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All attendees will be muted and will remain in Listen Only Mode.

Type your questions here so that the moderator can see them. Not all questions will be answered but we will get to as many as possible.
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.

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.
ACG Virtual Grand Rounds
Join us for upcoming Virtual Grand Rounds!

Please NOTE: there will be no ACG Virtual Grand Rounds on April 6 and 13 due to low attendance from Spring Breaks.

Week 16 – Thursday, April 20, 2023
Quality Indicators for Capsule Endoscopy and Deep Enteroscopy: An ACG and ASGE Joint Publication
Faculty: Jonathan A. Leighton, MD, FACP
Moderator: Carol E. Semrad, MD, FACP
At Noon and 8pm Eastern

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

Visit gi.org/ACGVGR to Register

ACG 2023
OCTOBER 20-25, 2023
VANCOUVER, CANADA

Be sure your passport is up to date!
**Disclosures**

Charles Kahi, MD, MSc, FACG  
*Dr. Kahi has no financial relationships with ineligible companies.*

Jennifer Maratt, MD, MS  
*Dr. Maratt has no financial relationships with ineligible companies.*

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

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**Colon Polypectomy Techniques**  
**Big Polyps, Small Polyps, and Everything in Between**

Charles Kahi, MD, MSc, FACG  
ACG Virtual Grand Rounds  
March 30\(^{th}\), 2023
The Big Picture

- Colonoscopy: Most performed endoscopic procedure in the U.S. → 11 M out of 17.7 M

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Total population (n = 3,901,576)</th>
<th>Screening only, ages 50–75 y, average risk (n = 1,476,145)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td>22,118</td>
<td>0.6</td>
</tr>
<tr>
<td>Adenomatous polyps</td>
<td>13,328,060</td>
<td>34.0</td>
</tr>
<tr>
<td>1 or 2 tubular adenomas &lt;10 mm</td>
<td>946,263</td>
<td>24.2</td>
</tr>
<tr>
<td>3 or more tubular adenomas &lt;10 mm</td>
<td>245,223</td>
<td>6.3</td>
</tr>
<tr>
<td>≥10 mm, high-grade dysplasia, villous component</td>
<td>178,217</td>
<td>4.6</td>
</tr>
<tr>
<td>Serrated polyps</td>
<td>211,915</td>
<td>5.4</td>
</tr>
<tr>
<td>&lt;10 mm with no dysplasia</td>
<td>150,866</td>
<td>3.9</td>
</tr>
<tr>
<td>&gt;10 mm or with dysplasia or traditional serrated adenoma</td>
<td>96,801</td>
<td>2.5</td>
</tr>
<tr>
<td>Hyperplastic polyps</td>
<td>696,165</td>
<td>17.8</td>
</tr>
<tr>
<td>Other pathology</td>
<td>540,268</td>
<td>13.9</td>
</tr>
</tbody>
</table>

Source: GI Quality Improvement Consortium Endoscopy.


Why high-quality polypectomy matters

- Colonoscopy quality is operator-dependent!
- Adenoma detection rate (ADR) inversely associated with risk of post-colonoscopy colorectal cancer (PCCRC)
- Polypectomy technique also variable, and does not necessarily correlate with detection:
  - Review of 130 polypectomy videos using the Direct Observation of Polypectomy Skills (DOPyS)
  - Overall DOPyS competency scores ranged between 30% to 90%
  - Polypectomy competency rates did not significantly correlate with ADR (r=0.4, P = 0.2)

Duloy et al. Gastrointest Endosc 2018;87:635–44.
Why high-quality polypectomy matters

- Kaiser study including 236 PCCRC diagnosed < 4 years after colonoscopy
  - 70% likely missed lesion
  - About 15% incomplete/failed resection of advanced adenomas

  *Leung et al. Gastroenterology 2023; 164 (3): 470-472*

- Follow-up of the original CARE study cohort
  - Measured segment metachronous neoplasia
  - Risk for any metachronous neoplasia was greater in segments with incomplete versus complete resection (52% vs. 23%; P = 0.004)
  - Incomplete polypectomy associated with 3-fold higher risk of metachronous neoplasia


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Step 0: Systematic Structured Assessment

- Facilitates clear communication between endoscopists
- Defines best practice resection techniques
- Helps identify correct surveillance intervals
- Helps identify features of submucosally invasive carcinoma (SMIC), especially in large polyps.
Paris Endoscopic Classification


Narrow Band Imaging International Colorectal Endoscopic (NICE) classification

Non-pedunculated polyp

- Diminutive ≤ 5 mm
  - CSP (Rarely CFP 1-2 mm)
- Small 6-9 mm
  - CSP
- Size ≥ 10 mm
  - No features of SMIC
    - Intermediate 10-19 mm
      - CSP or HSP ± SM injection
    - Large ≥ 20 mm
      - EMR + SM injection

Serrated lesion
  - C-EMR or CSP

The Cold Revolution
Non-pedunculated polyp

- Diminutive ≤ 5 mm
  - CSP (Rarely CFP 1-2 mm)
- Small 6-9 mm
  - CSP
- Size ≥ 10 mm No features of SMIC
  - Intermediate 10-19 mm
    - CSP or HSP ≤ SM injection
  - Large ≥ 20 mm
    - EMR + SM injection

Serrated lesion
  - C-EMR or CSP

CSP is best for polyps < 10 mm

- >80% colorectal polyps are diminutive (≤ 5 mm) or small (6-9 mm)
- Very rarely harbor advanced histology

- CSP has unassailable dominance in this size range
  - Effective: Low incomplete resection rate (IRR)
  - Safe: No electrocautery = no delayed bleeding or perforation
  - Straightforward: To apply, teach, and learn.
CSP versus cold forceps polypectomy (CFP)

- IRR of CFP ranges from 10% to 60%
- SRMA of 3 RCTs comparing CSP to CFP:
  - Incomplete resection relative risk = 0.31 (0.14-0.67) favoring CSP
    
    *Raad et al. Gastrointest Endosc 2016; 83:508-15*

- Network meta-analysis of 7 studies and 700 patients:
  - CSP superior to CFP for complete eradication (ORs 2.5-4.3)


CSP versus hot resection techniques

- RCT of CSP vs. hot forceps polypectomy (HFP) for polyps 3-5 mm:
  - Higher *en bloc* resection for CSP (99% vs 80%)
  - Lower IRR for CSP (20% vs 53%)
  - Higher severe injury to tissue specimen for HFP (53% vs 1%)
  - No delayed bleeding or perforation

  *Komeda et al. World J Gastroenterol.2017; 23(2): 328-335*

- CRESCENT non-inferiority RCT: CSP vs. HSP for polyps 4-9 mm:
  - IRR 1.8% for CSP, vs. 2.6% for HSP
  - Bleeding requiring hemostasis occurred only with HSP (0.5%)

CSP is safer than HSP

RCT of CSP vs. HSP for polyps 4-10 mm
- 4270 patients,
- Delayed PP bleeding (within 14 days) occurred in 0.4% vs. 1.5%
- Severe bleeding also favored CSP (0.05% vs. 0.4%)
- Mean polypectomy time (119.0 vs. 162.9 sec) shorter in CSP group
- Successful tissue retrieval, en bloc resection, and complete histologic resection did not differ.


CSP versus HSP

- Comparable low IRR (< 5%)
- Similar retrieval rate (96%)
- Significantly shorter procedure time with CSP (mean 7 minutes)
- Lower incidence of post-polypectomy bleeding with CSP, and no deep mural injury
- Rare immediate PP bleeding with CSP, rarely requires intervention

USMSTF Guidelines for diminutive (≤ 5 mm) and small (6–9 mm) polyps

• **Recommend CSP** due to high complete resection rates and safety profile.

• **Recommend against cold forceps polypectomy** due to high rates of incomplete resection. For diminutive lesions ≤ 2 mm, if CSP is technically difficult, jumbo or large-capacity forceps polypectomy may be considered.

• **Recommend against hot forceps polypectomy** due to high incomplete resection rates, inadequate histopathologic specimens, and complication rates.

  (Strong recommendation, moderate-quality evidence)

Non-pedunculated polyp

- Diminutive ≤ 5 mm
  - CSP (Rarely CFP 1-2 mm)
- Small 6-9 mm
  - CSP
- Size ≥ 10 mm No features of SMIC
  - Intermediate 10-19 mm
    - CSP or HSP ± SM injection
  - Large ≥ 20 mm
    - EMR + SM injection

Serrated lesion

- C-EMR or CSP

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**CSP/c-EMR for serrated polyps ≥ 10 mm**

- Literature supporting cold resection for large SLs is significant, but heterogeneous
- Most studies use submucosal injection:
  - Better delineation of lesion borders = ensure a resection margin of ≥ 2 mm
  - Facilitate transection and decrease immediate bleeding
- No need for STSC or clips
- Low recurrence rates (0-10%), low immediate bleeding rates (0-3%), and no perforations

Tutticci et al. Gastrointest Endosc 2018; 87:837–842
Tate DJ et al. Endoscopy 2018;50:248–252._
Non-pedunculated polyp

- Diminutive ≤ 5 mm
  - CSP (Rarely CFP 1-2 mm)
- Small 6-9 mm
  - CSP
- Intermediate 10-19 mm
  - CSP or HSP ± SM injection
- Large ≥ 20 mm
  - EMR + SM injection

Size ≥ 10 mm No features of SMIC

Serrated lesion

C-EMR or CSP
Always Assess for SMIC

- NICE 3
- Paris 0-IIc or 0-III (depressed or ulcerated)
- Kudo pit pattern types Vi (irregular) or Vn (non-structural)
- Non-granular surface

Fundamentals of EMR for non-pedunculated polyps ≥ 20 mm

- Do not start unless you know you can finish!
- Expertise of endoscopist and endoscopy team are critical factors
- Use **snare resection** for all visible polyp tissue
- Use submucosal injection with dye for lifting
- Treat post-EMR margin with snare tip soft coagulation (STSC)
- Defect closure in the appropriate setting.
Submucosal injection fluids for EMR

• **Proprietary solutions (FDA-approved)**
  - Eleview, Everlift
  - Note: ORISE gel recalled by manufacturer due to foreign body reactions presenting as mass formations
  - Practical but more expensive

• **DIY solutions**
  - Add indigocarmine or methylene blue
  - Normal saline, hydroxyethyl starch, succinylated gelatin, sodium hyaluronate, glycerol
  - More economical.
EMR Outcomes

• Less morbidity and mortality, and more cost-effective than surgical resection
• Low risk of severe adverse events (1%)
• Low rate of local recurrence (< 15%)
• Local recurrences usually small and straightforward to resect
• USMSTF guidelines recommend EMR as the preferred treatment method of ≥20 mm non-pedunculated colorectal lesions

Non-pedunculated polyp

- Diminutive ≤ 5 mm: CSP (Rarely CFP 1-2 mm)
- Small 6-9 mm: CSP
- Intermediate 10-19 mm: CSP or HSP ± SM injection
- Large ≥ 20 mm: EMR + SM injection
- Size ≥ 10 mm: No features of SMIC
- Serrated lesion: C-EMR or CSP

Approach to intermediate-size polyps (10-19 mm)

- Evidence more sparse than for < 10 mm and ≥ 20 mm, leading to inconsistent practices and guidelines

- Basic principles:
  - Cold resection: Smaller size, Flat (Paris Ila/Ilb), Less bulk, Serrated histology
  - Hot resection: Larger size, Sessile (Paris Is), More bulk, Adenomatous histology
  - Consider SM injection
Approach to intermediate-size polyps (10-19 mm)

• Non-inferiority RCT including 286 polyps 6-15 mm:
  - Randomized to CSP, c-EMR, HSP, or h-EMR
  - Overall IRR 2.4%
  - 7 incompletely removed polyps were all 10-15 mm in size, and 6 of 7 were resected using HSP or h-EMR.
  - No incomplete resections in CSP group, only one in c-EMR group.
  - No serious adverse events in CSP group
  - Resection time was significantly shorter for CSP


Pushing the envelope further for polyps 10-19 mm

• Observational study including 350 polyps 10-19 mm:
  - All treated with CSP or c-EMR (87% with SM injection)
  - 68.5% were adenomas, 30% SSL
  - IRR based on margin or central biopsies being positive was 1.7%
  - Polyp recurrence rate was 1.7%(n=4) at first surveillance colonoscopy
  - Adverse events occurred in 3.4%(n=10) of patients, including 4 bleeds
  - 2 patients had post-polypectomy-syndrome-like presentations (unusual)
  - There were no perforations.

Pedunculated polyps

- Pedunculated polyps contain a feeding blood vessel within the lesion stalk, and HSP is recommended to decrease the risk of immediate bleeding.
- CSP may be reasonable for small (<10 mm) pedunculated polyps with a thin stalk, but this is not advisable (and often not feasible) for larger lesions.
- Polyp size ≥10mm and stalk diameter ≥5 mm are known risk factors for bleeding, and pedunculated polyps with these features should be resected using HSP.
- Prophylactic measures, such as detachable nylon loops or standard clips, are recommended to decrease the rate of immediate and delayed bleeding, particularly for pedunculated polyps with heads ≥20 mm and/or stalks ≥ 5 mm.

To Clip or Not to Clip?


Clipping: Size and Location matter

• Meta-Analysis of 9 RCTs, 72,000 polyps
  - Clipping did not significantly reduce the overall risk of PPB:
    2.2% with clipping vs 3.3% with no clipping; RR 0.69 (95% CI 0.45–1.08)
  - Clipping reduced risk of PPB for polyps ≥ 20 mm (RR 0.51; 0.33–0.78) or proximal location (RR, 0.53; 0.35–0.81)
  - Clipping reduced PPB for large proximal polyps (RR, 0.37; 0.22–0.61) but not small proximal lesions (RR, 0.88; 0.48–1.62)
  - Clipping did not benefit distal polyps, regardless of size

**Clipping: Size and Location matter**

- **Individual Patient Data Meta-Analysis, 5380 patients, nearly 9000 polyps**
  - Prophylactic clipping reduced delayed bleeding in proximal polyps ≥20 mm
    OR 0.62 (95% CI, 0.44–0.88; NNT = 32)
    ++ especially with antithrombotics OR 0.59 (95% CI, 0.35–0.99; NNT = 23)
  - No benefit with distal polyps ≥20 mm (OR 1.41; 95% CI, 0.79–2.52), regardless of antithrombotics
  - No benefit with polyps < 20 mm (OR 1.05; 95% CI, 0.76 – 1.44)


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**Clipping: Histology also matters**

- **Post-hoc analysis of RCT of clipping after EMR of ≥ 20mm polyps:**
  - Low bleeding rates for serrated polyps (2.8% vs. 5.8% for adenomas)
  - Risk for PPB dependent on polyp histology:

<table>
<thead>
<tr>
<th></th>
<th>Clip</th>
<th>No Clip</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenoma</td>
<td>3.9%</td>
<td>7.6%</td>
<td>0.03</td>
</tr>
<tr>
<td>Serrated Polyp</td>
<td>2.3%</td>
<td>3.3%</td>
<td>NS</td>
</tr>
</tbody>
</table>

*Crockett et al. Clin Gastroenterol Hepatol 2022;20:1757-1765*
Recommendations for Follow-Up After Colonoscopy and Polypectomy: A Consensus Update by the US Multi-Society Task Force on Colorectal Cancer

Samir Gupta,1,2,3 David Lieberman,4 Joseph C. Anderson,5,6,7 Carol A. Burke,8 Jason A. Dominitz,9,10 Tonya Kaltenbach,11,12 Douglas J. Robertson,5,6 Aasma Shaukat,13,14 Sapna Syngal,15,16 and Douglas K. Rex17

High quality colonoscopy
- Complete to cecum
- Adequate bowel prep to detect polyps > 5mm
- Adequate colonoscopist adenoma detection rate
- Complete polyp resection

Risk-stratified repeat colonoscopy interval

- 10 years
  - Normal colonoscopy
  - ≥ 20 HP < 10mm
- 7–10 years
  - 1–2 adenomas < 10mm
- 5–10 years
  - 1–2 SSPs < 10mm
- 3–5 years
  - 3–4 adenomas < 10mm
  - 3–4 SSPs < 10mm
  - HP > 10mm
- 3 years
  - 5–10 adenomas
  - 5–10 SSPs
  - Adenoma or SSP ≥ 10mm
  - Adenoma with villous or tubulovillous histology and/or high-grade dysplasia
  - SSP with dysplasia
  - Traditional serrated adenoma
- 1 year
  - > 10 adenomas
Take–Home Points

• Polypectomy has become a science!

• **Key principle is tailoring technique to polyp and patient specifics**

• The “**Cold Revolution**” for non-pedunculated polyps:
  + Cold snare polypectomy for polyps < 10 mm
  + Cold resection for many polyps 10-15 mm
  + Cold resection for all serrated polyps regardless of size

• Hot resection for some polyps 10-19 mm and pedunculated polyps with stalk > 5 mm

• EMR for polyps ≥ 20 mm (Refer to expert endoscopist, NOT surgical resection)

• Selective clipping:
  + Non-pedunculated polyps ≥ 20 mm located in the proximal colon
  + Serrated lesion resection sites do not need to be clipped.

Questions?

Charles Kahi, MD, MSc, FACP

Jennifer K. Maratt, MD, MS
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