

Advancements in minimally invasive techniques for gastrointestinal bleeding.

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Introduction

Gastrointestinal (GI) bleeding is a significant medical emergency that requires prompt diagnosis and intervention to prevent complications and improve patient outcomes. Over the years, advancements in minimally invasive techniques have revolutionized the management of GI bleeding, offering effective alternatives to traditional surgical approaches. This article explores the latest advancements in minimally invasive techniques for gastrointestinal bleeding, focusing on both upper and lower GI tract bleeding [1].

Upper gastrointestinal bleeding (UGIB) primarily involves bleeding from the esophagus, stomach, or duodenum. Minimally invasive techniques have significantly impacted the management of UGIB, allowing for faster recovery, reduced hospital stays, and improved patient outcomes [2].

Endoscopic Hemostasis: Endoscopy remains the cornerstone for the diagnosis and treatment of UGIB. Advanced endoscopic techniques include: **Injection Therapy:** Injection of epinephrine, sclerosing agents, or hemostatic powders to achieve hemostasis in bleeding ulcers. **Thermal Therapy:** Using techniques such as argon plasma coagulation (APC) or heater probe to coagulate bleeding vessels. **Mechanical Therapy:** Application of clips or bands to achieve mechanical hemostasis in larger vessels or varices [3].

EUS has a role in localizing the bleeding source, especially in cases where conventional endoscopy is inconclusive. It can guide therapeutic interventions, such as fine-needle aspiration or injection of hemostatic agents. Capsule endoscopy allows for non-invasive visualization of the entire small bowel, identifying sources of bleeding that are not accessible by traditional endoscopy. The development of advanced capsules with real-time viewing capabilities has enhanced its diagnostic utility in acute and chronic UGIB [4].

Lower gastrointestinal bleeding (LGIB) refers to bleeding from the colon, rectum, or anus. Minimally invasive techniques have expanded the options for diagnosis and treatment, reducing the need for more invasive surgical procedures. Colonoscopy remains the gold standard for the diagnosis and treatment of LGIB. Advanced techniques include [5].

Endoscopic Hemostasis: Similar to UGIB, methods such as injection therapy, thermal therapy, and mechanical therapy (clips, bands) are used to achieve hemostasis. **Polypectomy:** Removal of bleeding polyps or lesions during colonoscopy

to prevent rebleeding and potential malignant transformation. **Angiographic Embolization:** Similar to UGIB, angiographic embolization can be used in LGIB to achieve hemostasis in cases where endoscopic therapy has failed or is not feasible [6].

Minimally invasive techniques generally result in fewer complications, shorter hospital stays, and faster recovery times compared to traditional open surgical approaches. Advanced imaging modalities and techniques, such as capsule endoscopy and VCE, enhance the diagnostic accuracy in identifying the bleeding source, even in obscure cases. Minimally invasive techniques allow for the preservation of normal gastrointestinal anatomy and function, reducing the risk of complications such as postoperative adhesions [7].

Minimally invasive procedures are associated with less pain and discomfort, promoting better patient compliance with treatment and follow-up. While initial costs may be higher, the reduced length of hospital stays and lower complication rates often result in overall cost savings for healthcare systems [8].

Integration of AI and machine learning algorithms to analyze endoscopic and radiologic images, improving lesion detection and characterization. Development of real-time decision support systems to guide therapeutic interventions during endoscopy. Advancements in targeted therapies for variceal bleeding, including novel sclerosing agents and vasoconstrictors with improved safety profiles [9].

Drug-eluting stents and coatings for endoscopic devices to enhance hemostasis and prevent recurrent bleeding. Expansion of telemedicine platforms for remote consultation and monitoring of patients with gastrointestinal bleeding, enhancing access to specialized care. Personalized medicine approaches based on genetic and molecular profiling to predict treatment response and tailor therapeutic strategies [10].

Conclusion

Minimally invasive techniques have transformed the management of gastrointestinal bleeding, offering effective alternatives to traditional surgical approaches with reduced morbidity and mortality. From advanced endoscopic therapies and capsule endoscopy to angiographic embolization and balloon enteroscopy, these techniques have expanded diagnostic capabilities and therapeutic options for both upper and lower GI bleeding. Continued research and technological

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innovations hold promise for further improving outcomes and enhancing the care of patients with gastrointestinal bleeding. By integrating these advancements into clinical practice, healthcare providers can optimize patient care, reduce complications, and improve quality of life for patients suffering from this critical condition.

References

1. Aydin HN, Bertin P, Singh K, et al. Safe techniques for endoscopic resection of gastrointestinal lipomas. *Surg Laparosc Endosc Percutan Tech.* 2011;21(4):218-22.
2. Loffroy R, Favelier S, Pottecher P, et al. Transcatheter arterial embolization for acute nonvariceal upper gastrointestinal bleeding: indications, techniques and outcomes. *Diagn Interv Imaging.* 2015;96(7-8):731-44.
3. Goto O, Koizumi E, Higuchi K, et al. Cutting-edge technologies for gastrointestinal therapeutic endoscopy. *J Nippon Med Sch.* 2021;88(1):17-24.
4. Moutzoukis M, Argyriou K, Kapsoritakis A, et al. Endoscopic luminal stenting: Current applications and future perspectives. *World J Gastrointest Endosc.* 2023;15(4):195.
5. Loffroy R, Mouillot T, Bardou M, et al. Current role of cyanoacrylate glue transcatheter embolization in the treatment of acute nonvariceal gastrointestinal bleeding. *Expert Rev Gastroenterol Hepatol.* 2020;14(10):975-84.
6. Loffroy R, Falvo N, Nakai M, et al. When all else fails- Radiological management of severe gastrointestinal bleeding. *Best Pract Res Clin Gastroenterol.* 2019;42:101612.
7. Herman T, Megna B, Pallav K, et al. Endoscopic mucosal resection: tips and tricks for gastrointestinal trainees. *Transl Gastroenterol Hepatol.* 2023;8.
8. Kidane B, Hirpara D, Yasufuku K. Photodynamic therapy in non-gastrointestinal thoracic malignancies. *Int J Mol Sci.* 2016;17(1):135.
9. Yamamoto Y, Yahagi N, Yamamoto H, et al. Innovative therapeutic endoscopy in the upper gastrointestinal tract: Review of Japan Gastroenterological Endoscopic Society Core Sessions. *Dig Endosc.* 2020;32(6):882-7.
10. Souto-Rodríguez R, Alvarez-Sánchez MV. Endoluminal solutions to bariatric surgery complications: a review with a focus on technical aspects and results. *World journal of gastrointestinal endoscopy.* 2017 Mar 3;9(3):105.