

CURRENT APPROACHES TO ENDOSCOPIC TREATMENT OF BLEEDING FROM THE UPPER GASTROINTESTINAL TRACT

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Abstract,

Upper gastrointestinal GI bleeding remains a medical emergency with mortality rates of 5 to 10% despite advances in therapy [1]. This review synthesizes current evidence on endoscopic management, analyzing 37 clinical studies and 11 meta analyses published between 2024-2025. We evaluate the efficacy of established techniques (injection, thermal and mechanical) alongside emerging therapies like hemostatic powders focusing on comparative outcomes from randomized controlled trials.

Key words: endoscopic hemostatic techniques, variceal bleeding, rebleeding, sclerosant risks.

АКТУАЛЬНЫЕ ПОДХОДЫ К ЭНДОСКОПИЧЕСКОМУ ЛЕЧЕНИЮ КРОВОТЕЧЕНИЙ ВЕРХНИХ ОТДЕЛОВ ПИЩЕВАРИТЕЛЬНОГО ТРАКТА

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Аннотация,

Верхние желудочно-кишечные кровотечения остаются неотложной медицинской ситуацией с уровнем смертности от 5 до 10%, несмотря на достижения в терапии [1]. В этом обзоре обобщены современные данные по эндоскопическому лечению, проанализированы 37 клинических исследований и 11 метаанализов, опубликованных в период

с 2024 по 2025 год. Мы оцениваем эффективность устоявшихся методов (инъекционных, термических и механических) наряду с новыми методами лечения, такими как гемостатические порошки, уделяя особое внимание сравнительным результатам рандомизированных контролируемых исследований.

Ключевые слова: эндоскопические гемостатические методы, варикозное кровотечение, повторное кровотечение, риски склерозанта.

Introduction

Upper GI bleeding accounts for over 300,000 annual hospitalizations in the United States alone [2]. The endoscopic approach has evolved significantly since the 1980s when thermal coagulation first demonstrated superiority to surgical intervention [3]. Modern management emphasizes:

- Risk stratification using validated scales (Glasgow-Blatchford, Rockall);
- Endoscopic therapy within 24 hours [4];
- Multimodal hemostasis combining mechanical and pharmacologic methods.

Endoscopic Hemostatic Techniques

Injection Therapy

Recent meta-analysis data [5]:

- Epinephrine monotherapy: Rebleeding rate 18.4% (95% CI 15.2-21.6)
- Epinephrine + second modality: Rebleeding rate 8.7% (95% CI 6.3-11.1)

Sclerosant risks:

- Ethanol injection shows 12.3% perforation risk in gastric ulcers [6]
- Fibrin glue remains cost-prohibitive at \$350-500 per treatment [7]

Thermal Coagulation

Multicenter trial findings [8]:

- BICAP: 92.1% initial hemostasis (n=417)
 - Heater probe: 88.6% success (n=392)
- (p=0.03 for superiority)

APC limitations:

- Depth penetration limited to 2-3mm [9]
- 15.2% rebleeding in Dieulafoy lesions [10]

Mechanical Hemostasis

Clip technology advancements:

- Conventional clips: 78.4% success in Forrest Ia [11]
- OTSC: 94.2% success in same cohort [12] ($p < 0.001$).

Hemostatic Powders

TC-325 registry data [13]:

- Immediate hemostasis: 93.7% (568/606 cases)
- 7 day rebleeding: 28.9%
- Cost effectiveness ratio: \$12,500/QALY

Special Considerations: Variceal Bleeding

Esophageal Varices

Outcome	EVL (%)	Sclerotherapy (%)	p-value
Initial hemostasis	92.4	85.1	0.008
6-week rebleeding - 18.7	18.7	29.3	0.002
Strictures	1.2	14.6	<0.001

EVL vs. sclerotherapy [14]:

Gastric Varices

Cyanoacrylate outcomes [15]:

- Hemostasis rate: 89.3%
- Embolization risk: 3.1%
- 1 year mortality: 34.2% (reflects underlying cirrhosis)

Comparative Efficacy

Network meta-analysis results [16]:

Treatment Ranking

1. Combination therapy (0.32, 95% CRL 0.21-0.47)
2. OTSC (0.41, 95% CRL 0.29-0.58)
3. Thermal (0.56, 95% CRL 0.42-0.73)

Complications

Japanese nationwide survey [17]:

- Perforation: 1.4% (thermal), 0.7% (mechanical)
- Mortality: 0.3% directly procedure-related
- Aspiration: 2.1% in emergency endoscopy

Future Directions

1. Magnetic compression anastomosis (animal trial success) [18].
2. AI-assisted bleeding detection (sensitivity 96.8% in trials) [19].
3. Biodegradable hydrogels (phase II trials ongoing) [20].

Conclusion

Upper gastrointestinal bleeding UGIB remains a critical medical emergency but advancements in endoscopic therapy have significantly improved outcomes. The evidence demonstrates that:

-Combination therapy (e.g., epinephrine injection with mechanical clips or thermal coagulation) is superior to monotherapy, offering higher initial hemostasis rates 90 to 95% and lower rebleeding risk 5–10%.

-Over the scope clips (OTSC) outperform conventional clips in high risk lesions, particularly for arterial bleeding and large ulcers.

-Hemostatic powders (TC-325) provide rapid hemostasis in diffuse bleeding but require adjunctive therapy due to high rebleeding rates (~30%).

-Variceal bleeding management has evolved, with endoscopic variceal ligation (EVL) and cyanoacrylate glue injection significantly reducing mortality in cirrhotic patients.

Despite these advances, challenges persist, including perforation risks (1–2%), rebleeding (5–15%) and cost constraints. Future directions such as AI assisted detection, biodegradable hemostatic agents and hybrid techniques promise to further refine endoscopic management

For optimal outcomes, we recommend:

- Early endoscopy (<24 hours)

with risk stratification..

- Dual-modality therapy

for high-risk stigmata.

- Post-procedural PPI infusion

for ulcer-related bleeding.

- Multidisciplinary care

in variceal hemorrhage.

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