



What is important for a smooth implementation of endoscopic submucosal dissection?

Endoscopic resection is the most ideal and minimally invasive treatment for superficial GI neoplasms, which are predicted to have a very low risk of lymph node metastasis. Because both patients and doctors strongly desire to avoid organ resection, many endoscopic resection techniques, including endoscopic submucosal dissection (ESD), have been developed. The concept of ESD is very clear and is completely different from previous endoscopic resection techniques. The lateral margin is ensured by incising the surrounding mucosa at least a few millimeters away from the tumor's border, and the vertical margin is also ensured by dissecting the deeper part of the submucosal layer in ESD. This approach is a freehand resection technique; therefore, limitations on size and location are almost nonexistent, although it is technically demanding. As a result of reliable en bloc resection, it allows precise histopathologic evaluation and prevention of local recurrence. However, this technique was initially regarded as a risky procedure, even in Japan, and was very much criticized not only by surgeons but also by gastroenterologists because of the increased adverse event rates. However, after the development of specific devices, such as ESD knives and hemostatic forceps, and the accumulation of knowledge about the management of adverse events, ESD quickly became a popular practice in Japan. It has gradually spread worldwide, especially in Eastern Asia, including South Korea and China, because of its excellent clinical outcomes. It has already become a standard practice in Asian countries; however, the case volume of ESD in Western countries is still very limited. Surprisingly, many patients with benign lesions undergo surgery in the United States, and the ratio of benign lesions among surgically treated cases is still increasing.¹ In Japan, a superficial neoplasia is nearly always removed endoscopically by EMR and ESD.

ESD is the most reliable and effective endoscopic resection technique, even for large and difficult colorectal lesions; however, it is a more complex and lengthy procedure than EMR. Owing to its complexity, prediction of a procedural time for nonexperts is difficult. The lack of experts and of training systems for ESD is the main reason why ESD is still not widely used in Western countries,²⁻⁴ but unpredictable and lengthy procedures are also reasons for this situation.

It is very important to predict difficulties of the procedure for risk management and for time management of colorectal ESD. Imai et al,⁵ working at a high-volume center in Japan, recently established a risk prediction model for en bloc resection failure or perforation during colorectal ESD. They identified endoscopist experience, tumor location, morphology, endoscope operability, underlying fold, and fold convergence (which suggests the presence of severe fibrosis) as significant risk factors. If the specific procedure is predicted to be risky by this system, we can assign a much more experienced operator for the procedure. By contrast, Li et al⁶ developed another scoring model in a Chinese high-

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volume center that can predict the probability of successful (defined as resection in ≤ 60 minutes) colorectal ESD. They identified tumor size, circumference of the lesion, unfavorable anatomic location, and morphology as predictors. This scoring system can also predict the grade of technical difficulty before the procedure. Usually, in most Asian high-volume centers, technical difficulty and necessary procedure time are judged by the impression of an expert endoscopist who is familiar with colorectal ESD. However, in most Western countries, including the United States, it is difficult to predict such factors because ESD experts are less widely available. Therefore, this subjectively predictable system seems very helpful, especially in Western countries. Additionally, 60 minutes of procedural time seems acceptable everywhere in the world. The operator can avoid unexpectedly lengthy ESD procedures or the risky situations of rushing procedures within allocated time slots for ESD by using this prediction system.

Unfortunately, this scoring system did not include as one of the parameters maneuverability of the endoscope, which is the most crucial factor for smooth procedures, probably because it is a subjective parameter. Instead,

they included unfavorable anatomic locations, which are generally closely correlated with poor maneuverability of the endoscope. However, in some patients with severe adhesion of the colon or long and flexible colon, it becomes very difficult to perform ESD regardless of the location of the tumor. Therefore, information about the maneuverability of the endoscope is extremely important to predict the difficulty of the procedure and the time required. In addition, the presence of fibrosis was not identified as a predictor in this study; however, it should be included because severe fibrosis is the most challenging situation for ESD. There are causes of severe fibrosis. Large protruding lesions, such as 0-Isp lesions on a haustral fold, usually have severe fibrosis induced by movement of the lesions. Previous endoscopic treatment or multiple biopsies from flat lesions are also major causes of fibrosis. Especially in the United States, there are many cases of severe fibrosis resulting from previous attempts at partial resection or tattooing by primary physicians.³ Neoplastic lesions crossing a surgical suture line also accompany severe fibrosis. Chronic inflammation, such as ulcerative colitis, causes massive fibrosis under the lesions. Needless to say, severe fibrosis is a major burden of submucosal dissection in ESD.

It is very important to educate every endoscopist that careless partial resection, multiple biopsies of a flat lesion, or tattooing of the lesion can cause serious problems. At the same time, everyone should be aware that accurate information about the tumor is essential for making a proper treatment strategy.⁷ At least in Japan, it is very common to perform preoperative detailed colonoscopic evaluation before ESD at a tertiary referral center where endoscopic treatment is planned to check the characteristics of the target lesion, especially the depth of the lesion. When the lesion is judged to be suitable for endoscopic resection, the size and location of the lesion, presence of a fold, presence of fibrosis, maneuverability of the endoscope, and direction of gravity according to the patient's position are carefully checked by an experienced doctor. All of this information is essential for developing treatment strategies and for estimating procedure times for ESD. In other words, it is almost impossible to make a plan for ESD without precise information. Unfortunately, it is very uncommon to perform such a detailed endoscopic examination before ESD in most Western countries, including the United States. This situation makes ESD more challenging and unpredictable in those countries.

For this reason, it is highly recommended to perform secondary detailed endoscopic examination at the referral center, even in the United States. First, it is necessary to check the entire lesion by magnification with narrow-band imaging or crystal violet staining to ensure that the lesion is suitable for endoscopic resection. Even when the primary doctor has already taken some biopsy specimens, use of them is sometimes unreliable because it is a kind of pinpoint diagnosis. Especially when the biopsy

specimen is taken from the peripheral part of a large and inhomogeneous lesion, it is usually underestimated. Second, it is necessary to check the parameters mentioned by Li et al,⁶ the presence of a fold and the presence of fibrosis. All of these parameters are subjective metrics that might be able to be judged by artificial intelligence in the near future. However, it is mandatory to check them by ourselves at this moment to obtain precise information about the target lesion. Third, it is necessary to check the maneuverability of the endoscope to judge the applicability of complicated procedures to that patient. This is the most important parameter for predicting the success of ESD and is thought to be a kind of subjective metric that is still very difficult to judge by artificial intelligence. All of these objective and subjective metrics are carefully checked in most Asian high-volume centers before the treatment strategy is planned; therefore, in those centers the clinical results for colorectal ESD have been far better than in Western centers. The results in Western institutions would also drastically improve if the endoscopists could use this detailed endoscopic examination system before planning treatment. If the procedure is judged to be easy by objective parameters and maneuverability is also good, it is a case for trainees. If the procedure is judged to be difficult but maneuverability is not bad, it is a good case for experienced operators. If the procedure is judged to be very difficult and maneuverability is also bad, it is a case only for super-experts with extended time schedules or the patient may be a candidate for laparoscopic surgery. Under these circumstances, the scoring model of Li et al⁶ in this issue of *Gastrointestinal Endoscopy* includes most objective parameters and seems useful for planning ESD. However, these data are from a high-level Asian institution; therefore, they are not directly applicable to most Western institutions. To introduce ESD more smoothly in Western countries, it would be better for each endoscopist to interpret the score according to his or her own skill level. We hope that ESD, which is currently the most sophisticated minimally invasive endoscopic treatment, will become much more popular around the world in the near future.

DISCLOSURE

Dr Yahagi is a paid speaker and an advisor for, and has an ownership interest, in Olympus Co Ltd; has an ownership interest in Pentax Co Ltd; is an advisor for Boston Scientific Co; is a consultant for and has an ownership interest in Top Corporation; is a paid speaker for EA Pharma, Takeda Pharmaceuticals, Otsuka Pharmaceuticals, AstraZeneca, and Dach-Saijo Co Ltd; and is the recipient of research grants from Kaigen Pharmaceutical and Sanwa Kagaku Kenkyusho Co Ltd. The other author disclosed no financial relationships.

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Abbreviation: ESD, endoscopic submucosal dissection.

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