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Editorial

Improvement of Endoscopic Therapy for Early Colorectal Cancers

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INTRODUCTION

Colorectal cancer (CRC) has high incidence and mortality worldwide. In 2012, CRC was the second most prevalent cancer among males and the third among females [1]. Colonoscopy is considered to be an effective examination for the detection of early CRCs. Additionally, endoscopic therapy, including endoscopic mucosal resection (EMR) and endoscopic sub mucosal dissection (ESD), is used worldwide to treat adenoma and early CRC. Fortunately, most of colorectal polyps removed by EMR are <20 mm in size. On the other hand, ESD is reported to be an efficient treatment with a high rate of en bloc resection for large colorectal tumors. In this review, we describe the improvement of EMR and ESD for early CRCs.

Endoscopic mucosal resection

EMR is generally performed for early colorectal cancers worldwide. The saline injection-assisted method was first described by Rosenberg, who identified it as a safety factor for the removal of rectal and sigmoid polyps, and was reintroduced by Tada et al. in 1984 [2,3]. Most adenomas and intramucosal cancers can be resected by EMR; Gglycerol, dextrose, and hyaluronic acid (HA) provide better complete resection rates and longer-lasting mucosal elevation than does normal saline (NS) [4-7]. We previously reported a prospective randomized controlled trial about the efficacy of 0.13% HA in colorectal EMR and proved that using 0.13% HA rather than NS during EMR was more effective for complete resection and maintenance of mucosal elevation [8]. Additionally, we reported the safety of HA is reported by multicenter large scale study (post-operative hemorrhage: 1.1%, perforation: 0%) [9]. However, tumors greater than 20 mm in diameter are considered difficult candidates for en bloc resection [60-63]. When en bloc resection of the tumor by EMR fails, piecemeal EMR is generally performed instead. Although piecemeal EMR enables the removal of large colorectal tumors, it has a high rate of local recurrence (7.9–21.4%) [10-13]. Hereafter, the improvement of snare and injection liquid is expected for resection large colorectal polyps with EMR.

Endoscopic submucosal dissection

In Japan and part of Western and Asian countries, endoscopic submucosal dissection (ESD) is reported to be an efficient treatment with a high rate of en bloc resection for large colorectal tumors [14-20]. The rate of en bloc resection for large colorectal tumors has been reported to be 80.0–98.9% [14-20]. However, the procedure has not been standardized because of its associated technical difficulties. The rate of perforation is reported to be higher for ESD (1.5–10.4%) than for EMR [21]. To solve these difficulties, a mixture of 0.4 % hyaluronic acid solution (Mucoup; Johnson & Johnson K.K., Tokyo, Japan and Seikagaku Corporation, Tokyo, Japan) is used as the injection liquid to induce a higher elevation of the submucosa as also to lengthen the duration of the continuous elevation of the submucosa [22]. Additionally, various knives are used in ESD for excising colorectal tumors. Among the obtuse short-tipped types are included the Flush knife (Fujifilm Medical, Tokyo, Japan), Dual knife (Olympus Optical Co, Tokyo, Japan) [14,21]. These knives had a ball disk at the tip of the knife, enabling us to hook the submucosa. The flush knife is capable of injecting substances into the submucosa. Grasping-type scissor forceps including Clutch cutter (Fujifilm medical, Tokyo, Japan) are also used [23].

On the other hand, difficulties of ESD are related with some characteristics of tumors. Right sided colon, size of the lesion (30-50 mm<), and severe fibrosis are reported to be some of risk factors with perforation [15,24-27]. Colorectal ESD is difficult for less experience endoscopist. One of expected component of ESD trainings is extensive practice using animal models. There are also several reports on an ex vivo animal model for colorectal ESD [28]. We have reported ex vivo animal model with blood flow recently [29]. It would allow endoscopist to gain whole ESD experience including perioperative hemorrhage. We introduce expected ESD training system which is performed in some Japanese institutions including us. It is a step-by-step system starting with observing and assisting in ESD procedures performed by experts. Next, animal model training is performed to the extent possible. Finally, clinical practice is performed under the supervision of instructors. Generally, clinical practice training proceeds according to the difficulty of the procedure, beginning with gastric ESD, then rectal ESD, and finally colonic ESD [29]. For clinical colorectal ESD, Hotta et al. showed that approximately 40 procedures were sufficient to acquire skill in avoiding perforations, and the perforation rate in the first 40 cases was about 12.5% [30]. However, perforation rate did

not decrease to zero even if the skill level improved greatly. Therefore, we believe that the endoscopist must also obtain expertise in endoscopic closure. Small perforations can be closed by endoscopic clipping. Ex vivo animal model with perforation is more useful for training in endoscopic closure than in vivo animal model [29]. Endoscopists have to know the complications of colorectal ESD in order to prevent them. Additionally, appropriate training, including animal model training, for colorectal ESD should be acquired before working on clinical cases.

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