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Resection of Diminutive and Small Colorectal Polyps: What Is the Optimal Technique?

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Colorectal polyps are classified as neoplastic or non-neoplastic on the basis of malignant potential. All neoplastic polyps should be completely removed because both the incidence of colorectal cancer and the mortality of colorectal cancer patients have been found to be strongly correlated with incomplete polypectomy. The majority of colorectal polyps discovered on diagnostic colonoscopy are diminutive and small polyps; therefore, complete resection of these polyps is very important. However, there is no consensus on a method to remove diminutive and small polyps, and various techniques have been adopted based on physician preference. The aim of this article was to review the diverse techniques used to remove diminutive and small polyps and to suggest which technique will be the most effective. **Clin Endosc 2016;49:355-358**

Key Words: Polyps; Colorectal; Technique; Resection

INTRODUCTION

Colorectal cancer is the third most frequently diagnosed cancer in Korea.[1] Most, if not all, colorectal cancers arise from preexisting adenomas. Adenomas develop as a result of factors associated with the initiation of tumors, and they progress to carcinoma because of factors that act as tumor promoters. Therefore, early detection and complete removal of adenomatous polyps reduces the incidence of colorectal cancer as well as the mortality of patients with colorectal cancer.[2,3]

Colorectal polyps are divided by size into three groups: diminutive (≤5 mm), small (6 to 9 mm), and large (≥10 mm). In a systematic review of the frequency of advanced neoplasia according to polyp size, advanced adenomas were discovered in 1,155 subjects, corresponding to diminutive, small, and large polyps in 4.6%, 7.9%, and 87.5% of the cases, respectively.[4] Although diminutive and small polyps demonstrate a lower frequency of any advanced histological features compared with large polyps, all neoplastic polyps should be completely removed because of the risk of malignancy. However, there is no consensus regarding the method to remove diminutive and small polyps, and various techniques have been adopted based on physician preferences. According to surveys of endoscopists in Korea and Japan, cold forceps polypectomy (CFP) is the preferred method for removing diminutive polyps.[5,6] However, according to a survey of endoscopists in the United States, the most commonly used polypectomy techniques are CFP for polyps measuring 1 to 3 mm and hot forceps polypectomy (HFP) for polyps measuring 4 to 6 mm.[7] In this article, we have discussed and suggested optimal techniques for the resection of diminutive and small colorectal polyps.

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POLYPECTOMY TECHNIQUES FOR DIMINUTIVE AND SMALL COLORECTAL POLYPS

Cold forceps polypectomy

The CFP technique is performed as follows. A biopsy for-

ceps is passed through the working channel of the endoscope. The jaws of the forceps are placed over the polyp tissue, and the polyp is captured and removed with mechanical pressure. The advantages of CFP are the following: easy, simple technique to apply; short procedure time; relatively low cost; easy tissue retrieval; and low rate of complications, such as bleeding or perforation. Unfortunately, this procedure is associated with significant rates of incomplete polyp resection.[8] The endoscopist should meticulously inspect the resection site and remove any remaining tissue to confirm that complete resection has been achieved. Notably, previous trials revealed a marked incomplete resection rate following what was considered complete removal of a polyp (29% to 38%).[9-11] The reason for this rather high incomplete resection rate might be that minor bleeding after the initial bite can obstruct the visual field of a polypectomy site. To increase the complete resection rate, proposed alternatives to conventional CFP include the use of jumbo biopsy forceps (Radial Jaw 4 Single-Use Jumbo Biopsy Forceps; Boston Scientific Corp., Marlborough, MA, USA)[12] or narrow-band imaging evaluation of remnant tissue following CFP.[13]

Hot forceps polypectomy

HFP is analogous to CFP except it involves applying an electric current to the forceps. The technique of HFP involves the following. A biopsy forceps is passed through the working channel of an endoscope. The tip of the polyp should be captured and tented away from the colonic wall to prevent perforation. The colonic lumen should be slightly deflated, and electrocautery is then applied. Application of electrical current by a coagulation wave removes the polyp and burns the surrounding tissue. The disadvantages of this method are a 17% to 34% risk of residual polyp; increased risk of coagulation syndrome, perforation, and delayed bleeding; and impaired histological evaluation of the biopsy specimen.[14-16] The right colon is particularly vulnerable to transmural injury. Great care must be taken when performing HFP in the right colon. For these reasons, the Korean guidelines for colonoscopic polypectomy do not routinely recommend HFP for the removal of diminutive and small polyps.[17]

Cold snare polypectomy

Cold snare polypectomy (CSP) has recently been accepted as the ideal method for the resection of diminutive and small polyps. The technique of CSP is performed as follows. First, the lesion should be placed at the 5 o'clock position. The snare opens and encircles the polyp without air aspiration. Then, the snare slowly captures the polyp with at least 1 to 2 mm of surrounding normal tissue. The polyp is guillotined and should not be lifted or tented until complete closure is achieved. The polyp can then be suctioned through the working channel into the trap.[18] The advantages of CSP are a short procedure time, high complete resection rate, and low complication rate. In a recent prospective, randomized trial, CSP with a snare exclusively designed as a cold snare (Exacto cold snare; US Endoscopy, Mentor, OH, USA) resulted in complete polyp removal more often than did CSP with a traditional snare.[19] Snares exclusively designed as cold snares (with features such as thinner wires or a different shield shape) may be more efficient for resection and easier to use for cutting than traditional snares.

Hot snare polypectomy

Hot snare polypectomy (HSP) is a polyp removal method in which a polyp is grasped by a snare and then removed by electrocautery. Electrocautery can cause damage to the proper muscle layer and then lead to coagulation syndrome or perforation. Therefore, HSP should be used with some caution in comparison to CSP. First, to avoid grasping excess normal tissue, a polyp with minimal normal tissue should be captured by the snare. Second, the ensnared polyp should be tented away from the colonic wall and the lumen should be deflated prior to the application of electrocautery to minimize the risk of transmural injury. The following are three types of electric currents used in HSP: pure cut, coagulation, and blended. There is currently no consensus regarding the optimal type of current that should be used. Generally, a blended or coagulation current, rather than a pure cut current, is recommend for polypectomy because of the bleeding risk.

Endoscopic mucosal resection

Endoscopic mucosal resection (EMR) has generally become an accepted curative treatment for large polyps up to 20 mm in size. EMR allows the resection of the mucosa, muscularis mucosa, and a part or even all of the submucosa. The technique of EMR technique involves the following. First, the polyp should be elevated by a submucosal injection. The elevated polyp is grasped in a polypectomy snare and removed by an electric current. The submucosal cushion reduces the risk of perforation and improves the chances of complete resection. Therefore, it is vital to maintain sufficient elevation of the lesion throughout the procedure.[20] Normal saline without epinephrine is the most common solution used for the injection. Normal saline is rapidly absorbed, and a repeated injection may be necessary. Dextrose, hyaluronic acid, glycerol, or other solutions have been used to allow longer-lasting injection, but are generally reserved for a submucosal dissection.

Table 1. Endoscopic Techniques for Resection of Diminutive and Small Polyps

Endoscopic technique	Advantages	Disadvantages	Recommendation
Cold forceps polypectomy	Easy, simple technique Short procedure time Low complication rate	Low complete resection rate	Therapeutic option for removal of diminutive polyps
Hot forceps polypectomy	Easy technique Short procedure time	Low complete resection rate High complication rate	No recommendation for removal of small and diminutive polyps
Cold snare polypectomy	Short procedure time Low complication rate High complete resection rate	-	Most ideal technique for removal of small and diminutive polyps
Hot snare polypectomy	High complete resection rate	Long procedure time High complication rate	Therapeutic option for removal of small polyps
Endoscopic mucosal resection	High complete resection rate	Difficult procedure Long procedure time High complication rate	Therapeutic option for removal of small polyps

WHAT IS THE OPTIMAL TECHNIQUE FOR THE REMOVAL OF DIMINUTIVE AND SMALL POLYPS?

A colon polypectomy is associated with a 65% relative reduction in colorectal cancer deaths, but incomplete polypectomy is the main known cause of interval cancer.[21-23] An optimal technique for the removal of diminutive and small polyps must satisfy many conditions that include high complete resection rate, low complication rate, easy available technique, and short procedure time. Comparison of relative strengths and weakness of techniques for the removal of diminutive and small polyps are summarized in Table 1.

A systematic review and meta-analysis showed that CSP or jumbo biopsy polypectomy decrease the risk of incomplete diminutive polyp removal by 60%, without increasing the total procedure time or complication rates.[24] In a subgroup analysis of this study, three randomized trials showed that CSP reduces the risk of incomplete removal by 79%, and two randomized trials showed that jumbo biopsy polypectomy reduces the risk of incomplete removal by 52%[12,25-27] Therefore, CSP was found to be associated with the lowest rate of incomplete removal, making it a very effective polypectomy method.

In the past, HFP was widely accepted as an effective method of enhancing the complete resection rate and inducing simultaneous hemostasis because of the additional effect of electrocautery burning the surrounding tissue. Contrary to these perceptions, however, several studies of HFP and CFP for the removal of diminutive and small polyps have shown that there is not a statistically significant difference in the complete resection rate between the two methods. HFP is associated with a higher rate of complications, such as bleeding and perforation.[10,16,28] In addition, a recently reported comparative study between jumbo forceps polypectomy and HFP showed that jumbo forceps polypectomy is superior to HFP in terms of histological quality (96% vs. 80%) and complete resection rate (87.5% vs. 76.1%).[29] For these reasons, HPF is not recommended as the first-line treatment for diminutive and small polyp removal in Korea.

Several studies have compared CSP and HSP for the removal of diminutive and small polyps. CSP was found to be superior to HSP in terms of procedure time.[30-33] In HFP, complications, such as bleeding, required additional intervention, and post-procedural abdominal symptoms were similar to CFP or developed more frequently.[30,32] A prospective randomized controlled study has shown that immediate bleeding (5.7% vs. 23%) and delayed bleeding (0% vs. 14%) were more common with conventional polypectomy compared with CSP.[34] This study demonstrated that CSP is preferred for the removal of small colorectal polyps in patients taking anticoagulants without stopping the medication. EMR is the standard treatment for the removal of large or non-pedunculated polyps. However, there have been few comparative studies of EMR and other techniques for the removal of diminutive and small polyps. A submucosal injection as prophylaxis for delayed bleeding and electric damage can sometimes facilitate the grasping of a difficult portion of the polyp. Therefore, EMR is considered an option for the removal of diminutive and small polyps in some cases.

CONCLUSIONS

All neoplastic polyps should be completely removed because interval cancer may be correlated with incomplete polypectomy. Currently, there is no consensus regarding the optimal method to remove diminutive and small polyps. Re-

cent studies have shown that CSP is a safer and more effective method. Therefore, CSP should be considered first for the removal of diminutive and small polyps. Based on circumstances, however, a cold forceps or jumbo forceps polypectomy may be considered for the removal of diminutive polyps, while HSP or EMR may be considered for the removal of small polyps.

Conflicts of Interest

The author has no financial conflicts of interest.

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