

Technique and Prevention of Complications of Esophageal ESD

Tsuneo Oyama

Director of Endoscopy, Saku Central Hospital Advanced Care Center

Many endoknives have been developed for ESD. The basic knives are the Hook knife and the Dual knife. The insulated tip (IT) knife is widely used for gastric ESD but is not suitable for esophageal ESD, because of higher perforation rate. However, recently the IT nano was developed for colonic and esophageal ESD. The size of the insulation tip is smaller than that of the usual IT knife, and good maneuverability in narrow space is now obtainable.

Glycerol is injected into the submucosal layer to separate the mucosa from the proper muscular layer. The viscosity of Hyaluronic acid is higher than that of glycerol. Therefore, it is a suitable injection fluid for the IT knife.

The strategy to make mucosal incision is dependent upon the type of endoknive. When a dual or hook knife is used, basically the mucosal incision is performed from the oral side. A deeper cut of submucosal fibers is performed after mucosal incision. The hook knife is inserted into the submucosal layer, and submucosal fibers are hooked and cut. The lesion then shrinks by the contraction of muscularis mucosa. After that, the mucosal incision and deeper cut of the other side is performed and a circumferential incision is completed.

A good traction makes submucosal dissection easier. Clip with line method is the most effective technique to make good traction. The author reported clip with line method in 2002. A long, 3-0, silk line is tied to the arm part of the clip. A clip applicator device is inserted into the accessory channel of the endoscope, and the clip with line is mounted onto the tip of the applicator. The scope is inserted again, and the submucosal side of the target lesion is grasped. After that, the line is pulled very gently. This method also creates a clear field of vision. During submucosal dissection.

The major complication of ESD is perforation, as well as air embolization and aspiration pneumonia. Perforations may cause mediastinal emphysema, which increases the mediastinal pressure crushing the esophageal lumen, leading to difficulty in securing the visual field. Severe mediastinal emphysema may be complicated by pneumothorax, which can lead to shock; therefore, electrocardiography, arterial oxygen saturation, and blood pressure monitoring should be conducted during ESD, as well as periodic observation for subcutaneous emphysema through palpation. CO₂ insufflation is useful for preventing such severe mediastinal emphysema. It is important to dissect the submucosal layer making sure to leave the lowest one-third without exposure of the proper muscular layer.

Water jets are useful for the detection of the bleeding point. However, sometimes water reflux causes aspiration pneumonia. A flexible overtube (Sumitomo Bakelite, Akita, Japan) is a useful device to prevent aspiration pneumonia. General anesthesia with tracheal intubation is

necessary for the cervical esophageal ESD because the risk of aspiration pneumonia is high.

Conclusion: ESD is a useful technique to get R0 resection. However, the operator should have enough skill for not only diagnosis but also resection, dissection and control for complications.