or Stoma
- If incomplete capsule on review of study:
  - Patient should visually confirm excretion OR
  - Perform Abdominal X-ray in 2 weeks if no witnessed excretion (To rule out retention)
  - Observe if asymptomatic retained capsule, unless malignancy suspected
  - Enteroscopy or Surgery if retained capsule and symptomatic
- Percent of incomplete Examinations: 16-20%[2,4-5]
  - Bedbound/Lack of activity significantly associated with incomplete study[6]

1. Leighton JA, et al. Am J Gastroenterol 2022; In Press.
2. Spada C, et al. Endoscopy 2019;51(6):574-598.
3. Rondonotti E, et al. Endoscopy 2018;50:423-446.
4. Liao Z, et al. Gastrointest Endosc 2010;71:280-286.
5. Hoog CM, et al. Gastroenterol Res Pract 2012;2012:518718.
6. Shibuya T, et al. Intern Med 2012;51(9):997-1001.

33

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Track CE Complications and Appropriate Management

- Overall Adverse Event Rate:
  - Approximately 2% (Retention, Aspiration < 0.1%, Capsule-induced bleeding or perforation)[1-4]
  - Safe to perform VCE with Pacemakers, AICDs, LVADs[5,6]
- Capsule Retention: > 15 days on Abdominal X-Ray or Symptomatic
- Asymptomatic Retention: Observe, unless malignancy suspected[3,4]
  - Watch and Wait: Approximately 50% will pass spontaneously[7]
  - Laxatives or Prokinetics
  - Disease-specific medical therapy
- Symptomatic retention: Early Enteroscopy or Surgery if retained capsule and symptomatic, significant pathology, or suspected malignancy[3,4,8]
- Determine appropriate management and document in report

1. Fernandez Urien I, et al. Rev Esp Enferm Dig 2015;107:745-52.
2. Koulaouzidis A, et al. World J Gastroenterol 2013;19:3726-46.
3. Spada C, et al. Endoscopy 2019;51(6):574-598.
4. Rondonotti E, et al. Endoscopy 2018;50:423-446.
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6. Harris LA, et al. Gastroenterol Res Pract 2013;2013:959243.
7. Rondonotti E, et al. Eur J Gastroenterol Hepatol 2010;22:1380-6
8. Cheon JH, et al. Endoscopy 2007;39:1046-52.

34

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Postprocedure Research Questions

- How often are lesions identified on CE found on subsequent DE?
- What are the diagnostic yields and outcomes of CE in nonacademic practices?
- How do we improve use of capsule SBTT to predict the correct route for DE?
- What is the ideal management approach to capsule retention?
- What are ideal standards for training and competency in CE?
- What are the best ways to assess adequacy of the mucosal examination and use of CE image-processing algorithms?

35

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Take Home Points:

Optimizing CE in Clinical Practice
Indication/Brief Clinical History
Endoscopy vs Oral Ingestion
Gastric and Small Bowel Transit Times
Quality of Bowel Preparation with Mention of Adequacy
Image Landmarks
Completeness of Study
Comment on Retention if indicated
Diagnostic Findings & Plan of Care

Adequacy:
- Study is complete
- Adequate bowel prep quality
- SBTT > 2 hrs

1. Leighton JA, et al. Am J Gastroenterol 2022; In Press.
2. Barkin JA, et al. Gastrointest Endoscopy Clin N Am 2017;27:15-27.
3. Barkin JA, et al. Gastroenterological Endoscopy. 3rd Ed. Stuttgart: Thieme; 2018. Ch 14; p. 96-100.

36

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Quality Indicators in Deep Enteroscopy (DE)

MAYO CLINIC

Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711.

37

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Balloon Enteroscopy

Double

Single

Forcep channel allows biopsy and therapy

MAYO CLINIC

38

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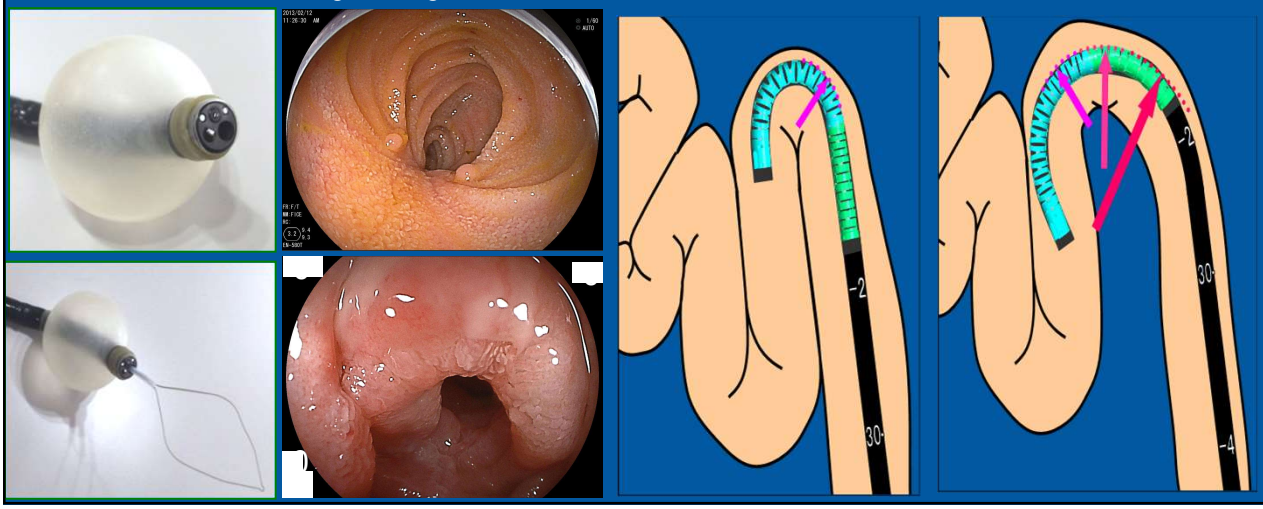
Balloon Enteroscopy Technical Improvements

- Larger channel size for suction and accessories
- High definition imaging
- Passive bending and high force transmission



39

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Optimizing DE in Clinical Practice: Preprocedure DE QIs

- Demonstrate competency
- Perform for an indication that is documented and appropriate
- Reviewing CE or Cross-Sectional Imaging (CSI) before DE
- Discussing anti-coagulation management with patient
- Document choice of insertion route based on CE transit time or CSI

Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711.

40

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Demonstrate Competency in DE

- Labor-intensive procedure with steep learning curve[1,2]
- No standardized training requirements in US[1]; ESGE recommends 75 procedures[3]
- Learning curve flattening:
  - Single-balloon: 30 procedures[4]
  - Double-balloon: 10-15 procedures (proc time & extent reached)[5-6]; Clinical impact: first 50 procedures achieve 58% DY vs. after 200 procedures achieves 86%[7]
  - Spiral (non-motorized): potentially after 5 procedures[8]

1. Leighton JA, et al. AJG 2022;117:1780-1796
2. Barkin JA, et al. Gastrointest Endosc 2021;93:627-629.
3. Sidhu R, et al. Endoscopy 2020;52:669-686.
4. Lenz P, et al. Gastrointest Endosc Clin N Am 2017;27:132-131.
5. Mehdizadeh S, et al. Gastrointest Endosc 2006;64:740-750.
6. Dutta AK, et al. Trop Gastroenterol 2012;33:179-184.
7. Gross SA, et al. Gastrointest Endosc 2008;67:890-897.
8. Buscaglia JM, et al. Endoscopy 2009;41:194-199.

41

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Perform For An Indication That Is Appropriate

Appropriate Indications for Deep Enteroscopy
Small Bowel Bleeding *(most common indication)*
Small Bowel Tumor or Polyp
Inflammatory Bowel Disease (Crohn's Disease Diagnosis/Evaluation/Therapy)
Foreign Body Removal/Retained CE
Small Bowel Stricture Dilation/Therapy
Placement of Percutaneous Endoscopic Jejunostomy
Access for Altered Anatomy for ERCP
Evaluation/Biopsies of Malabsorptive Syndromes & Refractory Celiac Disease

Guide approach with capsule endoscopy, CT/MR enterography before DE
No specific DE contraindications beyond other endoscopic procedures
Caution if strictures present or substantial adhesions

Leighton JA, et al. AJG 2022;117:1780-1796
Leighton JA, et al. GIE 2022;96:693-711.

42

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Review CE or CSI Prior to DE/Anticoagulation Plan

- Review VCE or imaging study and findings before DE
  - Decide approach of insertion: anterograde vs retrograde
  - Bowel preparation needed if retrograde approach
  - When CE video not available, color pictures of lesion should be reviewed
- Devise a peri-procedural anticoagulation management plan (if needed)
  - Manage according to current ACG Guidelines
  - Risk of bleeding: 0.2% if diagnostic vs. 3.3% if polypectomy[2]
  - Reasonable to continue ASA but stop other antiplatelets/anticoagulants[3]
  - In difficult cases, consider performing on anti-coagulation
- Total enteroscopy completion rates: research settings 45-86%[4-5]
  - Real-world rates of 10-60% depending on platform[6]
  - Motorized PowerSpiral total enteroscopy rate > 60%[7]

1. Leighton JA, et al. AJG 2022;117:1780-1796
2. Gerson LB, et al. Clin Gastroenterol Hepatol 2009;7:664-9.
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43

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Choose Insertion Route Based on SBTT/CSI

- DE route should be based on lesion location on CE SBTT or CSI
- Clinically, melena predicts proximal small bowel; with massive overt GIB, prefer antegrade approach due to higher diagnostic and therapeutic yield
- CE transit times are useful
  - Antegrade approach for lesions with with a time index value 60% of the pylorus to cecal time
  - Retrograde for more distal lesions, e.g. suspected CD/NETs (bowel purge is required)
- Increases both the diagnostic (73-93%) and therapeutic (57-73%) yield
- If you are not sure of location, choose the antegrade approach
  - Antegrade approach maximal insertion 240-360 cm
  - Retrograde approach maximal 102-180 cm
- A negative CE allows for the avoidance of DE in patients with a low pre-test probability for SB findings
- Similar to CE, DE should be performed as close to the bleeding episode as feasible to improve diagnostic yield

Gay G et al: Endoscopy 2006;38:49-58
Kaffes Aj et al: GIE 2007;66:304-9
Hendel JW et al: Scan J Gastro 2008;43:363-7

44

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Preprocedure DE Research Questions

- How much training is required to be competent in DE?
- What is the optimal anticoagulation management for patients undergoing DE that improved diagnostic yield?
- When should DE be performed directly and bypass CE?
- What is the optimal timing of DE in the setting of GIB?
- Should total enteroscopy be routinely performed for suspected SB bleeding when the initial approach is negative?
- What is the ideal sedation method for DE?

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45

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Intraprocedure DE QIs

- Perform DE in a timely manner after a bleeding episode
- Recommend the use of carbon dioxide insufflation
- Estimate the depth of advancement
- Mark the most distal point of advancement when indicated
- Characterize and treat clinically significant lesions
- Treat vascular lesions that are the potential source of bleeding

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46

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Perform DE in a Timely Manner After Bleed

- Timing of Procedure:
  - Optimal diagnostic and therapeutic yield if DE within 72 hours of overt, suspected small bowel bleeding episode[2-5]
  - 70% diagnostic yield if DE within 72 hours vs 30% if nonurgent[2] (wide range of DE yields: 30-80%[6])
  - Potential benefit to earlier DE at 24hrs vs 72hrs[3]
  - DE within 72 hours correlates with improved diagnostic yield, decreased transfusion requirements, decreased rebleeding rates[5]
- Choice of Enteroscope:
  - Yield of Double-Balloon and Single-Balloon relatively equivalent in bleeds[7-8]
  - Double-Balloon superior to push enteroscopy: ↑ depth of insertion & ↑ yield (73 vs 44%)[9]
  - Ongoing Study evaluating Motorized Spiral in Small Bowel Bleeds with results expected in 2024
  - Intra-operative enteroscopy only when DE not possible (adhesions) or fails → high morbidity[6,10]
- If urgent and/or persistent bleeding, consider DE without doing capsule first
- Consider interventional radiology or intra-operative endoscopy if DE unavailable

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47

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Use of Carbon Dioxide Insufflation, Estimating Depth of Advancement, and Marking Most Distal Point

- CO_2 Insufflation significantly improves depth of insertion and reduces patient discomfort in DE vs air insufflation in RCTs[2-4]
- Estimating depth of advancement
  - Should be documented to predict if site of suspected lesion was reached and whether total enteroscopy will be feasible
  - Validated distance estimate using length of each push-and-pull cycle for DBE[5-7] (no validation for other methods or DE platforms)
  - Should be reported in centimeters
  - Document if suspected lesion was reached and if total enteroscopy was performed
- Mark most distal point of advancement
  - When lesion not reached, remember to tattoo the deepest site of insertion to mark the extent reached, especially when total enteroscopy is planned.
  - Higher success rates have been reported for complete enteroscopy when performed on separate days

1. Leighton JA, et al. AJG 2022; 117:1780-1796.
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48

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Characterize and Treat Clinically Significant Lesions, Including Vascular Abnormalities

- Clinically Significant Lesions
  - It is important to document that the lesion reached correlated with CE or other imaging study
  - Photo document and describe small bowel abnormalities using standardized nomenclature similar to that for VCE[2]
  - Biopsy and tattoo ulcers and tumors for possible resection
  - Dilation of strictures is safe and effective if less than 5-cm, not ulcerated and relatively straight
- Vascular Abnormalities
  - Treat with endoscopic therapy when small bowel bleeding is suspected or found
  - Low wattage settings given thin small bowel wall
  - Classify using system of flat or punctate (angioectasia), raised or pulsating (Dieulafoy), or raised with surrounding venous dilation (AVM)[3]
  - High rates of rebleeding if medical comorbidities (i.e., CKD, Aortic stenosis) or LVADs
  - Consider somatostatin analogs +/- IV iron & transfusions as complimentary to endotherapy[4-5]

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49

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Intraprocedure DE Research Questions

- What factors affect sensitivity of DE for finding clinically significant lesions?
- What factors, including enteroscope, bowel prep, and withdrawal time affect diagnostic yield?
- What technology is needed to optimize depth of insertion?
- What innovation is needed to determine optimal route of insertion based on noninvasive imaging?
- What improvements in DE are needed to reduce procedure time?
- What tools can be designed that will improve SB endoscopic therapy?
- What approach to anesthesia and sedation is ideal?
- What technology is available to determine depth of insertion more accurately?

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50

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Postprocedure DE QIs

- Generate a complete report in the electronic health record
- Track DE complications and appropriate management

The management of anticoagulation was not deemed appropriate as a quality indicator

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51

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Generate A Complete Report in the EHR

Quality Reporting Components
Indication/Brief Clinical History
Route of Insertion
Estimated Depth of Insertion
Abnormal Findings with Description & Photo Documentation
Details of Any Therapeutic Interventions
Whether Primary Goal was Achieved & If Area of Interest was Reached/Identified/Treated
Complications if Present
Communication with Referring Physician and Post-Procedure Instructions
Additional Standard Quality Indicators Documentation for All GI Procedures[2]

1. Leighton JA, et al. Am J Gastroenterol 2022; AJG 2022;117:1780-1796
2. Rizk MK, et al. Gastrointest Endosc 2015;81:3-16.

52

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Track DE Complications and Appropriate Management

- Overall Adverse Event Rate: 1.2%[2]
  - Perforation
  - Bleeding
  - Pancreatitis (< 1% if Anterograde DE)
  - Similar rates between single- and double-balloon
- Increased risk if DE with therapeutic interventions: 4.3%-8.0%[2-9]
  - Cautery of vascular lesions
  - Stricture dilation
  - Resection of large polyps
- Consider admission based on comorbidities, clinical instability or complexity of intervention
- Post-procedural anticoagulation management, recovery, and resumption of oral intake per standard endoscopic guidelines

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53

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Postprocedure DE Research Quesions

- What are the diagnostic yields and outcomes in nonacademic gastroenterology practices
- How often are clinically significant lesions identified on DE missed on CE
- How can we improve the reporting frequency of complications, including immediate and delayed?
- What is the impact of DE on clinical outcomes for vascular lesions?

54

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Tips Regarding Quality Balloon Assisted Enteroscopy

- Demonstrate competency
- Review capsule study or CT/MR before procedure
- Document peri-procedural anticoagulation plan when pertinent
- Base insertion route on capsule transit time or CT/MR
- Perform in timely manner after bleeding episode
- Use CO2 insufflation instead of air
- Mark most distal point of advancement with tattoo
- Treat clinically significant lesions preferably during advancement
- Be prepared to identify and manage complications

55

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Conclusion

- CE and DE have had an important impact on the diagnosis and management of SB diseases
- Comprehensive Qis have been lacking in the US
- These QI's should improve the performance of these procedures in clinical practice
- Incorporating these measures into clinical practice should also improve standardization of these procedures
- We have also identified knowledge gaps and posed specific research questions to help guide future clinical studies to improve quality of CE and DE

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56

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Questions?

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57

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58