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Editorial

Improvement of Endoscopic Therapy for Colorectal Polyps

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Editorial

The number of colorectal cancer death is increasing in the world. Resecting neoplastic colorectal polyps is thought to lead to the decrease of colorectal cancer death. Endoscopic therapies such as polypectomy, endoscopic mucosal resection (EMR), and endoscopic submucosal dissection (ESD), are used worldwide to resect colorectal polyps including early colorectal cancer. Those techniques are improving to resect polyps safely and thoroughly according to the development of new devices. Endoscopists have to know the indication and knack of each therapy in order to perform it in high quality. In this editorial, we describe the recent improvement of polypectomy, EMR, and ESD for colorectal polyps.

Polypectomy without injection

Polypectomy without injection are divided into conventional polypectomy and cold polypectomy. Conventional polypectomy is performed using electrocautery equipment. This method is performed by forceps and snare and is standard and useful for resecting small polyps less than 10 mm in size. The complications of polypectomy are not so frequent, but postoperative hemorrhage and perforation happen in rare cases. On the other hand, cold snare polypectomy is performed without electrocautery equipment. Recently, it was reported to be less complications such as postoperative hemorrhage and perforation than conventional endoscopy. This method had less postoperative hemorrhage than conventional polypectomy even in anticoagulated patients [1]. Additionally, it had the advantage of shorter total procedure time. Because it did not need the preparation of electrocautery equipment and less number of clipping to immediate hemorrhage after resection.

Endoscopic mucosal resection

EMR is generally performed for early colorectal cancers worldwide. The saline injection-assisted method was first described by Rosenberg and was reintroduced by Tada et al. EMR is currently the most widely accepted method for a resection of middle sized polyps 10-20 mm in the world. Previously, EMR was not recommended for very large tumors >20mm due to poor en bloc resection rate. However, various new methods and devices have improved the chance of complete resection for large polyps by EMR. For instance, various injection solutions have been used to achieve sustained and higher mucosal elevation for easier and a more complete resection. Glycerol, dextrose, and hyaluronic acid (HA) provide better complete resection rates and longer-lasting mucosal elevation than doe's normal saline (NS) [2]. In Japan, hyaluronic acid is accepted as the use of EMR by Japanese national health insurance. On the other hand, EMR with circumferential incision has also been introduced for resecting larger polyps. Recently, the use of a uniquely shaped snare (Dualoop; Medico's Hirata Inc., Tokyo, Japan) has been reported to be useful for resecting middle and large polyps [3]. Moreover, under water EMR enable complete removal of large sessile tumor without submucosal injection.

Endoscopic submucosal dissection

In Japan and some other Western and Asian countries, ESD is reported to be an efficient treatment with a high rate of en bloc resection for large colorectal tumors and it is considered less invasive than laparoscopic colectomy (LAC). The rate of en bloc resection is reported to be more than 90% [4,5]. In Japan, ESD is the treatment for tumors that are impossible to be resected with EMR, diagnosing intramucosal cancer and shallowly invasive submucosal cancer (sSM) with the help of chromoendoscopy, narrow-band imaging (NBI), and blue laser imaging (BLI) [6]. However, ESD can be a time-consuming procedure and carries a higher risk of perforation than EMR. Compared to EMR, the rate of perforation is reported to be higher for ESD (1.5–10.4%). Recently, the devices of ESD are improving rapidly and these resolve problems of time and complications partially. Various knives are developed and used in colorectal ESD. There are the obtuse short-tipped types, long-blade types and scissor types. Some obtuse knife has water jet function and it enables faster dissection. Long-blade typed knife also allows rapid dissection. Scissor typed knife are less likely to cause perforations because these knives enable grasping the tissue and cutting safely. With respect to injection liquid, hyaluronic acid can lengthen the duration of the continuous elevation of the submucosa and it prevents perforation. According to these improvements, ESD has become safer and quicker gradually. Thus, this method is expected to be standardized in a near future.

The training of endoscopic therapy

Training in EMR and ESD is important for safe procedures. Prevention of perioperative hemorrhage and rapid hemostasis are one of the most important techniques especially in clinical ESD. Endoscopists are expected to train these techniques using animal models. With respect to training of animal models, both vivo animal models and ex vivo animal models using harvested organs have been used for the training of EMR and ESD. In vivo animal models which have blood flow are ideal for training and frequently used in the world. However, in vivo animal models are expensive and

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inconvenient. In contrast, ex vivo animal models are inexpensive and convenient. However, one of the weaknesses of ex vivo animal models is the lack of blood flow. Recently, an ex vivo animal model with blood flow has been developed and this has enabled more practical training including endoscopic hemostasis [7]. Additionally, various ex vivo animal models such as bovine cecum, rectum, porcine cecum, rectum, and stomach had each characteristic features, making it possible to choose a suitable animal model according to the skill level of the endoscopist. With respect to training for complication, the perforation rates during ESD and EMR do not decrease to zero even if the skill level improved greatly. Therefore, we believe that the endoscopist must also obtain expertise in endoscopic closure. Our previous study showed that repeated endoscopic closure improved the non-experts' completion rates and decreased their procedure times. Further studies should be performed to examine the efficacy of these animal models. On the other hand, there are no virtual simulators for training of ESD. The development of virtual simulator for EMR and ESD is expected.

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