

## Comparison of newly found polyps after removal of small colorectal polyps with cold or hot snare polypectomy

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### Abstract

**Background and study aims :** There are limited data regarding polyp recurrence following cold or hot snare polypectomy for small colorectal polyps. The aim of this study was to evaluate the prevalence of newly found polyp after cold or hot snare polypectomy and the predictive factors.

**Patients and methods :** This was a retrospective case-control study at a single municipal hospital. Patients undergoing cold or hot snare polypectomy for colorectal polyps  $\leq 8$  mm included in a previous study (Digestion 2011 ; 84 :78) were enrolled. Newly found polyps were defined as polyps detected at follow-up colonoscopy within 3 years. Predictive factors for new polyps were assessed by multivariate analysis using logistic regression.

**Results :** A total of 72 patients (female 22, mean age 68) with 184 polyps were enrolled. Eighty-nine polyps (mean size  $\pm$  SD,  $5.3 \pm 2$  mm) were resected with cold snare while 95 polyps (mean size  $5.5 \pm 6$  mm) were resected with hot snare polypectomy. Twenty-four new polyps ( $< 5$  mm) were found at follow-up. No polypectomy scars were detected in the vicinity of the new polyps. The prevalence of new polyps was similar (i.e., cold vs. hot snare polypectomy ; 23% vs. 19%,  $P = 0.68$ ). Multivariate analysis revealed that the removal of  $\geq 4$  polyps was an independent predictor associated with new polyps (odds ratio : 7.8, 95% confidence interval : 2.1-32,  $P = 0.0022$ ).

**Conclusions :** Diminutive polyps were newly found with similar prevalence after cold or hot snare polypectomy, but there were no recurrent polyps detected. (Acta gastroenterol. belg., 2015, 78, 406-410).

**Key words :** colorectal polyp, cold snare polypectomy, hot snare polypectomy.

**Abbreviations :** CSP, cold snare polypectomy ; HSP, hot snare polypectomy.

### Introduction

Colorectal polypectomy is thought to decrease the incidence of colorectal cancer and reduce mortality (1,2). More than 90% of colorectal polyps detected during colonoscopy are diminutive or small polyps less than 10 mm in diameter (3,4). Endoscopic removal of small colorectal polyps is a daily routine procedure. Application of the “predict, resect, and discard” strategy, a newly proposed approach to manage small colonoscopic polyps, is a cost-saving approach based on the assumption that all neoplastic small polyps should be completely resected endoscopically (5).

Cold snare polypectomy (CSP) has been reported to be a safe and effective method for endoscopic resection of small colorectal polyps of  $\leq 1$  cm (6,7). The proce-

dures with CSP is significantly shorter than that of hot snare polypectomy (HSP) (8). In addition, delayed bleeding has been found to be less frequent after CSP than after HSP even in anticoagulated patients (9). However, there are limited data comparing polyp recurrence following CSP and HSP for resection of small colorectal polyps. The aim of this study was to evaluate the prevalence of newly found polyps following CSP or HSP and identify predictive factors. The study was based on follow-up colonoscopy of the patients who previously underwent either CSP or HSP for small colorectal polyps (8).

### Patients and Method

#### Study population and design

This was a retrospective case-control study at a single municipal hospital. The study was approved by the ethics committee at our hospital. Patients undergoing CSP or HSP for small colorectal polyps ( $\leq 8$  mm) included in our previous study (8) were enrolled. Follow-up colonoscopy was performed within 3 years after CSP or HSP. The data was obtained from the endoscopic filing system at Showa Inan General Hospital obtained between January 2010 and December 2012. Inclusion criteria included  $> 90\%$  of mucosa was seen at the follow colonoscopy and excellent or good bowel preparation. Inclusion and exclusion criteria of the previous study were as follow : Patients with colorectal polyps up to 8 mm in diameter were enrolled. Exclusion criteria include age less than 20 years old, pregnant, American Society of Anesthesiologists class III and IV, overweight (body weight  $> 100$  kg), or allergic to propofol used or its components (soybeans or eggs). Those in whom  $< 90\%$  of mucosa was seen due to mixture of semisolid and solid colonic contents were excluded as poor bowel preparation as were patients with previous colorectal surgical resections. Patients were randomized to two groups based on

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whether CSP or HSP was done. Submucosal injection of a solution (e.g., saline) before the removal was not routinely performed irrespective of the type of polypectomy.

### Colonoscopy

All procedures were performed by two experienced endoscopist (AH, MK) (having performed > 10,000 colonoscopies each). A pediatric variable-stiffness colonoscope (Olympus PCF-Q260AZI; Olympus medical systems, Tokyo, Japan) was used in all procedures. The instrument has a distal tip diameter of 11.7 mm and insertion tube diameter of 11.8 mm (working length, 133 cm; accessory channel diameter, 3.2 mm). As is our standard practice, a transparent short cap (Olympus D-201-12704) with an outer diameter of 13.4 mm and inner diameter of 12 mm was attached to the tip of the colonoscope in an attempt to improve adenoma detection rate (10). The edge of the cap protrudes for approximately 4 mm beyond the tip of the colonoscope. Retroflexion in the rectum was routinely performed.

The standard bowel preparation was performed using polyethylene glycol electrolyte lavage solution (Ajinomoto Pharmaceutical Co., Tokyo, Japan) in all patients. All the procedures were conducted under nurse administered propofol sedation (AstraZeneca, Osaka, Japan) (11).

### Evaluated outcomes

Newly found polyps (either recurrent, new formed, or previously missed) were defined as polyps found at follow-up colonoscopy done within 3 years after initial CSP or HSP. Endoscopists were instructed to measure polyp size using the size of the snare catheter or the snare diameter. The snare with the 2.4-mm snare catheter and a loop size of 13 mm (Captivator™ Small Hex, Boston Scientific Japan, Tokyo, Japan) was used in this study. Polyps were measured in increments of 1 mm. Cecal intubation was verified by identification of the appendix orifice and ileocecal valve. The time taken to reach the cecum, the intubation rate of the terminal ileum, the withdrawal time, the total procedure time, the location of polyps (right side was defined at or proximal to the splenic

flexure), and the size and morphology (flat type was defined height < 2.5 mm at measured by the diameter of the 2.4-mm snare catheter) of each polyp were recorded. All colorectal polyps up to 8 mm found, except for tiny hyperplastic polyps in the rectum and distal sigmoid colon, were removed. And the complete resection rate of all collected specimens were defined histologically.

The principal outcome measures were the number of newly found polyps defined as polyps found at follow-up colonoscopy within 3 years after CSP or HSP. The prevalence of newly found polyps at follow-up colonoscopy in both groups was compared. In addition, logistic regression analysis was applied to identify independent predictors such as polypectomy techniques (CSP or HSP), the number of polyps ( $\geq 4$ ), mean size ( $\geq 6$  mm), and location and shape of polyp found in the previous study.

### Statistical Analyses

Statistical tests to compare the measured results for the two groups were as follows: the Chi-square test, with Yates' correction for continuity where appropriate, was used for comparison of categorical data. Fisher's exact test was used when the numbers were small. For parametric data, the Student's *t*-test was used when 2 means were compared. Differences were considered significant if the *P* value was less than 0.05. Statistical analysis was performed by using JMP® 9.0.2 version software (SAS Institute Inc.).

## Results

### Baseline characteristics

Fig. 1 shows a flowchart of the study. Of the 80 patients included in the previous study, 72 patients were enrolled in the follow-up study including 35 in the CSP group (female 14, mean age 67) and 37 in the HSP group (female 8, mean age 68). There were no significant differences in the baseline characteristics of patients between the two groups at follow-up colonoscopy (Table 1). The follow-up period was also similar between the two groups. The detailed characteristics of 184 polyps in enrolled patients is shown in Table 2. In the previous

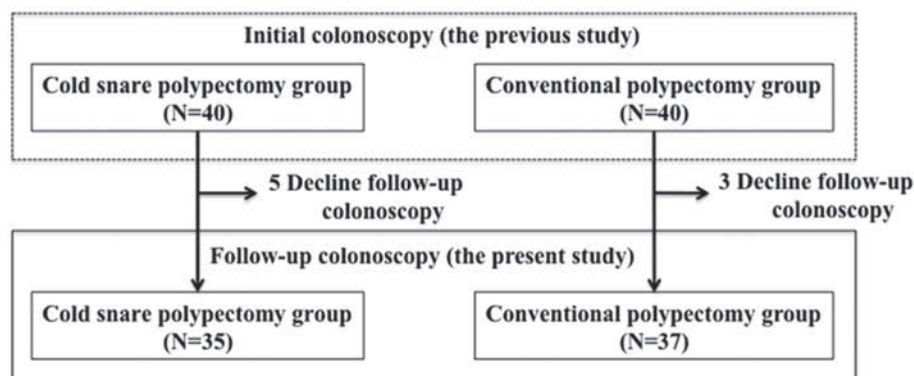


Fig. 1. — Flowchart of the study

Table 1. — Baseline characteristics at follow-up colonoscopy in enrolled patients

Group	CSP	HSP	P value
Number of patients	35	37	
Mean (SD) age (yr) *	67 (11)	68 (11)	0.40
Gender (female)**	14	8	0.09
Mean (SD) follow-up period (months)*	22 (8)	24 (11)	0.56
Cecum intubation rate (%)	100	100	
Intubation rate of terminal ileum (%)	100	100	
Mean (SD) cecal intubation time (min)*	5.3 (3)	5.4 (5)	0.89
Mean (SD) withdrawal time (min)*	10 (2)	9.5 (2)	0.63
Mean (SD) total procedure time (min)*	17 (7)	18 (6)	0.58

CSP, cold snare polypectomy ; HSP, hot snare polypectomy.

\*Differences between cold snare polypectomy and hot snare polypectomy compared by Student's t-test for continuous variables.

\*\*Differences between cold snare polypectomy and hot snare polypectomy compared by chi-square test for categorical data.

Table 2. — Detailed characteristics of polyps evaluated at initial colonoscopy in enrolled patients

Group	CSP	HSP	P value
Total number of polyps evaluated	89	95	
Mean (SD) number of polyps per patient*	2.5 (2)	2.6 (2)	0.53
Mean (SD) polyp size (mm)*	5.3 (2)	5.5 (6)	0.39
Complete resection rate (%)**	96 (85/89)	96 (91/95)	0.92
Cha Characteristics of polyps removed**			
Size			
< 5 mm	35	41	0.60
5 mm ≤ size ≤ 8 mm	54	54	
Shape			
Flat	7	6	0.68
Sessile	82	89	
Location			
Right colon	43	45	0.90
Left colon	46	50	
Pathology			
High-grade adenoma	1	1	0.99
Adenoma	82	86	
Hyperplastic polyp	6	8	

CSP, cold snare polypectomy ; HSP, hot snare polypectomy.

\*Differences between cold snare polypectomy and hot snare polypectomy compared by Student's t-test for continuous variables.

\*\*Differences between cold snare polypectomy and hot snare polypectomy compared by chi-square test for categorical data.

study 89 polyps (mean size ± SD = 5.3 ± 2 mm) were resected with CSP and 95 polyps (mean size 5.5 ± 6 mm) were resected with HSP. The complete resection rates were similar (96 % (85/89) vs. 96% (91/95), P = 0.92).

#### Characteristics of newly found polyps at follow-up colonoscopy

Detailed characteristics of the newly found polyps is listed in Table 3. There were 24 new polyps following CSP and HSP (12 in each group). The proportion of patients with new polyps was similar (i.e., CSP vs. HSP :

23% vs. 19%, P = 0.68). The size of all newly found polyps was less than 5 mm the mean size of polyps in CSP and HSP group was 2.8 ± 1 mm and 2.8 ± 1 mm, respectively. Their morphology was sessile or flat. Most polyps evaluated were tubular adenomas (88% (21/24)). With respect to size, shape, anatomical location, and pathologic diagnosis, there were no significant differences between the two groups. The newly found polyps were considered new or missed polyps but not recurrent polyps based on the fact that no polypectomy scars were detected in the vicinity of the newly found polyps.

Table 3. — Comparison of newly polyps detected at follow-up colonoscopy

Group	CSP	HSP	P value
Number of patients with new polyps**	8 (23%)	7 (19%)	0.68
Total number of new polyps detected	12	12	
Mean (SD) polyp size (mm)*	2.8 (1)	2.8 (1)	0.85
Cha Characteristics of polyps removed**			
Size			
< 5 mm	12	12	
Shape			
Flat	3	4	0.65
Sessile	9	8	
Location			
Right colon	8	9	0.65
Left colon	4	3	
Pathology			
Adenoma	12	9	0.064
Hyperplastic polyp	0	3	

CSP, cold snare polypectomy ; HSP, hot snare polypectomy.

\*Differences between cold snare polypectomy and hot snare polypectomy compared by Student's t-test for continuous variables.

\*\*Differences between cold snare polypectomy and hot snare polypectomy compared by chi-square test for categorical data.

Table 4. — Multivariate analysis of variables affecting new polyps detected at follow-up colonoscopy

Variables	Odds ratio	95% CI	P value
Cold snare polypectomy	0.82	0.22-3.0	0.76
Number of polyps ( $\geq 4$ )	7.8	2.1-32	0.0022
Mean size of polyp ( $\geq 6$ mm)	0.50	0.097-2.1	0.34
Location, left	1.2	0.32-4.4	0.82
Shape, flat	0.52	0.023-4.5	0.59

CI, confidence interval.

#### Factors associated with newly found polyps

As shown in Table 4, multivariate logistic regression analysis revealed that the number of polyps  $\geq 4$  found in the previous study was a significant independent predictor affecting the newly found polyps (odds ratio 7.8, 95% confidence interval : 2.1-32,  $P = 0.0022$ ). However, the results with each polypectomy technique were similar (odds ratio 0.82, 95% confidence interval : 0.22-3.0,  $P = 0.76$ ). Neither the mean size of polyps nor polyp location or shape was predictive of the presence of a newly detected polyp.

#### Discussion

This was a retrospective case-control study based on the population of a previous randomized controlled comparison of CSP with HSP. The proportion of patients (i.e., CSP vs. HSP : 23% vs. 19%,  $P = 0.68$ ) and the number of polyps with new polyps (i.e., 12 each) was similar for each technique. Multivariate analysis revealed that

the removal of  $\geq 4$  polyps was a significant independent predictor predicting the presence of new polyps (odds ratio : 7.8, 95% confidence interval : 2.1-32,  $P = 0.0022$ ). The lack of polypectomy scars near the new polyps suggests that the new polyps were either new or previously missed polyps and not recurrent polyps.

The endoscopic resection of polyps was considered to be the complete resection when the residual polyp was not seen endoscopically and both the horizontal and vertical histopathologic margins were free of neoplasm. Although 4 polyps in 4 patients were considered resected incompletely in the previous study, no new polyps were detected at one-year follow-up colonoscopy in those 4 patients and none arose from incompletely resected polyps in the previous study. These results indicate that the recurrence after CSP or HSP for small polyps ( $\leq 8$  mm) is low even if the endoscopic resection was incomplete pathologically.

A higher probability of *en bloc* complete removal without residual polyp tissue contributes to the achievement of no recurrences after polypectomy, irrespective of

polypectomy techniques using either CSP or HSP. The rates of complete resection between CSP and HSP in the previous study were similar (96%) and high and higher than those in most previous studies of CSP or HSP for removal of small polyps (94-86%) (12-16). Possibly the high rate of complete resection was related to the fact that the mean size was 5.3-5.5 mm (Table 2). Recently, the CARE study demonstrated incomplete resection of 17.3% in 10-20 mm and 6.8% in 5-9 mm diameter polyps using hot polypectomy in the blended coagulation mode (16) which suggests that larger size (9-10 mm) polyps may produce more frequent incomplete resections.

Although the relative high rate of newly found polyps within 3 years after polypectomy is somewhat disappointing, the prevalence was similar independent of the technique used and they were in different locations from the original polyps. The fact that the presence of 4 or more polyps increased the risk of new polyps within the time frame of the study suggests that 4 or more polyps may identify a group which possibly needs more frequent surveillance.

This study had some limitations. This study had a relatively small sample size and only two endoscopists. The results of this study may be limited when the size of polyps removed is  $\leq 8$ mm. In addition, it is unknown whether the newly found polyps were new or previously missed.

In conclusion, we found that formation of polyps detected within 3 years after endoscopic removal of small polyps was similar, irrespective of CSP or HSP. The fact that none were at the site of the original polyp confirmed the completeness of polypectomy. Our data indicate that the CSP technique should be considered the primary method for endoscopic treatment of polyps up to 8 mm. Because the procedure time with CSP is significantly shorter than that of HSP (8). In addition, delayed bleeding has been found to be less frequent after CSP than after HSP even in anticoagulated patients (9). Future studies comparing the completeness of endoscopically apparent eradication by the two techniques would be useful to determine which is best for clinical practice.

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