

BLEEDING AFTER ENDOSCOPIC RESECTION OF COLONIC ADENOMATOUS POLYPS SIZED 4-10 MM

Violeta Hristova Janik

¹ Department of Gastroenterology, ReMedika, General Hospital, Skopje, RN Macedonia

Corresponding author: Violeta Hristova Janik, Department of Gastroenterology, ReMedika, General Hospital, Skopje, N. Macedonia; e-mail: violetajanik@gmail.com

ABSTRACT

Introduction: Colonoscopy with polypectomy is an efficacious procedure in reducing the risk of colorectal cancer development, the precursor are adenomatous polyps. The most common method for resection of polyps measuring 4-10 mm are cold (CSP) and hot snare polypectomy (HSP). CSP has a lower incidence of adverse events, especially delayed post-polypectomy bleeding.

Aim: To evaluate the presence of immediate and delayed bleeding in the cold snare polypectomy of sub-centimeter polyps of the colon compared with hot snare polypectomy.

Materials and Methods: This prospective clinical study is comprised all patients who were incidentally detected to have adenomatous colonic polyps measuring 4-10 mm during a colonoscopy screening. Polypectomy was done with (hot snare) or without electrocautery (cold snare). After removal of polyps, immediate bleeding, delayed bleeding, and methods for were analyzed.

Results: The CSP and HSP groups included 116 patients, 113 (54.4%) polyps in 61 (52.6%) patients with CSP while 95 (45.6%) polyps in 55 (47.4%) patients with HSP. 25 (22.1%) polyps after CSP had immediate bleeding. In 5 patients (20.0%), five hemostatic clips were inserted after CSP for bleeding longer than 150 sek. The average percentage difference between immediate bleeding versus total number of resected polyps using the cold snare method is not statistically significant ($p < 0.05$) (Difference test, $p = 0.0000$). Delayed bleeding was not registered using this method. In the second investigated group (HSP), one patient had delayed bleeding. This was stopped with 2 clips. Immediate bleeding was not registered.

Conclusion: CSP is safer than HSP in resecting colon polyps sized 4-10 mm, without risk of delayed bleeding.

Keywords: polyps, colonoscopy, bleeding, clips

INTRODUCTION

Colorectal cancer mainly arises from adenomatous polyps. Prevention of this type of cancer is possible by conducting a colonoscopy when a polypectomy of colonic polyps is performed and an interruption of the adenoma-carcinoma sequence is made [1,2,3].

According to GLOBOCAN 2020, from all the diagnosed carcinomas so far, 19.3 million, 10% thereof, represents colorectal carcinoma

(CRC) [4]. It is projected that the number of new colorectal cancer cases will reach 3.2 million by 2040 [5].

Polypectomy is performed by using biopsy forceps with or without electrocautery (hot/cold forceps), with electrosurgical snare without electrocautery (cold snare), with electrocautery (hot snare), endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD). The

method chosen for polypectomy depends on the size of the polyp, its appearance, whether it is sessile, flat or pedunculated [6]. Polyps ≤ 5 mm are resected without electrocautery (cold snare). Polyps >10 mm are resected with electrocautery (hot snare) [7]. Polyps ≥ 4 mm and ≤ 10 mm can be resected either with a hot or cold snare polypectomy. Both methods have different advantages and disadvantages [8]. Polyps up to 10 mm in size can have malignant cells in $\leq 1\%$ of cases [9]. It is important to choose the ideal method that would enable complete resection without leaving residual adenomatous tissue behind [10]. 97.6% of detected polyps are small and sub-centimeter, and by applying an ideal resection method, their further development and progression to cancer is interrupted [11]. ESGE guidelines recommend the usage of cold snare polypectomy for polyps ≤ 5 mm (strong evidence) and for polyps of 6-9 mm in diameter (weak evidence) [3].

Cold snare polypectomy (CSP) is a method for removal of polyps without use of electrocautery. This technique was first reported by Tappero et al. in 1985 when they resected 288 small polyps by using exclusively mechanical strangulation. They observed no cases of bleeding, colonic perforation, or other complications [12]. This method is technically easier to perform, as there is no use of electrocautery. It also has a lower incidence of complications, such as delayed bleeding, post polypectomy syndrome, and colonic perforation. This is due to the absence of thermal damage to the colonic wall [13]. The polyp is positioned to the working field on 5 or 6 o'clock position, the polyp is then ensnared, but also a zone of 1-2 mm healthy mucosa is resected in order to avoid the risk of leaving a residual polyp behind [14]. In contrast to the hot snare, the snare is pushed towards the colonic wall, and the polyp is resected without using electricity [15]. Histologically, the resection is spread only superficially to the submucosal layer [16].

Thus, immediate bleeding appears, a result of the rupture of the superficial blood mucosal vessels. Very often, however, it spontaneously and usually stops without using any hemostasis methods. Delayed bleeding is a rare phenomenon when using this method. One day after polypectomy, the defect is reduced by 25% in diameter [17].

The absence of electrocautery brings with it the risk of leaving residual adenomatous tis-

sue, due to the absence of the additional burning effect of electrocautery to the surrounding tissue. Residual tissue can be a risk of developing colon cancer [18]. The rate of incomplete resection with cold and hot polypectomy of polyps ≤ 10 mm is 0.5 – 7.4% and is very small compared to forceps polypectomy [19].

According to Dwyer et al. immediate bleeding was encountered in 2% of cold snare polypectomies, and hemostasis was achieved by hemo-clipping. No delayed bleeding was registered [20]. Horiuchi et al. detected an immediate bleeding rate of 21% with traditional cold snares [14]. Toshiyuki et al. found delayed bleeding of 2% after cold snare polypectomy with traditional snare [21]. Aizawa et al. in their study discovered one delayed bleeding after polypectomy with cold snare [22]. According to Yoshikazu, the total delayed bleeding rate in cold snare polypectomy was 0.14% and it was higher in polyps ≥ 5 mm located in the rectum [23]. Prophylactic clipping is not recommended, except for larger pedunculated polyps [24, 3].

Usually, there is no colonic perforation after cold snare polypectomy [25, 26], although some rare cases have been reported [27].

Hot snare polypectomy (HSP) was first to be introduced and is primary used for polypectomy. It is performed using electrocautery [28]. The histopathology of the resected polyps with hot snare polypectomy showed stretching through the described resection deeply into submucosa for 60% and tunica muscularis propria of 20% [29]. This justifies, the mentioned delayed bleeding where it comes from great vascularization from bowel's blood vessels located into submucosa. On the day after, the resection the defect increases up to 29% [30] [31]. Delayed bleeding is a serious condition, requiring a repeated colonoscopy in order to precise localization of the resection margin. Prompt hemostasis is performed using clips or direct adrenaline injection. One of the most serious complications after hot snare polypectomy is perforation of the colonic wall [32]. The risk of perforation is 1 over 1000 up to 2000 done colonoscopies. The essential factors that favor perforation of the colon are the long lasting of the electrocauterization process together with polyp's localization into. 5% of the patients lethally suffered from colonic perforation [33].

AIMS

Primary aim: To evaluate the immediate bleeding and delayed bleeding after cold snare polypectomy compared with conventional polypectomy in adenomatous polyps sized 4-10 mm.

Secondary aims: Hemostatic methods, polyps' distribution by their localization, gender, and colonic perforation.

MATERIAL AND METHODS

This was a randomized, prospective, and analytic study, conducted in one Private General Hospital, Remedika, during a period of 18 months. Interventions were performed by one gastroenterologist-endoscopist. The study covers 116 patients, with 208 adenomatous polyps sized 4-10 mm. This study was approved by the Ethics committee of the hospital.

Equipment: For colonoscopy an Olympus Elvis Exera III CV 190 was used.

Protocol for colonoscopy with polypectomy [34]:

1. Prior to examination, each patient signed a consent form for the colonoscopy and an informed consent form for participation in the study, in the event that a sessile adenomatous polyp 4-10 mm in size was discovered.

2. Patients had previous diet preparation and took Macrogol for bowel cleansing. Patient' preparation was done one day prior to colonoscopy examination.

3. Those patients that underwent the procedure under anesthesia signed an anesthesia drug list.

4. Each detected polyp was assessed with narrow band imaging (NBI) by using the NICE classification for differentiation of adenomatous, sessile, serrated or polyps with advanced histopathological changes [35].

5. Every third adenomatous polyp was cut with electrocautery-hot snare, for other polyps cold snare polypectomy was used.

6. Immediate and delayed bleeding was measured.

If there was immediate bleeding, it most commonly stops quickly and spontaneously. If it does not stop, then a clip is placed [36]. If, during polypectomy, the intestinal wall is damaged, the defect is closed with several clips in order to avoid surgical treatment [37].

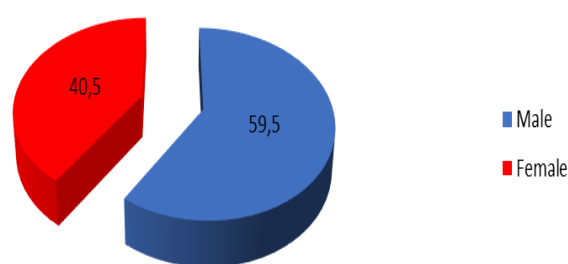
Inclusion criteria: Patients between the ages of 18-80 years from both sexes with present adenomatous sessile polyps sized 4-10 mm incidentally detected during colonoscopy.

Exclusion criteria: Hemoglobin <70 g/dL; hyperplastic polyps; pendulous polyps; juvenile polyps; colon polyposis; polyps less than 4 mm in size; polyps larger than 10 mm; malignant disease; age under 18 years; age over 80 years.

RESULTS

In a total period of 18 months, polypectomy of 208 polyps in 116 patients was completed. 69 (59.5%) of them were male and 47 (40.5%) were female. The average gender' disturbance was significant $p < 0.05$ (Difference test, $p = .0038$) (figure 1).

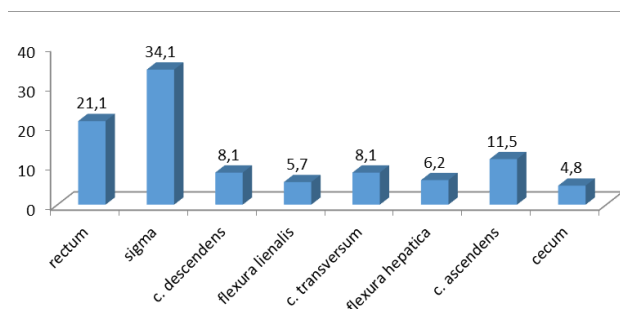
Figure 1. Age distribution of patients



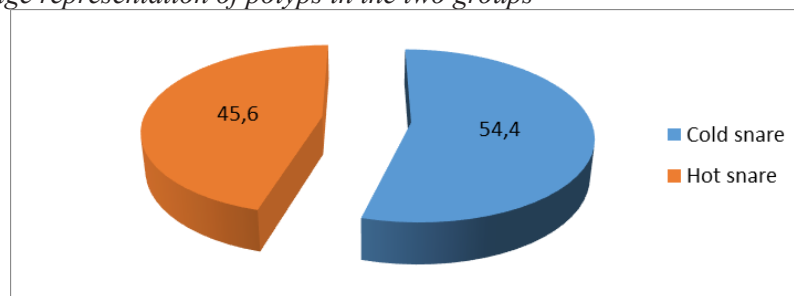
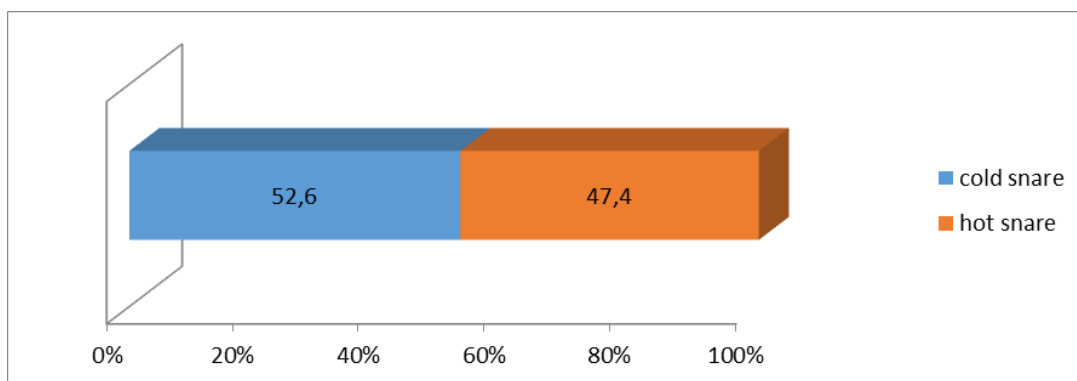
The most frequent localization of the polyps is (in descending order) sigmoid colon-34.1%, rectum 21.1%, 11.5% in ascendant colon, 8.1% in descendent colon, 8.1% of the polyps were located in colon transversum, while 6.2% in right vs. 5.7% of the left colonic flexure. The least frequent polyp' localization was in cecum, with 4.8%. The percentage discrepancy that had been registered between localization of the polyps in sigma versus the others is statistically significant $p < 0.05$ (Difference test, $p = 0.00$) (table and figure 1a).

Table 1. Location of detected polyps

Location	N	%
rectum	44	21.1
sigma	71	34.1
colon descendens	17	8.1
flexura lienalis	12	5.7
colon transversum	17	8.1
flexura hepatica	13	6.2
colon ascendens	24	11.5
cecum	10	4.8

Figure 1a. Location of the polyps**Table 2.** Bleeding in cold and hot snare polypectomy

Polypectomy method	Total polyps	Total number of patients	Immediate bleeding	Delayed bleeding	Clips for Hemostasis
Cold snare	113/54.4%	61/ 52.6%	25/ 22.1%	0	5
Hot snare	95/ 45.6%	55/ 47.4	0	1/1.05%	2

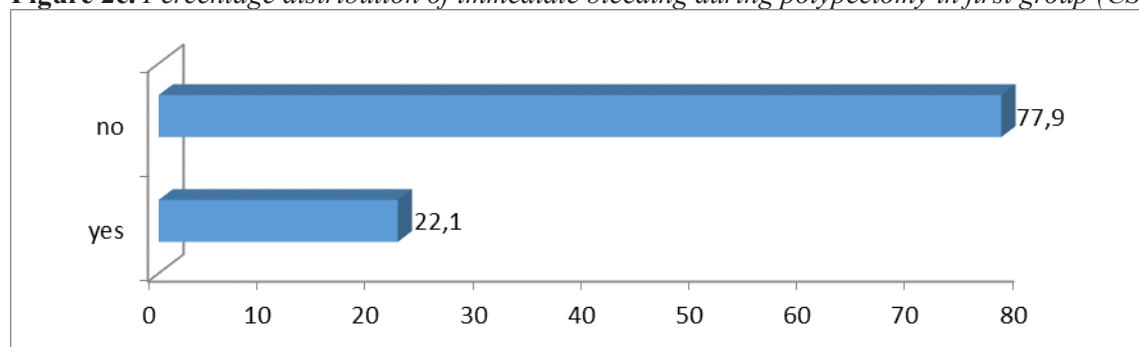
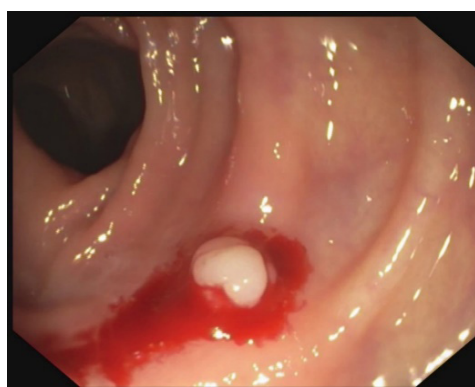
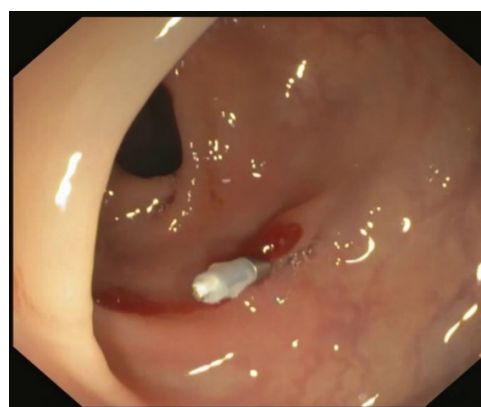
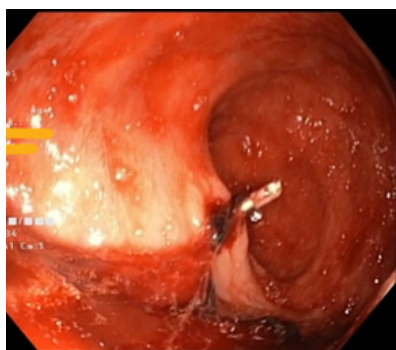
Figure 2a. Percentage representation of polyps in the two groups**Figure 2b.** Percentage representation of polyps in two groups according to the use of polypectomy technique

In the first investigated group, cold snare polypectomy was used. In 61 (52.6%) patients were resected a total of 113 (54.4%) adenomatous polyps, while in the second group a hot snare polypectomy was performed. In 55 (47.4%) patients were resected a total of 95 (45.6%) polyps (table 2, figure 2a, b).

In 25 (22.1%) polyps there was immediate bleeding during the CSP, while in 77.9% of the resected polyps were without bleeding. The average percentage difference between immediate bleeding versus total number of resected polyps using CSP is not statistically significant ($p < 0.05$) (Difference test, $p = 0.0000$) (table 2, figure 2c).

In 5 patients (20.0%) hemostatic clips were inserted in way of controlling hemorrhage when bleeding lasted 150 seconds after cold snare polypectomy (pic.1a, b).

Delayed post-polypectomy bleeding was not registered using this method.

Figure 2c. *Percentage distribution of immediate bleeding during polypectomy in first group (CSP)***Picture 1a.** *Immediate bleeding after cold snare polypectomy***Picture 1b.** *Controlled bleeding during cold snare polypectomy using clips.***Picture 2.** *Stopped delayed post-polypectomy bleeding using clips after conventional polypectomy (HSP)*

In the second investigated group (HSP), only one patient had delayed bleeding. This occurred, four days after the conventional polypectomy was done. An urgent colonoscopy was made, where a large amount of blood was seen and aspirated. The place of bleeding was spotted as an arterial pulsing blood fall at the same place in rectum where polypectomy was performed earlier. Two clips were inserted in order to control hemostasis. The bleeding had then stopped (pic. 2).

There is not any case with immediate bleeding using HSP.

There is not any case with colonic perforation using two investigated methods - CSP and HSP.

CONCLUSION

Cold snare polypectomy appears safer than hot snare polypectomy for the removal of 4-10 mm sessile colonic polyps. They can be removed without an increase in delayed bleeding after cold snare polypectomy.

Delayed adverse events were seen in patients who underwent HSP. In this study, CSP was not associated with any delayed post-polypectomy adverse events, but only with immediate bleeding which is easy to control using a hemoclips.

DISCUSSION

Cold snare polypectomy has bleeding as a complication, but the bleeding usually immediate, and it can be stopped without using any methods of hemostasis. Even if there is bleeding after the resection that does not stop by itself, there is always an immediate way for placing clips on the polypectomy area during the intervention, with the goal of reaching hemostasis. Delayed post-polypectomy bleeding is less frequently seen in cold snare polypectomy [38][22].

In most of the studies, there is evidence that the efficacy and safety of polypectomy without using electrocauterization is the best possible choice for polypectomy of sessile polyps sized 4-10 mm [6][9][11][13][18][19][39][40][41].

Delayed post-polypectomy bleeding is present in the conventional method of polypectomy (HSP) because the electro-cauterization causes a greater defect of the colonic mucosa after polypectomy [42].

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Резиме

КРВАВЕЊЕ ПО ЕНДОСКОПСКА РЕСЕКЦИЈА НА АДЕНОМАТОЗНИ КОЛОНСКИ ПОЛИПИ СО ГОЛЕМИНА ОД 4 ДО 10 ММ

Виолета Христова Јаниќ

Ендоскопски оддел, Општа болница Ремедика, Скопје, РС Македонија

Вовед: Колоноскопијата со полипектомија е ефикасен начин за редуцирање на ризикот за развој на колоректален карцином (КРК), чиј прекузор се аденоматозните полипи. Најчести методи за ресекција на полипи со големина од 4 до 10 мм се полипектомија без електрокаутеризација (cold snare-CSP) и со електрокаутеризација (hot snare-HSP). CSP има помала инциденца на компликации, особено одложено крвање.

Цел: Да се евалуира појавата на моментално и одложено крвање кај cold snare полипектомија на супсантиметарските полипи на дебелото црево, споредено со hot snare полипектомија.

Материјали и методи: Оваа проспективна клиничка студија ги опфаќа сите пациенти што имаат случајно откриени колонски аденоматозни полипи со големина од 4 до 10 мм, во текот на колоноскопскиот преглед. Полипектомија се изведува со (HSP) и без користење електрокаутеризација (CSP). По ресекцијата на полипите се гледа појава на моментално крвање, одложено крвање, користење методи за хемостаза.

Резултати: CSP- и HSP-групите опфаќаат 116 пациенти, 113 (54,4 %) полипи кај 61 (52,6 %) пациент со CSP, додека 95 (45,6 %) полипи кај 55 (47,4 %) пациенти со HSP. Кај 25 (22,1 %) полипи по CSP се јави моментално крвање. Кај 5 (20 %) пациенти беа поставени 5 клипси за хемостаза поради моментално крвање подолго од 150 секунди. Процентуалната разлика меѓу појавата на моментално крвање версус вкупниот број во групата на cold snare полипектомија не е статистички сигнификантна за $p < 0,05$ (Difference test, $p = .0000$). Одложено крвање не се јави при cold snare полипектомија. Во втората група (HSP) одложено крвање се јави кај еден пациент, се направи хемостаза со две клипси. Нема случај со моментално крвање во оваа група.

Заклучок: CSP е побезбедна метода од HSP за полипектомија на полипи со големина од 4 до 10 мм без голем ризик од одложено крвање.

Клучни зборови: полипи, колоноскопија, крвање, клипси