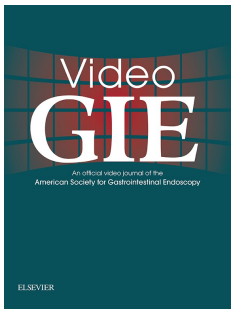
Journal Pre-proof



Different Endoscopic Submucosal Dissection Techniques; A tailored approach

Shaimaa Elkholy, MD, Abeer Awad, MD, Hany Haggag, MD, Karim Essam, MD, Kerolis Yousef, MD, Mohamed El Sherbiny, MD

PII: S2468-4481(24)00228-5

DOI: https://doi.org/10.1016/j.vgie.2024.12.007

Reference: VGIE 1399

To appear in: *VideoGIE*

Received Date: 2 October 2024

Revised Date: 17 November 2024

Accepted Date: 19 December 2024

Please cite this article as: Elkholy S, Awad A, Haggag H, Essam K, Yousef K, El Sherbiny M, Different Endoscopic Submucosal Dissection Techniques; A tailored approach, *VideoGIE* (2025), doi: https://doi.org/10.1016/j.vgie.2024.12.007.

Different Endoscopic Submucosal Dissection Techniques; A tailored approach

Shaimaa Elkholy, MD (1), Abeer Awad, MD (1), Hany Haggag, MD (2), Karim Essam, MD (1), Kerolis Yousef, MD (2), Mohamed El Sherbiny, MD (1)

Affiliation:

(1) Associate Professor of Gastroenterology & endoscopy in Gastroenterology Division, Internal medicine department, faculty of medicine, Cairo university, Cairo Egypt.

(2) Lecturer of Gastroenterology & endoscopy in Gastroenterology Division, Internal medicine department, faculty of medicine, Cairo university, Cairo Egypt.

Corresponding author:

Shaimaa Elkholy; Associate Professor of gastroenterology & advanced endoscopy, in Faculty of Medicine Cairo University, Cairo, Egypt. Email: shuma50082@gmail.com, shuma50082@kasralainy.edu.eg, +201060407761

Conflicts of interests:

All authors declare no conflicts of interests

Different Endoscopic Submucosal Dissection Techniques; A tailored approach

Abstract:

Background and Aims: Endoscopic submucosal dissection (ESD) is an advanced, minimally invasive technique for the removal of gastrointestinal lesions, offering several advantages over traditional methods, such as endoscopic mucosal resection (EMR). While ESD facilitates en bloc resection and allows for precise pathological assessment, its technical complexity underscores the need for tailored approaches. This video aims to provide a detailed explanation of the technical aspects of various ESD methods and to demonstrate the applicability of each technique in different clinical scenarios.

Methods: This video provides a comprehensive, step-by-step technical review of classic ESD techniques as well as various ESD modifications. The most common modifications include pocket, modified pocket, bridge, multiple tunnels, hybrid, and traction-assisted ESD. Limitations of each method are discussed and how to overcome these limitations using other methods is also addressed.

Results: Pocket ESD is the most commonly used modification, creating a tunnel beneath the lesion. Modified pocket ESD follows a similar approach but combines the steps of dissection and making the circular incision simultaneously. Both methods are considered classic for esophageal lesions, though they can also be applied in colorectal ESD. Bridge ESD involves starting from the cecal side of the lesion, followed by the oral or anal side, and then connecting both sides. This approach provides effective countertraction and is particularly useful in rectal ESD, though it remains applicable in other locations. For circumferential lesions, the multiple tunnels technique is the optimal option for management. Hybrid ESD combines EMR and ESD techniques. Traction-assisted ESD, using simple tools such as a clip in line or band, can be applied in conjunction with all of the aforementioned methods.

Conclusion: The adoption of a tailored ESD approach is crucial for improving procedural success rates, enhancing patient outcomes, and expanding the applicability of ESD to a broader range of complex lesions.

Introduction:

ESD is a sophisticated technique designed for the minimally invasive removal of gastrointestinal lesions, providing significant benefits over traditional methods like EMR.[1] ESD allows for en bloc resection and precise pathological evaluation, but its technical complexity and potential for complications highlight the need for customized approaches.[2]

As our understanding of these procedures' advances, the future of submucosal endoscopy looks promising for both diagnostic and therapeutic applications.[3] With the continued development of technologies such as endoscopic robotics, ESD may become the global treatment of choice for early gastrointestinal neoplasms.[4]

This video presentation focuses on the technical aspects of ESD and discusses strategies for developing a tailored approach.(Figure 1A,1B)

ESD is a knife-based resection technique aimed at removing lesions en bloc, enabling thorough assessment of the margins and ensuring complete therapeutic resection.(Figure 2)

The classic ESD procedure involves several key steps: identifying the lesion, marking its perimeter, injecting a diluted dye (such as methylene blue or indigo carmine) into the submucosal layer, making a complete circular incision around the lesion's markings, and performing submucosal dissection to separate the lesion. Finally, the lesion is removed in one piece, ensuring en bloc resection.[5, 6](Video 1) (Figure 3)

There are several challenges encountered during ESD, such as lifting, stability, traction, difficult locations, complications, and the steep learning curve. As a result, the classic technique is often modified. To address these challenges and improve feasibility, various modified techniques have been developed, such as pocket ESD, modified pocket ESD, bridging ESD, multiple tunnel ESD, hybrid ESD, and traction-assisted ESD.[7]

Pocket ESD:

The concept of tunneling has significantly modified the classic ESD steps, making the procedure more feasible and technically versatile. One of the most well-known adaptations is pocket ESD, which involves creating a tunnel beneath the lesion, akin to placing a hand inside a pocket [8, 9] The steps of pocket ESD are as follows: after marking the lesion and performing submucosal injection, a semi-lunar incision is made at either the oral or anal side of the lesion. Submucosal dissection is then carried out beneath the entire lesion. Once the dissection is complete, the circular incision is finalized from the outside, allowing for en bloc removal of the lesion.(Video 1)(Figure 4)

This technique offers numerous advantages, including improved scope stability, prevention of dye dispersion, and effective use of the cap to separate tissues and maintain alignment parallel to the muscle layer. Additionally, it enhances visualization of blood vessels, enabling prophylactic coagulation, and showed to have huge advantage in cases of submucosal fibrosis.[9,10]

Pocket ESD has demonstrated excellent outcomes in esophageal ESD and colorectal ESD, particularly when addressing laterally spreading tumors (LSTs) of the non-granular type.[10,11]

However, pocket ESD has some limitations. Its applicability in wide spaces, such as gastric lesions, can be challenging, though it remains feasible in certain cases. Another difficulty lies in determining when to stop dissection within the tunnel, not only at the end of the lesion but also along its lateral margins.

Modified Pocket ESD:

The second modification, known as modified pocket ESD, is designed to address the limitations of the pocket ESD technique. Similar to pocket ESD, a tunnel is created just below the lesion. However, in modified pocket ESD, after entering the tunnel and initiating the dissection, the circular incision is periodically performed on both sides concurrently with the dissection.[12] This approach opens the lesion like a book, allowing for the simultaneous completion of both the dissection and the circular incision.(Video 1)(Figure 5)

The modified pocket ESD technique is particularly helpful when maintaining the direction of dissection and identifying lesion margins is challenging. It is especially advantageous in colorectal ESD, particularly for large LSTs[12] Furthermore, the hanging down of the lesion creates a spontaneous traction effect, facilitating further dissection.

A limitation of the modified pocket ESD technique is that the cecal end of the lesion often becomes obscured by the hanging lesion. However, this issue can typically be resolved by repositioning the patient.

Bridge ESD:

Bridge ESD is an innovative modification designed to address the limitations of both pocket and modified pocket ESD techniques. In this approach, the procedure begins on the cecal side of the lesion (the distal end), often during retroflexion of the scope. On the cecal side, either trimming the edge or creating a tunnel is performed. The procedure then continues on the anal or oral side of the lesion, where another tunnel is created. During dissection a hole becomes visible, representing the communication between both sides or tunnels, thereby forming a bridge.[13] Once the bridge is created, the lesion falls under its own weight, providing effective traction. The procedure is completed by cutting the two pillars of the bridge.(Video 1)(Figure 6)

Additionally, the scope can be passed through the bridge and retroflexed, which provides maximum counter-traction and facilitates faster completion of the procedure. However, this maneuver should be performed with caution to avoid causing mechanical avulsion of the lesion.[14] (Video 1)(Figure 7)

Bridge ESD is particularly helpful for rectal or colonic lesions where retroflexion of the scope is feasible. However, the technique has limitations when retroflexion cannot be achieved, such as in certain gastric, esophageal, or sigmoid ESDs. In such cases, the cecal side of the lesion can be directly dissected without retroflexion, but this should be approached cautiously due to the perpendicular angle to the muscle layer.

Multiple Tunnel ESD:

Endoscopic management of circumferential or near-circumferential lesions is highly challenging and technically demanding. For such lesions, the previously mentioned techniques may not be sufficient. The multiple tunnel technique is considered a valuable approach for these cases.[15] This technique involves creating multiple tunnels followed by connecting the tunnels together.[16] The primary advantage of the multiple tunnel technique is that it prevents the lesion from obscuring the lumen by falling down, ensuring that the submucosal area remains clearly visualized throughout the procedure.(Video 1)(Figure 8)

Hybrid ESD:

The hybrid ESD technique combines the use of both a snare and a knife.[17] The process begins with precise identification of the lesion margins, followed by a circular incision made around the lesion. Next, trimming of the circular incision is performed to shrink the lesion, enabling the snare to be anchored securely around it. This allows for en bloc resection to be achieved.

The principle of hybrid ESD is focused on achieving en bloc resection, which does not necessarily require classic ESD. As long as en bloc resection is possible, techniques such as EMR, ESD, or even hybrid method can be employed. Hybrid ESD is particularly effective for lesions approximately 3 cm or smaller, especially those located on the right side of the colon.[18] It offers a comparable safety profile to conventional ESD while significantly reducing procedure time.(Video 1)

Traction assisted ESD:

One of the most challenging steps in ESD is getting beneath the lesion, and traction can be very helpful. Obtaining traction during ESD is crucial, as it provides two significant benefits: it creates a clear visual field by flipping the mucosal flap and facilitates dissection by applying tension to the dissection plane. There are many commercially available traction devices, such as; Multi-loop traction device (MLTD; Boston Scientific Co. Ltd., Tokyo, Japan), Endo Trac (TOP, Tokyo, Japan), TRACMOTION retraction device (Fujifilm), and Robotic device [19,20,21]. However, many them are expensive and not widely available. Simple traction methods, such as clip-in-line or band-assisted traction[20], can still be used with high efficacy, safety, and lower costs.

The clip-in-line method involves using a dental floss tied to a clip placed inside the working channel of the scope outside the patient. The clip is then attached to the edge of the lesion, and gentle traction is applied to the dental floss using an assisting hand. This method can be particularly useful in upper gastrointestinal ESD, or when access to the exterior of the patient is easily achievable.[22](Video 1)

Another technique involves using a band for traction, where one end of the band is clipped to the lesion's edge and the other to the contralateral bowel wall, known as band-assisted ESD. Band-assisted traction can provide multidirectional traction by using more than one band, and it can be applied without withdrawing the scope from the patient. This method is helpful in all ESD procedures, especially colonic ESD.[23](Video1)

The procedures demonstrated in Video 1 were done using Olympus scope (GIF TH 190, X1 1500, Tokoyo, Japan), Fujifilm (760 CT, Tokyo, Japan) & Pentax (i10, Tokyo, Japan). Hyrbid knifes from ERBE (Tubingen, Germany) were used. Electrosurgical device used, ERBE VIO3 (Tubingen, Germany). Electrosurgical settings (Endocut Q3,3,3) & Precisect 4.5). Diluted methylene blue was used as the injection material & distal attachment cap from Olympus (Tokyo, Japan).

ESD tailored approach:

Our proposed tailored ESD approach is illustrated in Figures 1A and 1B. For esophageal circumferential lesions, the multiple-tunnel technique can be used. For non-circumferential lesions, the pocket or modified pocket ESD method is preferred. However, the classic method, +/- traction, can also be used.

For gastric lesions, if a tunnel can be created, the pocket or modified pocket technique is recommended. If not, the classic ESD method, with or without traction, is appropriate.

For circumferential rectal lesions, the multiple-tunnel method is the standard approach. For non-circumferential lesions, the bridge ESD technique is preferred if feasible; otherwise, the pocket or modified pocket approach can be used.

For colonic lesions <3cm, hybrid ESD is a practical choice. If not feasible, then the pocket, modified pocket, bridge, or classic ESD method +/- traction can be used.

Conclusion:

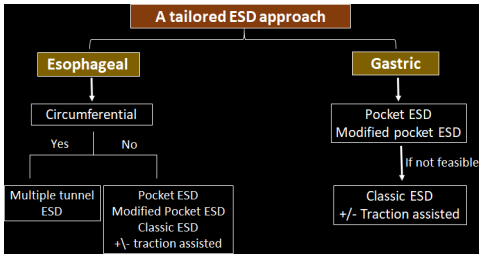
In ESD, there are no rigid rules. Meticulous planning and a tailored approach are essential for managing each lesion

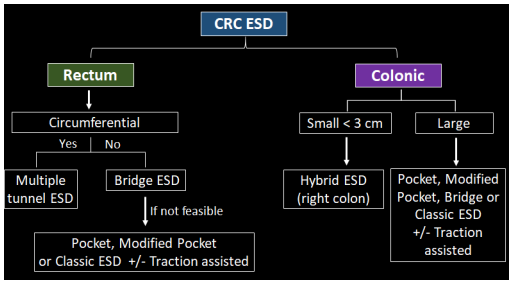
References:

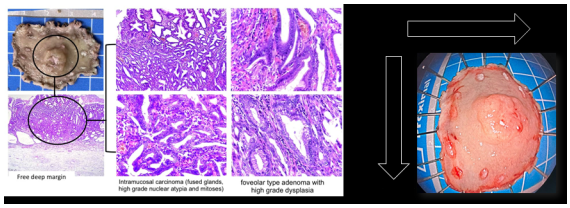
1. Harlow C, Sivananthan A, Ayaru L, et al. Endoscopic submucosal dissection: an update on tools and accessories. Therapeutic Advances in Gastrointestinal Endoscopy. 2020 Sep;13:2631774520957220.
2. Keihanian T, Othman MO. Colorectal Endoscopic Submucosal Dissection: An Update on Best Practice. Clin Exp Gastroenterol. 2021;14:317-330.
3. Yamamoto H. Endoscopic submucosal dissection—current success and future directions. Nature Reviews Gastroenterology & Hepatology. 2012 Sep;9(9):519-29.
4. Lam TLN, Chiu PWY. Current applications of flexible endoluminal robotics for colorectal endoscopic submucosal dissection. Tech Innov Gastrointest Endosc. 2023;25(1):88-94.
5. Libânio D, Pimentel-Nunes P, Bastiaansen B, et al. Endoscopic submucosal dissection techniques and technology: European Society of Gastrointestinal Endoscopy (ESGE) Technical Review. Endoscopy. 2023;55(4):361-389.
6. Zheng Z, Yin J, Liu XY, et al. Current indications for endoscopic submucosal dissection of early gastric cancer. World J Gastrointest Oncol. 2021;13(6):560-573.
7. Libânio D, Pimentel-Nunes P, Bastiaansen B, et al. Endoscopic submucosal dissection techniques and technology: European Society of Gastrointestinal Endoscopy (ESGE) Technical Review. Endoscopy. 2023;55(4):361-389.
8. Sakamoto H, Hayashi Y, Miura Y, et al. Pocket-creation method facilitates endoscopic submucosal dissection of colorectal laterally spreading tumors, non-granular type. Endosc Int Open. 2017 Feb;5(2):E123-E129.
9. Hayashi Y, Miura Y, Lefor AK, Yamamoto H. The pocket-creation method of endoscopic submucosal dissection. Mini-invasive Surgery. 2022 Feb 8;6:N-A.
10. Sakamoto H, Hayashi Y, Miura Y, et al. Pocket-creation method facilitates endoscopic submucosal dissection of colorectal laterally spreading tumors, non-granular type. Endosc Int Open. 2017;5(2):E123-E129.

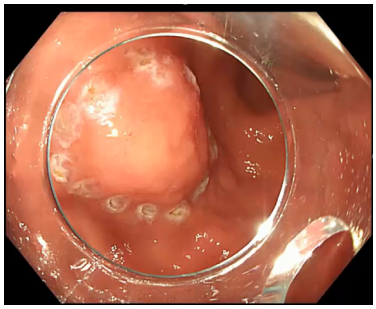
11. Dhaliwal L, Codipilly DC, Rowan DJ, et al. Water-pocket endoscopic submucosal dissection of an early esophageal adenocarcinoma in a patient with portal hypertension and varices. VideoGIE. 2020;5(12):646-8.
12. Bapaye A, Dharamsi S, Dashatwar P, et al. Modified Pocket Endoscopic Submucosal Dissection Technique for Resection of a Giant Rectal Lateral Spreading Tumor. J Dig Endosc. 2019 Oct;10(04):248-50.
13. Elkholy S, Essam K, Haggag H, Abdellatef AA, Yousef K, Abd El-Kareem D, El-Sherbiny M. 1185 BRIDGE ENDOSCOPIC SUBMUCOSAL DISSECTION (ESD). Gastroenterology. 2023 May 1;164(6):S-1514.
14. Pioche M, Rivory J, Lépilliez V, et al. Tunnel-and-bridge strategy for rectal endoscopic submucosal dissection: tips to allow strong countertraction without clip and line. Endoscopy. 2017;49(S 01):E123-E124.
15. Tian Y, Xue C, Li X, et al. Efficacy and safety of modified endoscopic submucosal tunnel dissection for superficial esophageal circumferential lesions. Dis Esophagus. 2023;36(11):doad035.
16. Aslan F, Akpınar Z, Kucuk M, et al. Multiple tunneling technique for treatment of rectal circumferential laterally spreading tumor with endoscopic submucosal dissection. VideoGIE. 2017 Feb 1;2(2):32-4.
17. Yang L, Ma XZ, Su H, et al. Safe and effective hybrid endoscopic submucosal dissection with ALL IN ONE snare in porcine gastric model. Sci Rep. 2024 May 2;14(1):10060.
18. Bae JH, Yang DH, Lee S, et al. Optimized hybrid endoscopic submucosal dissection for colorectal tumors: a randomized controlled trial. Gastrointest Endosc. 2016 Mar;83(3):584-92.
19. Kitahara G, Kaneko T, Ishido K, et al. The efficacy and safety of multi-loop traction device for gastric endoscopic submucosal dissection: a single center prospective pilot study. Sci Rep. 2023;13:20050. doi:10.1038/s41598-023-47390-4
20. Nagata M. Advances in traction methods for endoscopic submucosal dissection: What is the best traction method and traction direction?. World J Gastroenterol. 2022;28(1):1-22.

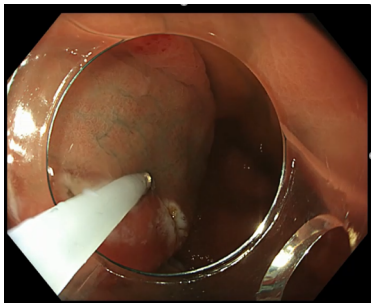
21. Kim SH, Kim C, Keum B, et al. A novel retractable robotic device for colorectal endoscopic submucosal dissection. Gut Liver. 2024 Jul 15;18(4):677-85.
22. Oyama T. Counter traction makes endoscopic submucosal dissection easier. Clinical Endoscopy. 2012 Nov;45(4):375-8
23. Tsuji K, Yoshida N, Nakanishi H, et al. Recent traction methods for endoscopic submucosal dissection. World J Gastroenterol. 2016;22(26):5917.

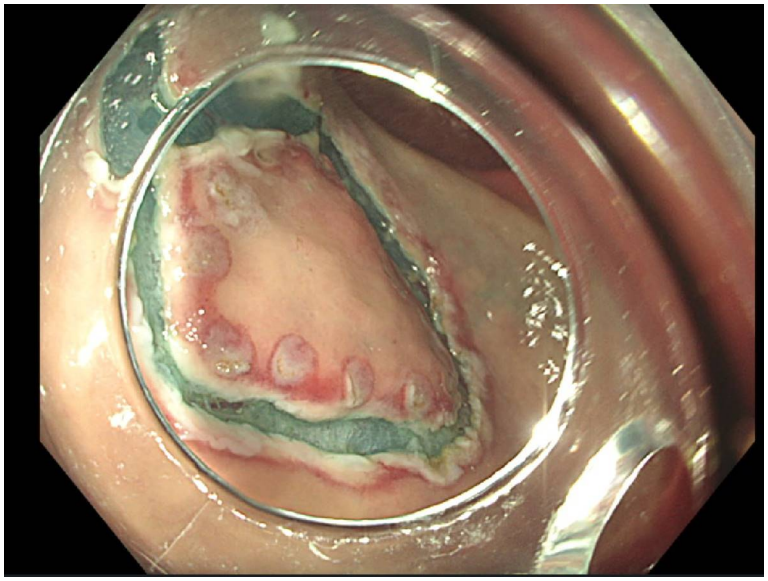


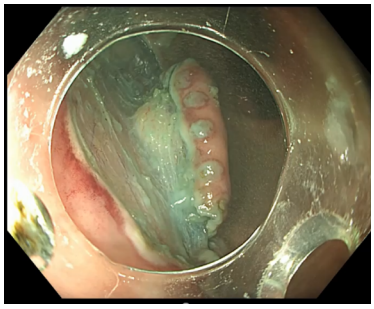


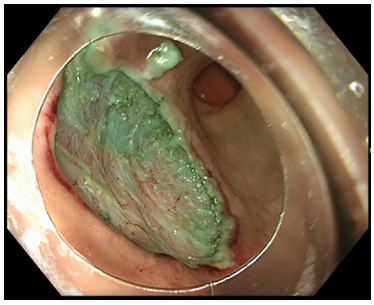


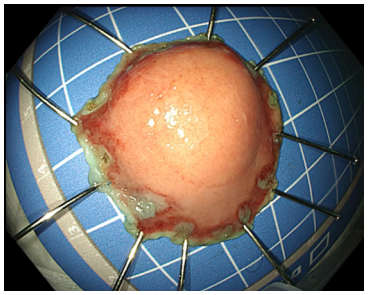


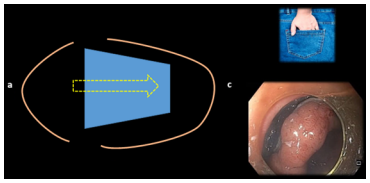


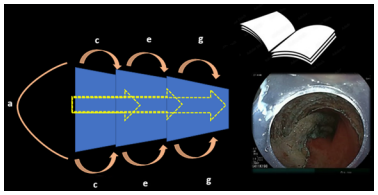


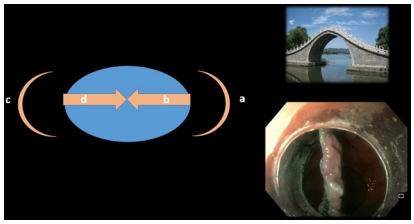


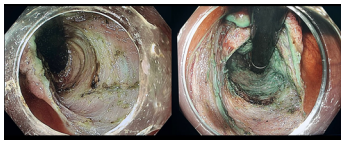


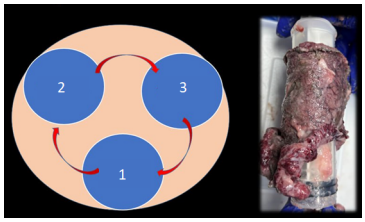












Running title:

Different ESD Techniques; A tailored approach

Figure legends:

Figure (1A): Tailored ESD approach for esophageal and gastric lesions; for circumferential esophageal lesions, multiple tunnel method can be used. For non-circumferential lesions, the Pocket or modified pocket or even classic ESD +/- traction could be used.

For gastric lesions, the pocket or modified pocket technique is recommended. If not feasible, the classic ESD method +/- traction could be used.

Figure (1B): Tailored ESD approach for colorectal lesions. For circumferential rectal lesions, multiple tunnel method could be used. For non-circumferential lesions, bridge ESD is preferred if not feasible we can use either Pocket or modified pocket or even classic ESD +/- traction. For colonic lesion < 3 cm, hybrid ESD can be used if en bloc resection can be assured. In larger lesions, we can use pocket, modified pocket, bridge or even classic ESD +/- traction.

Figure (2): The idea of ESD is en bloc resection enabling assessing the margins, ensuring therapeutic resection

Figure (3): Steps of classic ESD

(a) Marking all-round the lesion using coagulation mode

(b) Submucosal injection using a diluted dye as methylene blue or indigo carmine

(c) Circular incision all around the lesion outside the marking

(d) Submucosal dissection separating the lesion from the muscle layer

(e) Hemostasis to the bed of the lesion

(f) Retrieving the lesion en bloc resection

Figure (4): Steps of Pocket ESD

(a) Circular incision from the anal or oral side of the lesion

(b) Creating a tunnel below the lesion by submucosal dissection

(c) Completing the circular incision by cutting the lateral edges and cecal side of the lesion

Figure (5): Steps of Modified Pocket ESD (Open book)

(a) Circular incision from the anal or oral side of the lesion

(b) Creating a tunnel below the lesion by submucosal dissection to the proximal part of the lesion

(c) Performing the circular incision by cutting the lateral edges (on either sides) of the proximal part of lesion simultaneously with dissection

(d) Going on with submucosal dissection to the middle part of the lesion

(e) Performing the circular incision by cutting the lateral edges of the middle part of lesion simultaneously with dissection

(f) Going on with submucosal dissection to the distal part of the lesion

(g) Completing the circular incision by cutting the lateral edges of the distal part of lesion simultaneously with dissection, at the end the lesion will hang down like an open book

Figure (6): Bridge ESD

(a) Circular incision from the cecal side of the lesion on retroflexion

(b) Submucosal dissection of the cecal side of the lesion creating the first tunnel

(c) Circular incision from the anal or oral side of the lesion

(d) Submucosal dissection of the anal or oral side of the lesion creating the second tunnel and the connecting both tunnels together forming a bridge

Figure (7): Retroflexion through the dissected bridge to cause more counter traction, but this should be done safely to avoid mechanical avulsion of the lesion

Figure (8): Multiple tunnel technique for circumferential lesions

Video (1):

- In this video, we are focusing on the different technical aspects of ESD & how to have a tailored approach.
- ESD is a knife-based resection and the target of ESD is to remove the lesion en bloc Allowing for the assessment of both vertical and horizontal margins to ensure therapeutic resection.

- The classic steps of ESD are as follows: after identifying the lesion, marking is performed circumferentially using the knife in coagulation mode. This is followed by Submucosal injection with a diluted dye, such as methylene blue or indigo carmine. A circular incision is then made around the lesion, followed by submucosal dissection to separate the lesion from the muscle layer. Hemostasis is achieved in the lesion bed, and finally, the lesion is retrieved as en bloc resection.
- There are many challenges facing ESD; therefore, modifications have been done to the classic ESD to make it more applicable
- The most famous modification is pocket ESD in which we create a tunnel below the lesion. We start with anal or oral side of the lesion followed by submucosal dissection creating a tunnel, then completing the circular incision by cutting the lateral edges and cecal side of the lesion afterwards.
- Modified pocket ESD is the same as pocket ESD, however, cutting the lateral edges of the lesion is performed simultaneously with submucosal dissection. At the end the lesion looks like an open book facilitating its dissection
- Bridge ESD is when we start with the cecal side of the lesion followed by anal or oral side of the lesion connecting both sides together forming a bridge. Moreover, we can do retroflexion through the bridge carefully to cause more countertraction to the lesion facilitating its dissection
- Multiple tunnel ESD is classic for challenging circumferential lesions, in which we create multiple tunnels and then connecting them together to enable resection.
- Traction is highly beneficial in ESD and there are many commercially available devices. While some are expensive, simple methods can still be used effectively.
- Hybrid ESD is the combination of the snare and knife. After performing a circular incision around the lesion using the knife, we anchor the snare all around the lesion to enable en bloc resection.
- Tailored ESD approach for esophageal and gastric lesions; for circumferential esophageal lesions, multiple tunnel method can be used. For non-circumferential lesions, the Pocket or modified pocket or even classic ESD +/- traction could be used.
- For gastric lesions, the pocket or modified pocket technique is recommended. If not feasible, the classic ESD method +/- traction could be used.
- Approach for colorectal lesions; for circumferential rectal lesions, multiple tunnel

method could be used. For non-circumferential lesions, bridge ESD is preferred if not feasible we can use either Pocket or modified pocket or even classic ESD +/- traction. For colonic lesion < 3 cm, hybrid ESD can be used if en bloc resection can be assured. In larger lesions, we can use pocket, modified pocket or even classic ESD +/- traction.

Journal CME Conflict of Interest: Disclosure and Attestation

Lead Author: Shaimaa Elkholy

Article: Different ESD Techniques; A tailored approach

Date: 2/10/2024

PLEASE READ CAREFULLY AND THOROUGHLY.

The American Society for Gastrointestinal Endoscopy (ASGE) is accredited by the Accreditation Council for Continuing Medical Education (ACCME). ASGE must ensure balance, independence, and scientific rigor in all its sponsored educational activities. Anyone in a position to control the content of an activity (i.e., all participating planners, authors, staff, faculty, reviewers, and others in control of educational content) must disclose all financial relationships (of any amount) from the **past 24 months** with any ineligible company directly to ASGE***. ACCME defines an ineligible company as those whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.*** Individuals must disclose regardless of their view of the relevance of the relationship to the education.

ASGE Conflict of Interest: ASGE defines a conflict of interest (COI) as involvement in a business, partnership, consulting position, professional society, or a rewarding arrangement that could influence the deliberations or actions of the individual involved with our designated educational activities.

Examples of Ineligible Companies include: Advertising, marketing, or communication firms whose clients are ineligible companies; bio-medical startups that have begun a governmental regulatory approval process; compounding pharmacies that manufacture proprietary compounds; device manufacturers or distributors; diagnostic labs that sell proprietary products; growers, distributors, manufacturers, or sellers of medical foods and dietary supplements; manufacturers of health-related wearable products; pharmaceutical companies or distributors; pharmacy benefit managers; or reagent manufacturers or sellers.

Disclosure information includes: The name of the ineligible company with which you have a financial relationship and the nature of the financial relationship. Examples of financial relationships include employee, ownership interest, researcher, consultant, advisor, speaker, independent contractor (including contracted research), royalties, or patent beneficiary and executive role. Individual stocks and stock options are requested to be disclosed, although diversified mutual funds do not need to be disclosed. Research funding from ineligible companies is requested to be disclosed by the principal or named investigator even if that individual's institution receives the research grant and manages the funds.

Owners or Employees of ineligible companies: Within your disclosure, indicate that you are an owner or employee of an ineligible company. There are ONLY three exceptions that could permit your participation in an ASGE educational activity:

1. When the content of the activity is not related to the business lines or products of your employer/company.
2. When the content of the accredited activity is limited to basic science research, such as pre-clinical research and drug discovery or the methodologies of research, and you do not make care recommendations.
3. When you are participating as a technician to teach the safe and proper use of medical devices and do not recommend whether or when a device is used.

Financial Disclosure

This form must be completed even if you have no financial relationships with an ineligible company. As there is no minimum financial threshold, all individuals must disclose all financial relationships, regardless of the amount, with ineligible companies. Failure or refusal to disclose all financial relationships will result in disqualification from participating in the ASGE CME activity. Following approval, all relevant financial relationships indicated below will be disclosed to all participants/learners in print, electronic, and/or verbally prior to the start of this CME activity.

* We will use email addresses only for questions related to this article

** **Type of relationship may include:** full-time or part-time employee, independent contractor, consultant, research or other grant recipient, paid speaker or teacher, membership on advisory committee or review panels, ownership interest (product royalty/licensing fees, owning stocks, shares, etc.), or any other financial relationship.

The lead author is responsible for submitting the disclosures of all listed authors and must sign this form at the bottom. Additional forms may be submitted if the number of authors exceeds the space provided.

Lead/Primary Author: Shaimaa Elkholy **Email Address*: shuma50082@gmail.com**

[X] I have no financial relationship(s) to disclose.

I disclose the following financial relationships with ineligible companies' commercial entities that produce healthcare-related products or services that could be relevant to this article.

Company	Type of Relationship**	Content Area (if applicable)

Co- Author: Abeer Awad **Email Address*:Beero4a@yahoo.com**

[X] I have no financial relationship(s) to disclose.

I disclose the following financial relationships with ineligible companies' commercial entities that produce healthcare-related products or services that could be relevant to this article.

Company	Type of Relationship**	Content Area (if applicable)

Co-Author: Hany Haggag **Email Address*:hani_elhayani@hotmail.com**

[X] I have no financial relationship(s) to disclose.

I disclose the following financial relationships with ineligible companies' commercial entities that produce healthcare-related products or services that could be relevant to this article.

Company	Type of Relationship**	Content Area (if applicable)

Co-Author: Kerolis Yousef **Email Address*:kerolis_youssef86@yahoo.com**

[X] I have no financial relationship(s) to disclose.

I disclose the following financial relationships with ineligible companies' commercial entities that produce healthcare-related products or services that could be relevant to this article.

Company	Type of Relationship**	Content Area (if applicable)

* We will use email addresses only for questions related to this article

** **Type of relationship may include:** full-time or part-time employee, independent contractor, consultant, research or other grant recipient, paid speaker or teacher, membership on advisory committee or review panels, ownership interest (product royalty/licensing fees, owning stocks, shares, etc.), or any other financial relationship.

Co-Author: Karim Essam **Email Address*: kareemessam8100@yahoo.com**

☒ I have no financial relationship(s) to disclose.

I disclose the following financial relationships with ineligible companies' commercial entities that produce healthcare-related products or services that could be relevant to this article.

Company	Type of Relationship**	Content Area (if applicable)

Co-Author: Mohamed El Sherbiny **Email Address*:elsherbiny_mohammad@yahoo.com**

☒ I have no financial relationship(s) to disclose.

I disclose the following financial relationships with ineligible companies' commercial entities that produce healthcare-related products or services that could be relevant to this article.

Company	Type of Relationship**	Content Area (if applicable)

As corresponding author of this article, I attest that I have received disclosure information from all participating authors as listed above and acknowledge that I am responsible for verifying the accuracy of and reporting completely the information provided to me. Financial relationships relevant to this article can be researched at https://www.cms.gov/openpayments/. I understand that typing my name below serves as an electronic signature for the purposes of this form.

Shaimaa Elkholy **Date: 2 / 10 /2024**

Type Name (Electronic Signature)

* We will use email addresses only for questions related to this article

** **Type of relationship may include:** full-time or part-time employee, independent contractor, consultant, research or other grant recipient, paid speaker or teacher, membership on advisory committee or review panels, ownership interest (product royalty/licensing fees, owning stocks, shares, etc.), or any other financial relationship.

Abbreviations:

EMR: Endoscopic mucosal resection

ESD: Endoscopic submucosal dissection

LST: Laterally spreading tumor