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**2023**

**OCTOBER**  
20-25, 2023  
VANCOUVER, CANADA

**VANCOUVER**

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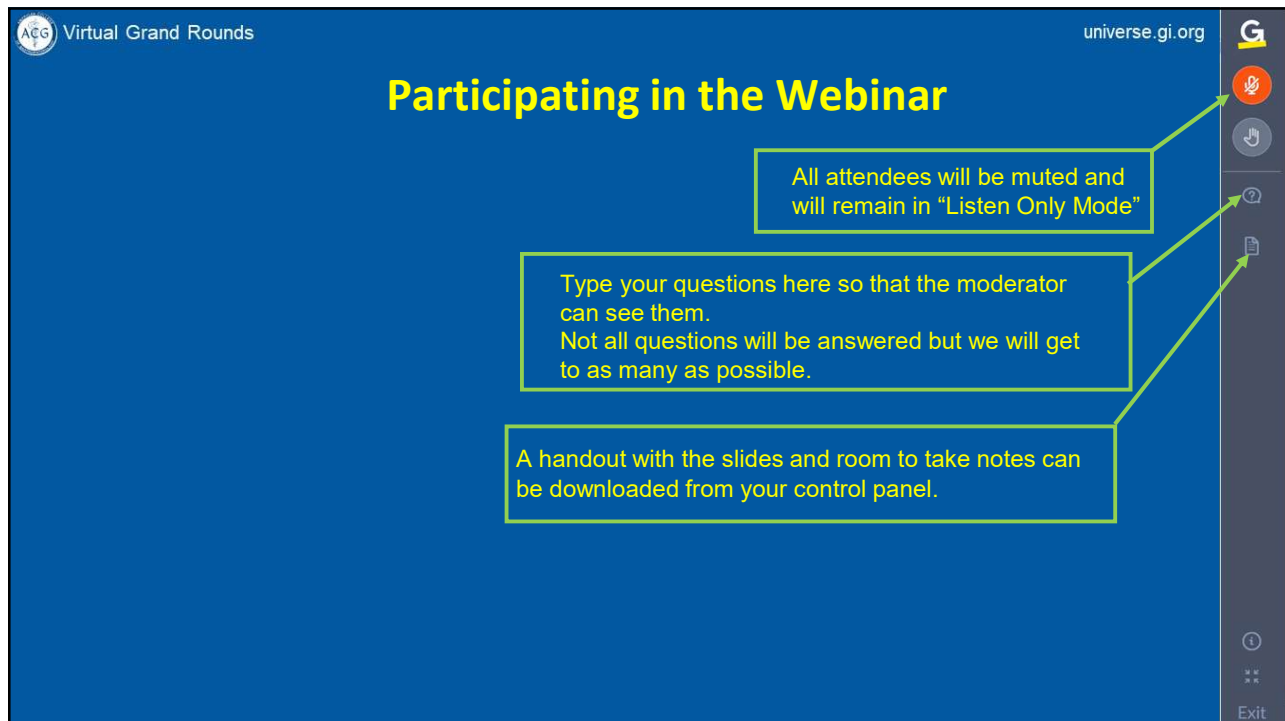
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All attendees will be muted and will remain in "Listen Only Mode"

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.

A handout with the slides and room to take notes can be downloaded from your control panel.

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## ACG Virtual Grand Rounds

Join us for upcoming Virtual Grand Rounds!

**There will be no VGR on Thursday July 6<sup>th</sup>**




**Week 28 – Thursday, July 13, 2023**  
 Going Green: Improving Your Endoscopy Unit's Carbon Footprint  
 Faculty: Rabia A. de Latour, MD  
 Moderator: Swapna Gayam, MD, FACC  
**At Noon and 8pm Eastern**




**Week 29 – Thursday, July 20, 2023**  
 American College of Gastroenterology Acute Liver Failure Guidelines  
 Faculty: Alexandra Shingina, MD, MSc  
 Moderator: Robert J. Wong, MD, MS, FACC  
**At Noon and 8pm Eastern**

**Visit [gi.org/ACGVGR](https://gi.org/ACGVGR) to Register**

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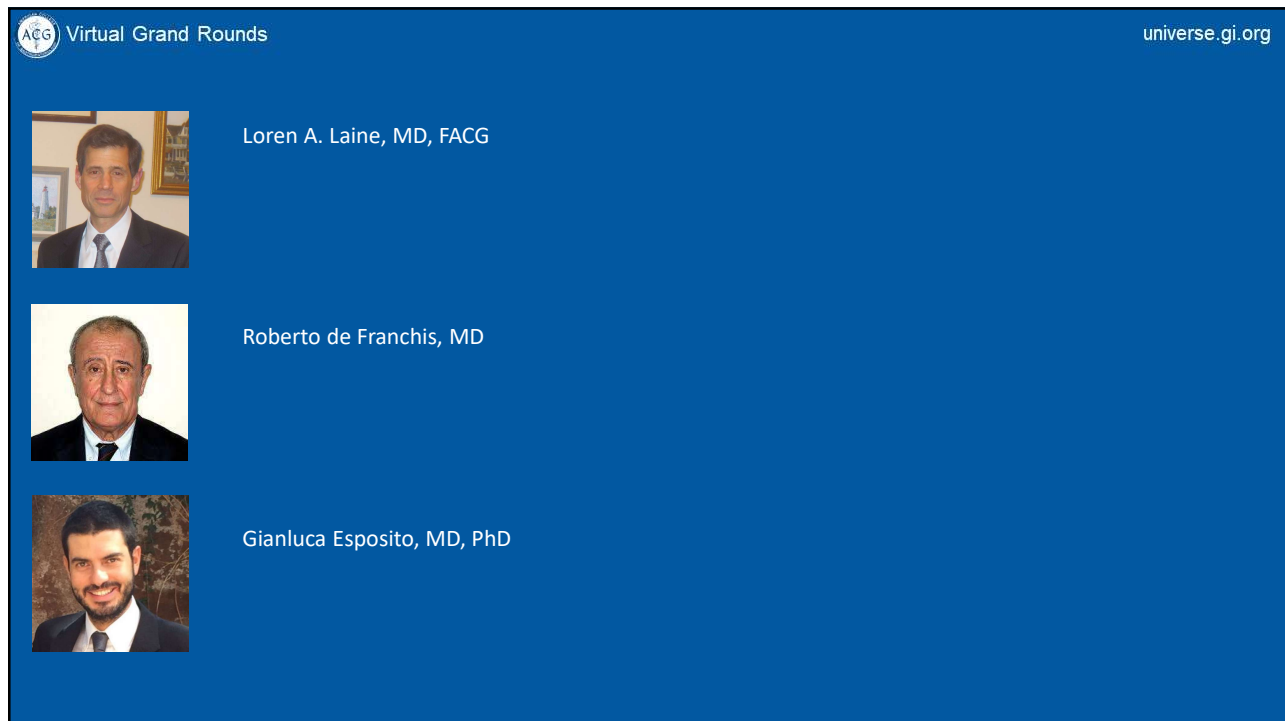
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Be sure your passport is up to date!

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The poster features a large aerial view of Vancouver, Canada, with mountains in the background and a harbor filled with boats. The text is arranged in a clean, modern layout with a mix of bold sans-serif and handwritten-style fonts. A speech bubble contains a reminder about passports.


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universe.gi.org

 Loren A. Laine, MD, FACC

 Roberto de Franchis, MD

 Gianluca Esposito, MD, PhD

The slide has a solid blue background. It features the ACG logo and the text 'Virtual Grand Rounds' in the top left, and the website 'universe.gi.org' in the top right. Three speaker portraits are arranged vertically on the left, each followed by their name and credentials in white text.

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# UPPER GI BLEEDING

## ACG Guideline

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**CME**

# ACG Clinical Guideline: Upper Gastrointestinal and Ulcer Bleeding

Loren Laine, MD, FACG<sup>1,2</sup>, Alan N. Barkun, MD, FACG<sup>3</sup>, John R. Saltzman, MD, FACG<sup>4</sup>, Myriam Martel, MSc<sup>2</sup> and  
Grigorios I. Leontiadis, MD, PhD<sup>5</sup>

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## OUTLINE

- **Initial management of all patients with UGIB**
  - Risk stratification
  - RBC transfusion
  - Pre-endoscopic medical therapy
  - Timing of endoscopy
- **Management of bleeding ulcers**
  - Treatment of acute bleeding episode
  - Prevention of recurrent bleeding
  - Treatment of further bleeding

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## RISK STRATIFICATION

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## PRE-ENDOSCOPIC RISK ASSESSMENT

- **Stratify patients into low/high-risk categories**
  - Level of care (ICU, ward, discharge)
- **Primary utility of risk assessment scores is to identify very-low risk patients for discharge from ED with outpatient management**
  - **Goal: high sensitivity to avoid false negatives**
    - Avoid sending patients home who will need hospital-based intervention or die

Laine, Jensen AJG 2012;107:345; Gralnek et al. Endoscopy 2015;47:a1-46; Sung et al. Gut 2018;67:1757; Barkun et al. AIM 2019;171:805; Laursen et al. CGH 2015;13:115; Stanley et al. BMJ 2017;356:i6432; Shung et al. Gastro 2020;158:160

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## GLASGOW-BLATCHFORD SCORE (GBS): 0-23

- **BUN**
- **Hemoglobin**
- **Systolic BP**
- **Pulse**
- **Melena**
- **Syncope**
- **Hepatic disease**
- **Cardiac failure**

Blatchford et al. Lancet 2000;356:1318

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## GLASGOW-BLATCHFORD SCORE (GBS): 0-23

- BUN

**GBS = 0-1**

- 99% sensitivity (1% false negatives) for transfusion, hemostatic therapy, or death
- Specificity only 27-40%
  - Most patients who won't need intervention or die are still hospitalized

Laursen et al. CGH 2015;13:115; Stanley et al. BMJ 2017;356:i6432; Shung et al. Gastro 2020;158:160

Cardiac Failure

Blatchford et al. Lancet 2000;356:1318

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## RISK STRATIFICATION

### 2021 ACG Guideline

- We suggest patients classified as very-low-risk, defined as risk assessment score with  $\leq 1\%$  false negative rate for the outcome of hospital-based intervention or death (e.g., GBS=0-1), be discharged with outpatient follow-up rather than admitted to hospital.
  - *Conditional recommendation, very-low-quality evidence*

Laine et al. AJG 2021;116:899

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## WILL MACHINE LEARNING MODELS REPLACE CLINICAL RISK SCORES

- **Excellent performance for predicting hospital-based intervention or death**
  - **AUC  $\geq$  0.90 (better than GBS)**
  - **At 99 and 100% sensitivity for model and GBS, specificity better than GBS**
    - **Increase number who can be discharged from ER with outpatient management by more than 2-fold vs. GBS=0**

Shung et al. Gastro 2020;158:160; Shung et al. DDW 2020

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## WILL MACHINE LEARNING MODELS REPLACE CLINICAL RISK SCORES

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    - **Increase number who can be discharged from ER with outpatient management by more than 2-fold vs. GBS=0**

**Goal is to have machine learning models embedded in electronic health record to automatically extract data, assess risk, and provide results in real time for decision making in ER**

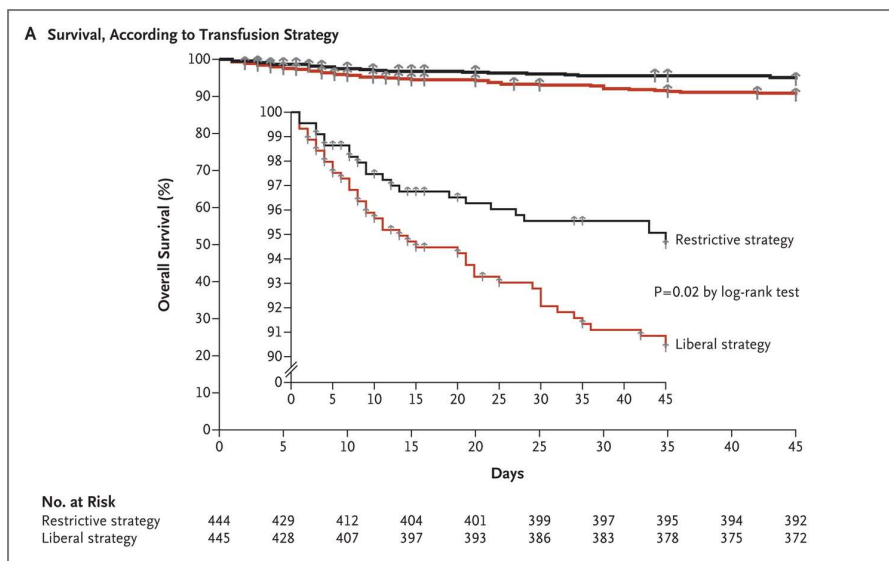
Shung et al. Gastro 2020;158:160; Shung et al. DDW 2020

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# RED BLOOD CELL TRANSFUSION

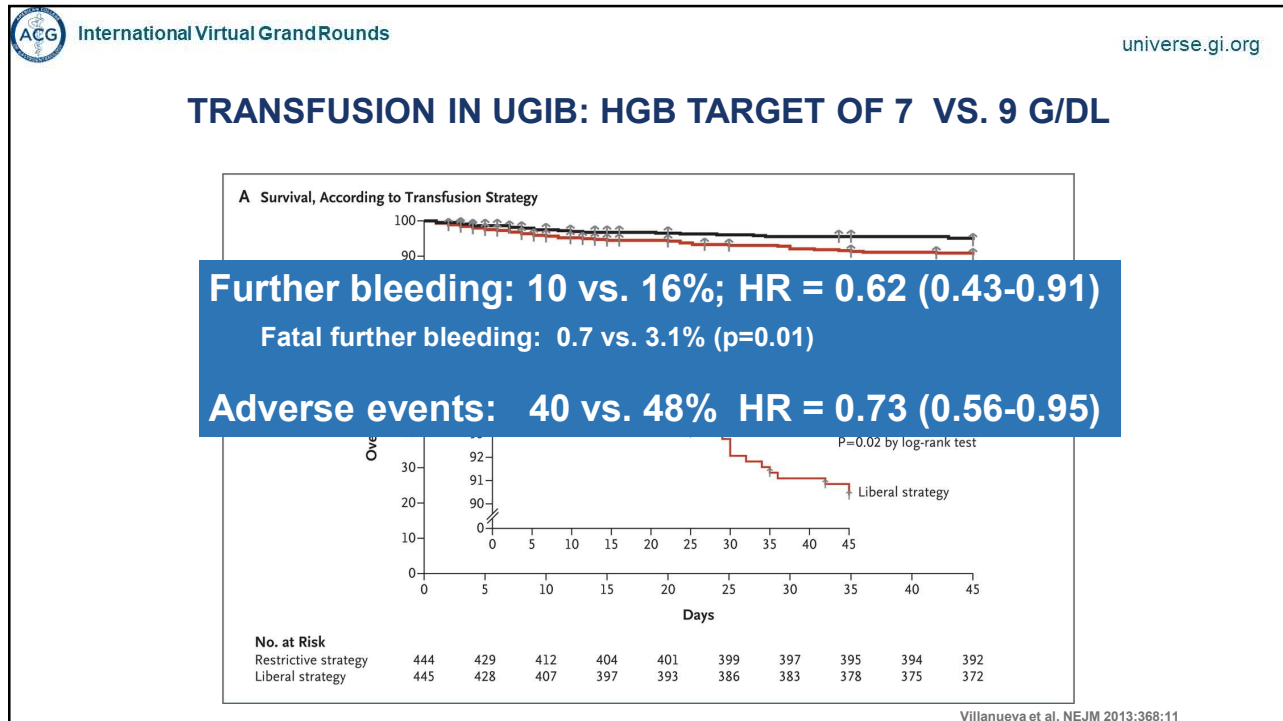
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## TRANSFUSION IN UGIB: HGB TARGET OF 7 VS. 9 G/DL



Villanueva et al. NEJM 2013;368:11

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## RED BLOOD CELL TRANSFUSION 2021 ACG Guideline

- **We suggest a restrictive policy of red blood cell transfusion with a threshold for transfusion at a hemoglobin of 7 g/dL.**
  - *Conditional recommendation, low-quality evidence*

Laine et al. AJG 2021;116:899

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## RBC TRANSFUSION

### Exceptions to Transfusion Threshold of 7 g/dL

- **Hypotensive patient**
  - Hgb lower with equilibration after fluid resuscitation
- **Pre-existing CV disease: 8 g/dL**
  - Based on general anemia guidelines (RCTs used 8 g/dL)
- **Acute coronary syndrome: 8 g/dL**
  - Based on RCT in patients with acute MI and anemia
    - Non-inferior in CV events\* for 8 vs. 10g/dL: 11% vs. 14%
    - RR, 1-sided 97.5% CI = 0.79 (0.00-1.19); non-inferiority <1.25

\* Death, MI, CVA, revascularization

Laine et al. AJG 2021; Ducrocq et al. JAMA 2021;325:552

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## PRE-ENDOSCOPIC MEDICAL THERAPY

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## PRE-ENDOSCOPIC MEDICAL THERAPY

### Evidence from RCTs

- **Erythromycin (prokinetic to improve visibility)**
  - Reduction in 2<sup>nd</sup> EGD, hospital stay
    - Reduction in further bleeding not documented

Rahman et al Ann Gastro 2016;29:312; Sreedharan Cochrane 2010; 7: CD005415;  
Lau et al. NEJM 2007; 356:1631; Leontiadis et al. Mayo Clin Proc 2007;82:286

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## PRE-ENDOSCOPIC MEDICAL THERAPY

### Evidence from RCTs

- Erythromycin (prokinetic to improve visibility)
  - Reduction in 2<sup>nd</sup> EGD, hospital stay
    - Reduction in further bleeding not documented
- **Proton pump inhibitor**
  - Fewer high-risk stigmata, endoscopic treatments
  - No change in clinical outcomes
    - ?Potential benefit if endoscopy not done, delayed
      - Less rebleeding in ulcer bleeding RCTs without consistent pre-randomization endoscopic therapy

Rahman et al Ann Gastro 2016;29:312; Sreedharan Cochrane 2010; 7: CD005415;  
Lau et al. NEJM 2007; 356:1631; Leontiadis et al. Mayo Clin Proc 2007;82:286

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**PRE-ENDOSCOPIC PPI IN PATIENTS WITH UGIB\***  
DB RCT of IV Omeprazole 80mg bolus followed by 8mg/hr Infusion

Outcome	PPI (N=314)	Standard (N=317)
Further bleeding (30 d)	11 (3.5%)	8 (2.5%)
Hospital days	4.5 ± 5.3	4.9 ± 5.1
Units of blood	1.54 ± 2.41	1.88 ± 3.44
Death (30 d)	8 (2.5%)	7 (2.2%)

UGIB = hematemesis or melena; mean infusion: 15 hrs pre-endoscopy  
\*p=0.007 Lau et al. NEJM 2007;356:1631

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**PRE-ENDOSCOPIC PPI IN PATIENTS WITH UGIB\***  
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Death (30 d)	8 (2.5%)	7 (2.2%)

**Endoscopic Hemostatic Therapy with Pre-Endoscopic PPI:  
Meta-Analysis of 3 Placebo-Controlled RCTs**

- **Difference, PPI vs. Placebo = -3%, -6% to -1%**

Laine et al. AJG 2021;116:899

UGIB = hematemesis or melena; mean infusion: 15 hrs pre-endoscopy  
\*p=0.007 Lau et al. NEJM 2007;356:1631

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## PRE-ENDOSCOPIC MEDICAL THERAPY 2021 ACG Guideline

- **We suggest an infusion of erythromycin [250mg infusion 20-90 minutes before EGD] in patients with UGIB.**
  - *Conditional recommendation, very-low-quality evidence*
- **We could not reach a recommendation for or against pre-endoscopic PPI therapy for patients with UGIB.**
  - **Might be given if EGD will be delayed or not done**

Laine et al. AJG 2021;116:899

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## PRE-ENDOSCOPIC MEDICAL THERAPY 2021 ACG Guideline

### ESGE 2021 Guidelines


- **ESGE recommends pre-endoscopy IV erythromycin in selected patients with clinically severe or ongoing active UGIH**
- **ESGE suggests that pre-endoscopy high-dose IV PPI be considered to downstage endoscopic stigmata and thereby reduce the need for endoscopic therapy**

Gralnek et al. Endoscopy 2021;53:300

Laine et al. AJG 2021;116:899

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## PRE-ENDOSCOPIC MEDICAL THERAPY 2021 ACG Guideline

- **Consensus on appropriate manner of presenting guideline recommendations has evolved**
  - Guidelines should provide a recommended action
  - Therefore, statements such as “may be considered”, which do not recommend for or against an action such as giving PPI therapy, are no longer used.

Laine et al. AJG 2021;116:899; Institute of Medicine. Clinical Practice Guidelines We Can Trust. 2011

Laine et al. AJG 2021;116:899

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# TIMING OF ENDOSCOPY

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## EGD IN PATIENTS HOSPITALIZED WITH UGIB

- Overall population
  - $\leq 24$  hrs reduces length of stay, surgery, ?mortality
  - RCT: No benefit  $\leq 12$  vs.  $>12$  hrs after presentation

Laine et al. AJG 2021;116:899; Cooper et al. Med Care 1998;36:462; GIE 1999;49:145; Wysocki et al. APT 2012;36:30.; Lin et al. JCG 1996;22:267; Lau et al NEJM 2020;382:1299; Lee et al. GIE 1999;50:755; Bjorkman et al. GIE 2004;60; Laursen et al. GIE 2017;85:936; Cho et al. CGH 2018;16:370; Guo et al. Gut 2022;71:1544

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## EGD IN PATIENTS HOSPITALIZED WITH UGIB

- Overall population
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- High-risk patients

Laine et al. AJG 2021;116:899; Cooper et al. Med Care 1998;36:462; GIE 1999;49:145; Wysocki et al. APT 2012;36:30.; Lin et al. JCG 1996;22:267; Lau et al NEJM 2020;382:1299; Lee et al. GIE 1999;50:755; Bjorkman et al. GIE 2004;60; Laursen et al. GIE 2017;85:936; Cho et al. CGH 2018;16:370; Guo et al. Gut 2022;71:1544

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## ENDOSCOPY TIMING: HIGH-RISK PATIENTS

- Previous guidelines suggest considering endoscopy within 12 hours for patients with high-risk features
  - Hemodynamic instability (ACG, ESGE, Asia-Pacific)
  - Comorbidities: e.g., cirrhosis (AASLD, Baveno)
- Supporting evidence scant

Laine, Jensen AJG 2012;107:345 ; Gralnek et al. Endoscopy 2015;47a1; Sung et al. Gut 2018;67:1757; Garcia-Tsao et al. Hepatology 2017;65:310; de Franchis J Hepatol 2015;63:743

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## EGD IN PATIENTS HOSPITALIZED WITH UGIB

- Overall population
  - ≤24 hrs reduces length of stay, surgery, ?mortality
  - RCT: No benefit ≤12 vs. >12 hrs after presentation
- High-risk patients
  - RCT (GBS ≥12): No benefit ≤6 vs. 6-24 hrs after GI consult
  - ≤6 hrs may increase mortality (observational studies)

Laine et al. AJG 2021;116:899; Cooper et al. Med Care 1998;36:462; GIE 1999;49:145; Wysocki et al. APT 2012;36:30.; Lin et al. JCG 1996;22:267; Lau et al NEJM 2020;382:1299; Lee et al. GIE 1999;50:755; Bjorkman et al. GIE 2004;60; Laursen et al. GIE 2017;85:936; Cho et al. CGH 2018;16:370; Guo et al. Gut 2022;71:1544

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## EGD IN PATIENTS HOSPITALIZED WITH UGIB

- Overall population
  - ≤24 hrs reduces length of stay, surgery, ?mortality
  - RCT: No benefit ≤12 vs. >12 hrs after presentation
- High-risk patients
  - RCT (GBS ≥12): No benefit ≤6 vs. 6-24 hrs after GI consult
  - ≤6 hrs may increase mortality (observational studies)
- Low-risk patients (normal VS, no severe comorbidity)
  - 2 RCTs: low-risk endoscopic findings in ≥40%, allow discharge

Laine et al. AJG 2021;116:899; Cooper et al. Med Care 1998;36:462; GIE 1999;49:145; Wysocki et al. APT 2012;36:30.; Lin et al. JCG 1996;22:267; Lau et al NEJM 2020;382:1299; Lee et al. GIE 1999;50:755; Bjorkman et al. GIE 2004;60; Laursen et al. GIE 2017;85:936; Cho et al. CGH 2018;16:370; Guo et al. Gut 2022;71:1544

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## TIMING OF ENDOSCOPY 2021 ACG Guideline

- We suggest that patients admitted to or under observation in hospital for UGIB undergo endoscopy within 24 hours of presentation
  - *Conditional recommendation, low-quality evidence*

Laine et al. AJG 2021;116:899

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## TIMING OF ENDOSCOPY

### 2021 ACG Guideline

- We suggest that patients admitted to or under observation in hospital for UGIB undergo endoscopy within 24 hours of presentation
  - *Conditional recommendation, low-quality evidence*
- **Resuscitation, attention to comorbidities before EGD**
- **Hemodynamically stable without severe comorbidities: EGD as soon as possible within routine hours**

Laine et al. AJG 2021;116:899

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## TIMING OF ENDOSCOPY

### 2021 ESGE Guideline

- **ESGE does not recommend urgent ( $\leq 12$  hours) upper GI endoscopy since as compared to early endoscopy, patient outcomes are not improved.**
- **ESGE does not recommend emergent ( $\leq 6$  hours) upper GI endoscopy since this may be associated with worse patient outcomes.**

Gralnek et al. Gut 2021;53:300

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# MANAGEMENT OF ULCER BLEEDING

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## ENDOSCOPIC THERAPY FOR ULCER BLEEDING\* 2021 ACG Guidelines

### Strong recommendation

- Bipolar electrocoagulation
- Heater probe
- Absolute ethanol injection
- Epinephrine should not be used alone but rather in combination with a 2<sup>nd</sup> modality

### Conditional recommendation

- Clips
- Argon plasma coagulation
- Soft monopolar electrocoagulation
- TC-325 hemostatic powder spray for active bleeding

\*Active bleeding, non-bleeding visible vessel,  $\pm$ adherent clot

Laine et al. AJG 2021;116:899

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# NEWER ENDOSCOPIC HEMOSTATIC MODALITIES

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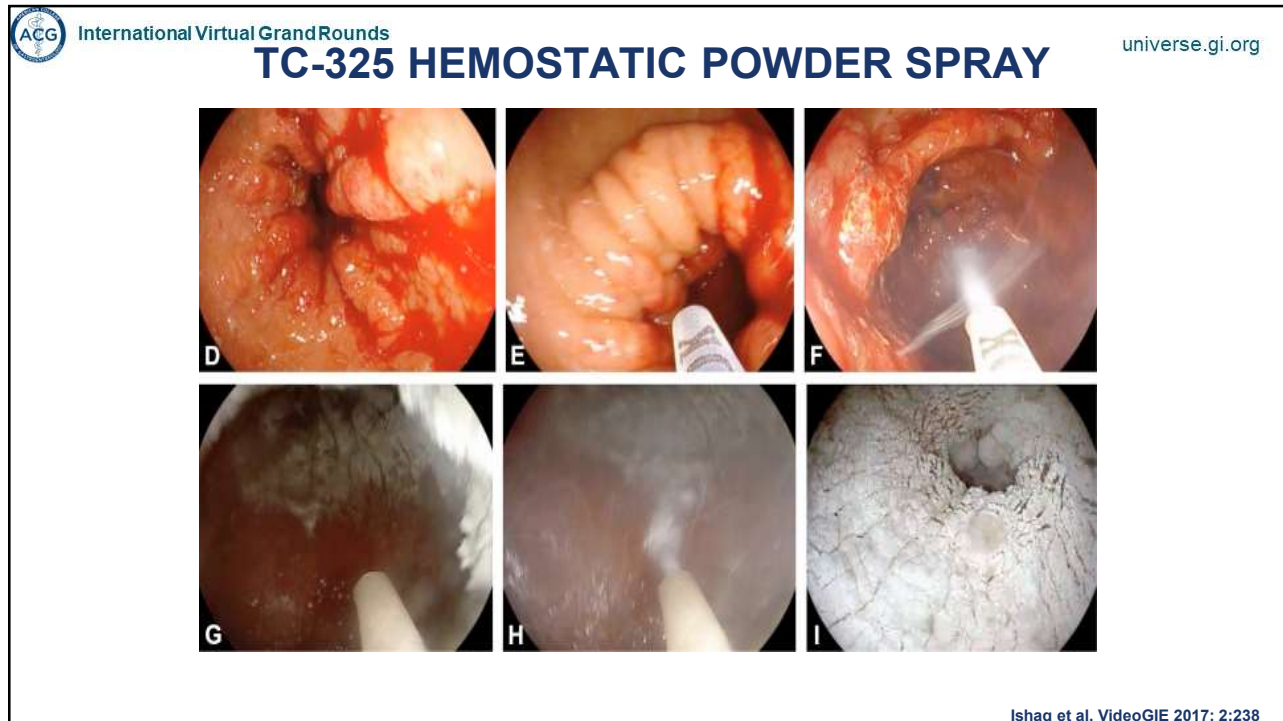


## ENDOSCOPIC TOPICAL HEMOSTATIC THERAPIES

- **TC-325 (Hemospray)**
  - Inert mineral powder rapidly absorbs water on contact with blood—creating adhesive seal for mechanical tamponade, concentrating clotting factors.
- **UI-EWD (Nexpowder)**
  - Natural polymer converts to adhesive hydrogel on contact with moisture. Cross-links within itself and adjacent tissue to create mechanical barrier. Does not require active bleeding.
- **TDM-621 (Purostat)**
  - Topical hemostatic agent for surgical wounds applied to endoscopic therapy. Transparent gel of amino acids, which upon contact with fluid forms a hydrogel scaffold.
- **Endoclot**
  - Absorbable modified polymers from plant starch. On contact with blood absorbs water, forms protective gel matrix and concentrates coagulation factors.

Jiang et al. Endosc Int Open 2022;10:E1136-46

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## TC-325 HEMOSTATIC POWDER SPRAY

**International Consensus (2019)**

- Suggest as temporizing therapy to stop active bleeding when conventional endoscopic therapies are not available or fail
- Suggest against use as monotherapy

Barkun et al. AIM 2019;171:805

Ishaq et al. VideoGIE 2017; 2:238

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### TC-325 HEMOSTATIC POWDER SPRAY VS. STANDARD THERAPY IN ACTIVE NONVARICEAL UGIB

Outcome	TC-325 (N=111)	Standard (N=113)	Difference (95% CI)
Further bleeding 30-d	11 (10%)	21 (19%)	-9% (-17, 0.5%)
Ulcer	8/68 (12%)	11/68 (16%)	-4% (-16, 7%)
Spurting	1/9 (11%)	5/12 (42%)	-31% (-70, 8%)
Oozing	10/102 (10%)	16/101 (16%)	-6% (-15, 3%)
Death	14 (13%)	14 (12%)	0.2% (-8, 9%)

Met non-inferiority margin (-10%) for control of bleeding  
90 vs. 81%: 1-sided 95% CI of difference = 1%

Lau et al. AIM 2022;175:171

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### TIMING OF ENDOSCOPY 2021 ACG Guideline

- **We suggest endoscopic hemostatic therapy with hemostatic powder spray TC-325 for patients with actively bleeding ulcers**
  - *Conditional recommendation, very-low-quality evidence*

Laine et al. AJG 2021;116:899

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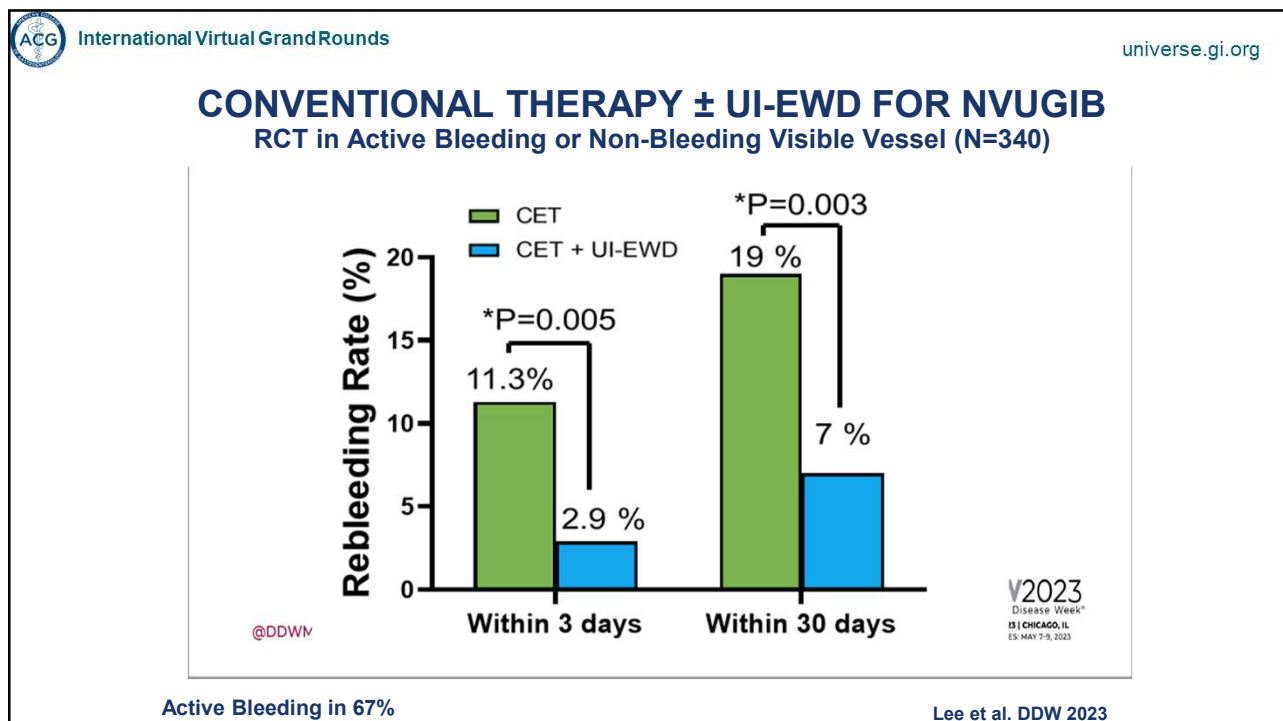
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## TIMING OF ENDOSCOPY 2021 ACG Guideline

- We suggest endoscopic hemostatic therapy with hemostatic powder spray TC-325 for patients with actively bleeding ulcers
  - *Conditional recommendation, very-low-quality evidence*
- Further research to confirm can be used as monotherapy, especially in spurting bleeding
- Due to high cost in U.S., should not be initial modality if other therapies can be readily applied

Laine et al. AJG 2021;116:899

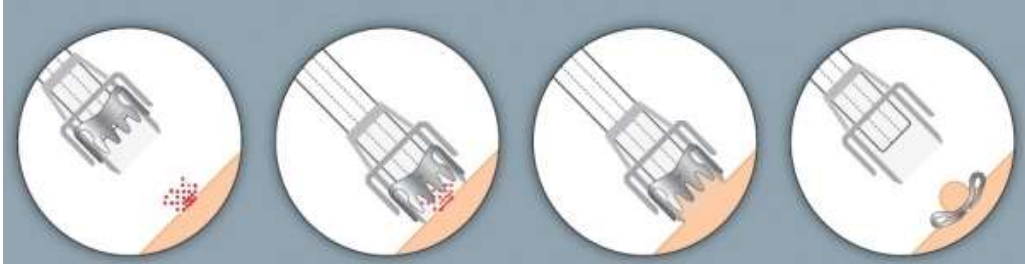
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## OVER-THE-SCOPE CLIP APPLICATION



Approach lesion enface      Cap over/around target lesion      Lesion sucked into cap, hand wheel turned to release clip      Clip in place

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## OVER-THE SCOPE CLIPS FOR ULCER REBLEEDING RCT in Patients with Rebleeding after Initial Hemostasis

	<b>Standard* (N=33)</b>	<b>OTSC (N=33)</b>
<b>Further bleeding</b>	<b>19 (58%)</b>	<b>5 (15%)**</b>
<b>IR or surgery</b>	<b>2 (6%)</b>	<b>0</b>
<b>Hospital days</b>	<b>13</b>	<b>13</b>
<b>Death</b>	<b>1 (3%)</b>	<b>3 (9%)</b>

\*through-the-scope clips in 31/33; \*\*p=0.001 Schmidt et al. Gastro 2018;155:674

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## ENDOSCOPIC THERAPY FOR BLEEDING ULCERS 2021 ACG Guideline

- We suggest over-the-scope clips as a hemostatic therapy for patients who develop recurrent bleeding due to ulcers after prior successful endoscopic hemostasis.
  - *Conditional recommendation, low-quality evidence*

Laine et al. AJG 2021;116:899

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## OVER-THE-SCOPE CLIPS FOR INITIAL THERAPY? Meta-Analysis of RCTs for NVUGIB

Study or Subgroup	OTSC		Standard Therapy		Weight	Risk Ratio	
	Events	Total	Events	Total		M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
Chan	6	50	11	50	24.1%	0.55	[0.22, 1.36]
Jensen	1	25	8	28	16.5%	0.14	[0.02, 1.04]
Lau	3	93	14	97	30.0%	0.22	[0.07, 0.75]
Meier	6	48	14	52	29.4%	0.46	[0.19, 1.11]
<b>Total (95% CI)</b>		<b>216</b>		<b>227</b>	<b>100.0%</b>	<b>0.36</b>	<b>[0.21, 0.61]</b>
Total events	16		47				
Heterogeneity: $\text{Chi}^2 = 2.57$ , $\text{df} = 3$ ( $P = 0.46$ ); $I^2 = 0\%$							
Test for overall effect: $Z = 3.77$ ( $P = 0.0002$ )							

- **Methodologic limitations in the 3 positive studies**
  - Change in original sample sizes without mention or justification in 2 RCTs
  - Very high further bleeding rates in standard arm (22-29% in 3 studies)
  - Inequality in important prognostic factors
    - Spurting (Jensen), ulcer >2cm (Meier): 25% vs. 8%
  - Lau did not randomize 10 patients due to unfavorable lesion position for OTSC, 5 other OTSCs didn't have successful placement

Jensen et al. CGH 2021;19:2315; Meier et al. Gut 2022;71:1251; Lau et al. AIM 2023;176:455; Chan et al. Gut 2023;72:638

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## OVER-THE-SCOPE CLIPS FOR INITIAL THERAPY? Meta-Analysis of RCTs for NVUGIB

Study or Subgroup	OTSC		Standard Therapy		Weight	Risk Ratio	
	Events	Total	Events	Total		M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
Chan	6	50	11	50	21.1%	0.55	0.22, 1.26

**ESGE 2021 Guidelines**

- ESGE suggests in selected actively bleeding ulcers (>2 cm, visible vessel >2mm, in a high-risk vascular area (e. g., gastroduodenal, left gastric arteries), or in excavated/fibrotic ulcers), a cap-mounted clip should be considered as first-line therapy

Gralnek et al. Endoscopy 2021;53:300

- Very high further bleeding rates in standard arm (22-29% in 3 studies)
- Inequality in important prognostic factors
  - Spurting (Jensen), ulcer >2cm (Meier): 25% vs. 8%
- Lau did not randomize 10 patients due to unfavorable lesion position for OTSC, 5 other OTSCs didn't have successful placement

Jensen et al. CGH 2021;19:2315; Meier et al Gut 2022;71:1251; Lau et al. AIM 2023;176:455; Chan et al. Gut 2023;72:638

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## ANTISECRETORY THERAPY FOR TREATMENT OF BLEEDING ULCER

- Reduced acid enhances clot formation and stability
- Continuous vs. intermittent PPI therapy?
  - Target intragastric pH based on experimental data
    - pH 6-7: studies of platelet aggregation, PT/PTT
    - pH 4-5: studies of pepsin-induced clot lysis, platelet disaggregation

Green et al. Gastro 1978;74:38; LaBenz et al Gut;1997;40:36; Patchett et al. Gut ;1989;30:1704; Laine et al. Gastro 2008;134:1836

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### HIGH-DOSE PPI AFTER SUCCESSFUL ENDOSCOPIC THERAPY

Meta-Analysis of RCTs of PPI vs. Placebo/No Treatment: Further Bleeding

	Risk Ratio (95% CI)
<b>All RCTs (N=8)</b> <b>GRADE: high quality of evidence</b>	<b>0.43 (0.33-0.56)</b>
Subgroup Analysis (subgroup difference p=0.94)	
<b>Continuous PPI (N=4 RCTs)</b>	<b>0.43 (0.31-0.61)</b>
<b>Intermittent PPI (N=4 RCTs)</b>	<b>0.42 (0.27-0.67)</b>

High-dose =  $\geq 80$ mg daily x 3 days Laine et al. AJG 2021;107:345

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### HIGH-DOSE PPI AFTER SUCCESSFUL ENDOSCOPIC THERAPY

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<b>Intermittent PPI (N=4 RCTs)</b>	<b>0.42 (0.27-0.67)</b>

**Mortality (PPI vs. Placebo/No Treatment)**

- RR = 0.41 (0.22-0.79)
- Continuous, intermittent subgroup RRs = 0.41, 0.42

High-dose =  $\geq 80$ mg daily x 3 days Laine et al. AJG 2021;107:345

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## POST-ENDOSCOPIC MEDICAL THERAPY 2021 ACG Guideline

- **We recommend high-dose PPI therapy given continuously or intermittently for 3 days after successful endoscopic hemostatic therapy of a bleeding ulcer.**
  - *Strong recommendation, moderate to high-quality evidence*

Laine et al. AJG 2021;116:899

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## PPI THERAPY FOR BLEEDING ULCER

- **Active bleeding, visible vessel, clot**
  - **High-dose PPI therapy for 3 days**
    - IV bolus (80mg), continuous infusion (8mg/hr)
    - Intermittent IV or oral
      - e.g., 80mg bolus and 40mg 2-4x daily
  - **Twice-daily PPI days 4 to 14**
- **Flat spot, clean base**
  - **Standard oral PPI once-daily**

Laine et al. AJG 2021;116:899; Barkun et al. AIM 2010;152:101; Cheng et al. Gut 2014;63:1864

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### PCAB VS. PPI AFTER ENDOSCOPIC HEMOSTASIS FOR ULCER BLEEDING

Vonoprazan 20mg PO bid x 3d, then 20mg qd x 28d vs.  
Pantoprazole 80mg IV bolus, 8mg/hr infusion x 3d, then 20mg bid x 28d

Outcome	PCAB (N=88)	PPI (N=86)	Difference (95% CI)
Further bleeding (30-day)*	4 (4.6%)	8 (9.3%)	-4.8 (-12.3 to 2.8)
Units blood transfused after endoscopic therapy	0.9	1.4	-0.6 (-1.1 to -0.04)
Hospital days	6.9	9.4	-2.5 (-5.3 to 0.2)
Death	5 (5.7%)	8 (9.3%)	-3.6 (-11.4 to 4.2)

\* Met non-inferiority margin (10%) for 30-day further bleeding Geeratrigoal et al. DDW 2023

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### REBLEEDING AFTER ENDOSCOPIC AND MEDICAL THERAPY

2021 ACG Guideline

- RCT of repeat endoscopic therapy vs. surgery
  - Avoids surgery ~75% cases, fewer complications
- We suggest that patients with recurrent bleeding after endoscopic therapy for a bleeding ulcer undergo repeat endoscopy and endoscopic therapy.
  - *Conditional recommendation, low-quality evidence*

Laine et al. AJG 2021;116:899

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## FAILURE OF ENDOSCOPIC THERAPY

### 2021 ACG Guideline

- **Interventional radiology vs. surgery**
  - Transcatheter arterial embolization has more rebleeding (OR=2.4, 1.8-3.4) but fewer complications (OR=0.5, 0.3-0.7) and shorter hospital stay—without an increase in mortality
- **We suggest patients with bleeding ulcers who have failed endoscopic therapy next be treated with transcatheter arterial embolization.**
  - *Conditional recommendation, very-low-quality evidence*

Laine et al. AJG 2021;116:899

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## SUMMARY

- **Risk stratify: if very-low risk, may discharge from ED**

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## SUMMARY

- Risk stratify: if very-low risk, may discharge from ED
- **Transfuse RBCs at Hgb 7 g/dL (8 g/dL if CV disease)**

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## SUMMARY

- Risk stratify: if very-low risk, may discharge from ED
- Transfuse RBCs at Hgb 7 g/dL (8 g/dL if CV disease)
- **Pre-endoscopic medications: erythromycin, ±PPI**

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## SUMMARY

- Risk stratify: if very-low risk, may discharge from ED
- Transfuse RBCs at Hgb 7 g/dL (8 g/dL if CV disease)
- Pre-endoscopic medications: erythromycin, ±PPI
- **EGD within 24 hrs (resuscitate, address co-morbidities first)**

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## SUMMARY

- Risk stratify: if very-low risk, may discharge from ED
- Transfuse RBCs at Hgb 7 g/dL (8 g/dL if CV disease)
- Pre-endoscopic medications: erythromycin, ±PPI
- EGD within 24 hrs (resuscitate, address co-morbidities first)
- **Ulcer bleeding**
  - **High-risk ulcer**
    - Endoscopic hemostatic therapy
    - High-dose PPI (continuous or intermittent) x 3 days
  - **If rebleeding, repeat EGD**
  - **If failure of endoscopic therapy → interventional radiology**


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## Questions



Loren A. Laine, MD, FACC



Roberto de Franchis, MD



Gianluca Esposito, MD, PhD

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