News in ESD

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9.1 Introduction

The development of endoscopic submucosal dissection (ESD) was critical in the history of endoscopy because it enhanced the value of therapeutic endoscopy and provided a less invasive therapy for many patients [1–7]. Although ESD is an attractive procedure for many endoscopists, mastery of ESD is difficult because it requires sophisticated endoscopic techniques. To improve the safety and success rate of ESD, we must continue to develop advanced endoscopic techniques, devices, and strategies.

9.2 Devices

The high-frequency knives used for ESD are roughly classified as tip knives or insulation-tipped diathermic knives (IT knife: Olympus Co., Tokyo, Japan). Both devices have advantages and disadvantages. The strong advantage of the IT knife is its fast speed of incision and dissection. The "IT" means "insulation tip." The tip of the knife restricts the flow of current thus reducing the chances of the

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device inadvertently damaging tissues. However, manipulating the IT knife is difficult and sometimes requires dissection of lesions without direct visualization of the cutting location when moving the IT knife parallel to the muscularis propria. Thanks to their strong electric current, tip knives are useful for lesions with abundant fibrosis. However, it requires very precise scope manipulation and the cutting speed is slow.

The IT knife series consists of IT knife, IT knife 2, and IT knife nano. Typical tip knives include the Dual knife (Olympus Co., Tokyo, Japan), the Jet-B knife (XEMEX Co., Tokyo, Japan), the Flush knife (Fujifilm Medical Co., Tokyo, Japan), and the Hook knife (Olympus Co., Tokyo, Japan). The Jet-B knife and Flush knife have a water-jet function that enables submucosal injection without exchanging devices. In 2015, a new Dual knife and Hook knife were developed. They have the water-jet function, which many tip knives now possess, and are called the Dual knife J and Hook knife J (Olympus Co., Tokyo, Japan). In addition, a thinner Flush knife BT-S has been developed that enables easier fluid suction during use.

During the procedure, hemostasis forceps should be used to control bleeding, because using clips often disrupts continuation of ESD. There are two types of hemostatic forceps: monopolar and bipolar. Coagrasper (Olympus Co., Tokyo, Japan) is a monopolar type and is frequently used, especially with gastric cases. Slightly larger forceps called Coaglasper G (Olympus Co., Tokyo, Japan) have also been developed because some vessels encountered during gastric ESD are too thick to occlude immediately even if using the Coaglasper. Bipolar-type hemostatic forceps are frequently used for procedures of the colon and esophagus to reduce the risk of delayed perforation. A well-known bipolar-type forceps is the Hemostat-Y (Pentax Co., Tokyo, Japan), and recently a rotatable, bipolar-type hemostatic forceps called Tighturn (XEMEX Co., Tokyo, Japan) has been released.

9.3 How to Create Countertraction

The main reason ESD is difficult is that we have no direct countertraction, unlike in surgical procedures. However, the use of gravity and the attached cap are often very effective to create countertraction. Especially in colorectal cases, you can use gravity by changing the position of the patient. Several other relatively easy methods have been developed. They are the “clip and line method” [8] (Fig. 9.1a– c), the “S-O (Sakamoto and Osada) clip method” [9] (Fig. 9.2a, b), the “clip flap

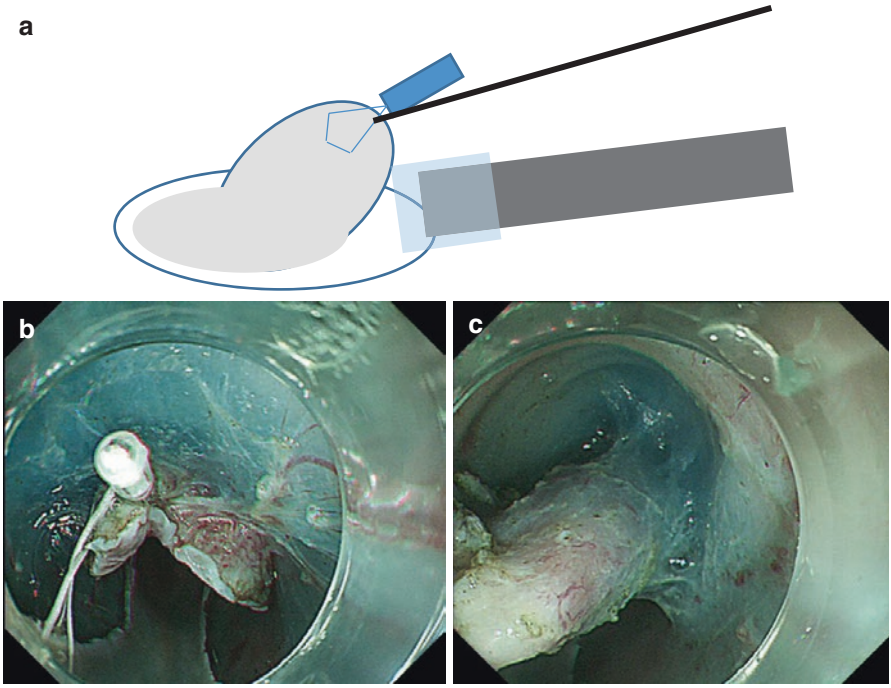

Fig. 9.1 (**a**) Schematic diagram of the clip and line method. (**b**, **c**) Good countertraction was made in esophageal ESD using the clip and line method

method" [10] (Fig. 9.3), and the "pocket creation method" [11]. The former three methods use clips and the last one is a newly developed strategy for ESD. The clip and line method is useful for esophageal, and sometimes gastric, ESD; you can achieve good tension and visibility of the submucosal layer by pulling back the string slightly. The S-O clip method uses a rubber strip or spring and is useful for colorectal lesions. The clip flap method is a relatively easy but helpful approach where an endoclip is substituted for the initial mucosal flap. The dissection may then become easier if traction can be achieved by going under the lesion. In addition, good traction can be achieved using the clip flap method if the submucosa is only slightly dissected. The pocket creation method is a novel strategy for colorectal ESD. It can provide traction and maintain the lifting created from the fluid injection for a longer period.

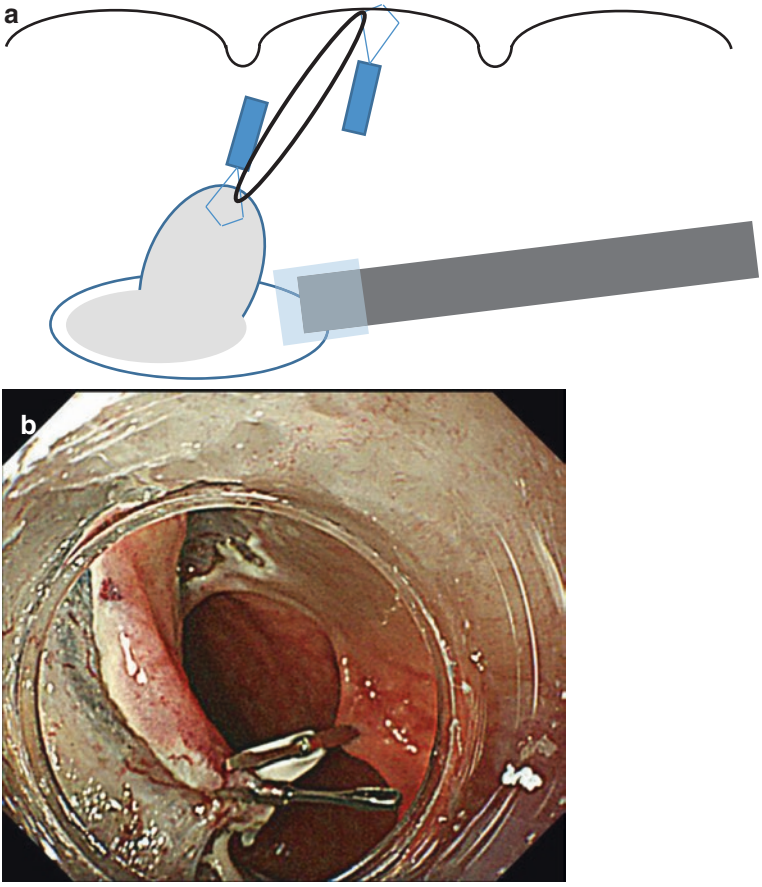

Fig. 9.2 (**a**) Schematic diagram of the S-O clip method. (**b**) Countertraction was made in colonic ESD by using clips and rubber band

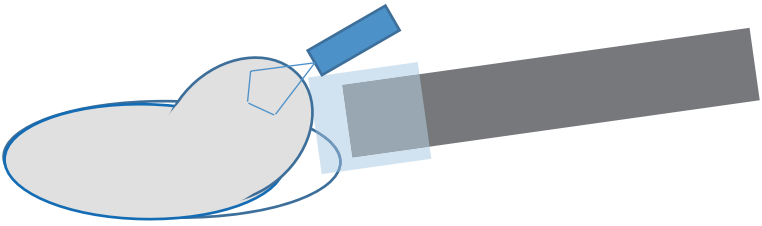

Fig. 9.3 Schematic diagram of the clip flap method. A clip is substituted for the initial mucosal flap

Conclusion

Many new devices and strategies have been developed, and while we have a long way to go before we have mastered ESD, applying these methods will make ESD procedures safer and easier.

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