



Polypectomy in Screening Colonoscopies: Is the Improvement of Adherence Better Following Clinical Data Publication or Publication of Guidelines?

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Abstract

Objective: According to recent ESGE guideline adequate polypectomy technique should be used in >80% of polypectomies. Despite recommendations of snare polypectomy for small polyps (6-9mm) almost half of them are resected by forceps. The aim of this study was to analyse if the publication of clinical data or guideline have more impact on the reduction of the forceps resection rate of polyps ≥ 5 mm.

Methods: A total of 90,279 screening colonoscopies performed by 266 endoscopists between 08/2015 and 10/2018 within a quality assurance program were included in this study. We analysed resection techniques by polyps' size before (08/2015-02/2017) and after (04/2017-10/2018) publication of the guideline. Further we investigated forceps resection rates after a publication on resection techniques of our present cohort study in 07/2015.

Results: The polyp detection and resection rate was 38.58% (n= 34,826) and 91.74% (n= 31,948), respectively. Overall, 28.00% (n= 2,521) of polyps sized ≥ 5 mm were resected using forceps. Forceps resection rate decreased in private practices after both publications (RR: 0.68 (95%CI: 0.66-0.70)) vs. 0.91 (95%CI: 0.86-0.96)); $p < 0.001$). In contrast, in hospitals a significant decrease of the forceps resection rate was observed only after the publication of clinical data. (RR: 0.91 (95%CI: 0.89-0.914); vs. 1.19 (95%CI: 1.13-1.26)); $p < 0.001$). For polyps ≥ 5 mm endoscopists had a mean adequate polypectomy technique rate of 68.31% (95%CI: 64.21-72.41).

Conclusion: The present study showed that publication of clinical data led to an increase of adequate polypectomy technique for polyps ≥ 5 mm in both, hospitals and private practices. None of the interventions were successful enough to reach the goal of at least 80% adherence to polypectomy guideline.

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Introduction

Colorectal Cancer (CRC) is the third most common cancer and the second leading cause of cancer-death, worldwide [1]. In accordance to Statistic Austria, CRC incidence and mortality has been decreasing in the last 10 years [2].

It is well known that higher adenoma detection rates and adequate resection technique are associated with reduction of incidence and mortality of colorectal cancer [3-5]. However, post-polypectomy cancer can occur between the screening and surveillance colonoscopies. Up to 37% of these cancers are associated with incomplete polyp resection [6-9].

Diminutive (≤ 5 mm) or small polyps (6-9 mm), which measure less than 10 mm account for the majority (90%) of colonic polyps [3,10,11]. 60% and 70.5% of those polyps were neoplastic and in 0.5% and 1.5% advanced histological features were found, respectively [12]. Complete histological resection by forceps was found in only 31-90.7% of small polyps [13-15]. In contrast cold snare polypectomy for small polyps was safe and effective in nearly 100% [16,17].

According to the European Society of Gastrointestinal Endoscopy (ESGE) polypectomy guideline diminutive (≤ 5 mm) and small polyps (6-9 mm) should be removed by cold snare [18], whereas forceps can be used for polyps between 1 and 3 mm if snare polypectomy is technically difficult to perform. The usage of hot snare is recommended only for polyps between 10 and 19 mm [18].

The ESGE and United European Gastroenterology (UEG) recommend an appropriate removal technique of $>80\%$ [19]. Two surveys have shown that the endoscopic polypectomy technique is associated with the appearance and size of polyps and varies strongly between endoscopists [20,21]. A prior publication of the present cohort study revealed that 46% of all lesions were removed by using forceps, which was incongruous to the EU-Guideline of 2010 [22].

The aim of this study was to evaluate whether publication of clinical data or the guideline has more impact on improving resection techniques for polyps ≥ 5 mm.

Material and methods

The Austrian Certificate of Quality Colonoscopy Screening was launched by the Austrian Society of Gastroenterology and Hepatology (OEGGH) in cooperation with the Association of Austrian Social Security Institutions and Austrian Cancer Aid in 2007.

All specialists for internal medicine and surgeons can participate in the project, if they accomplish the conditions and quality standards of the OEGGH. Participating endoscopists had to perform a minimum of 200 complete colonoscopies and 50 polypectomies under supervision to apply. Further, a minimum of 100 ongoing complete colonoscopies and 10 polypectomies per year are required. More information about the project can be found in previous studies [23-25]. Written informed consent for data transmission was obtained by the participating endoscopists. This study was approved by the Ethics Committee of the Medical University of Vienna (EK 2081/2018).

Screening colonoscopies of all patients between 50 and 100 years and asymptomatic patients without positive history over 30 years, if they obtain screening character (e.g. fear of cancer) were included. All colonoscopies between 01.03.2017 and

31.03.2017, in which the guideline were sent to the participating endoscopists and all colonoscopies in which both, forceps and snare were used for the same polypectomy, were excluded.

Definition of the periods

Period 0 (07/2012- 12/2013) is defined as the time before a prior publication of our present cohort study on resection techniques.

Period 1 (08/2015-02/2017) is defined as the time between a prior publication of the present cohort study on resection techniques and the publication of the ESGE-Guideline.

Period 2 (04/2017-10/2018) is defined as the time after the publication of the ESGE-Guideline.

Statistical analysis

For categorical variables absolute and relative frequencies were used and all continuous variables are described by arithmetic mean and Standard Deviation (SD).

To compare the adherence to the ESGE-Guideline, the forceps removal rate (FRR), based on the endoscopists facility type, polyp's size (<5 mm, ≥ 5 mm, 5-10 mm, >10 mm) and morphology (flat, sessile, pedunculated) were analyzed for both, before (period 1 (P1): 08/2015-02/2017) and after (period 2 (P2): 04/2017-10/2018) the publication of the ESGE-Guideline. Furthermore, we compared the periods before (Period 0 (P0): 07/2012- 12/2013) and after (P1) the prior publication of clinical data of our present cohort study. The FRR is defined as the percentage of forceps polypectomies. Chi-Squared test was used to compare the results before and after the publications.

The confidence interval for all analyses was set at 95% and statistical significance was defined by p values ≤ 0.01 . Statistical analysis was performed using IBM SPSS Statistics version 25.0 and Microsoft Office Excel.

Results

Between 01.08.2015 and 30.09.2018 107,125 screening colonoscopies were performed. After exclusion, 90,279 (P1: 43,41; P2: 46,338) screening colonoscopies by 266 (P1: 230; P2:247) endoscopists were analysed. The mean age was 60.35 (SD 9.03) and 47.80% (n= 47,081) were female (Table 1).

74.44% (n= 198) of endoscopists work in private practices and 25.56% (n= 68) in hospitals. Practitioners in private practices have performed 80.15% (n= 72,363) of all colonoscopies and in hospitals 19.85% (n= 17,916). Overall, 80.86% (n= 25,833; P1:12,350; P2:13,483) of all detected polyps were resected by endoscopists in private practices and 19.14% (n= 6,115; P1:2,973; P2:3,142) in hospitals.

Polyp detection rate was 38.58% (n= 34,826) and the resection rate was 91.74% (n= 31,948). In P1, the detection rate of polyps was 38.08% (n= 16,731) and 91.58% (n= 15,323) of polyps were resected. In contrast, in P2 the polyp detection and resection rate were 39.05% (n= 18,095) and 91.88% (n=16,625), respectively. Regarding shape, 63.32% (n= 20,230) of resected polyps were sessile, 28.83% (n= 9,212) flat and 7.85% (n= 2,506) pedunculated. The polyps' size of all resected lesions are shown in Table 2.

Forceps was used in 73.04% (n= 23,336) of all polypectomies. In the first period forceps was the preferred polypectomy technique in 73.52% (n= 11,266) and in the second period in 72.60%

(n= 12,070). 10.84% (n= 3,462; P1:1,415; P2:2,047) of polyps were resected by cold snare and 16.12% (n= 5,150; P1:2,642; P2:2,508) by hot snare. Forceps resection was used in 28.00% (n= 2,521; P1:1,441; P2: 1,080) of all lesion ≥ 5 mm, which does not correspond to the ESGE-Guideline. In contrast, cold and hot snare was the preferred polypectomy technique for 24.93% (n= 2,245; P1:975; P2:1,270) and 47.07% (n= 4,238; P1:2,164; P2:2,074) of polyps ≥ 5 mm, respectively. Furthermore, forceps polypectomy was used in 90.72% (n= 20,815; P1:9,825; P2:10,990) of lesions < 5 mm and 49.73% (n= 2,398; P1:1,377; P2:1,021) of lesions between 5 and 10 mm. Further, 6.89% (n= 123; P1:64; P2:59) of polyps > 10 mm were resected by forceps. 5.30% (n= 1,217; P1:440; P2:777) of polyps < 5 mm, 28.60% (n= 2,065; P1:900; P2:1,165) of polyps 6-10 mm and 10.09% (n= 180; P1:75; P2:105) of polyps > 10 mm were resected by cold snare. Hot snare polypectomy was performed in 3.97% (n= 912; P1:478; P2:434) for lesions < 5 mm, 28.19% (n= 2,757; P1:1,432; P2:1,325) between 5 and 10 mm and 83.02% (n=1,482; P1:732; P2:749) > 10 mm (Table 2).

Based on the polyp morphology, 76.25% (n= 15,425) of sessile, 80.22% (n= 7,390) flat and 30.79% (n= 521) of pedunculated polyps were resected by forceps.

Comparison between period 1 and period 2

Forceps polypectomy for lesions ≥ 5 mm was used in 30.33% (n= 2,247; P1:1,284; P2:963), 171.8% (n= 274; P1:157; P2:117) by endoscopists in private practices and hospitals, respectively. Interestingly we only found a significant decrease of 3.12% (P1: 35.73 [95%CI: 30.03-41.42] vs. P2: 32.61% [95%CI: 27.15-37.96]) of the FRR in private practices, but a significant increase of 3.96% (P1: 20.62% [95%CI: 12.89-18.35] vs. P2: 24.58% [95%CI: 16.49-32.67]) in hospitals (both $p < 0.001$) (Figure 1).

Regarding polyps sized smaller than 5 mm, a significant decrease of the FRR was observed after the publication of the ESGE-guideline for both, hospitals and private practices ($p < 0.001$). Furthermore, the FRR for polyps between 5 and 10 mm decreased significantly among private practices but increased significantly in hospitals ($p < 0.001$). For polyps > 10 mm the FRR decreased significantly in hospitals ($p < 0.001$). In contrast, there was no difference in private practices before and after the publication of the ESGE guideline ($p = 0.912$) (Table 3).

Between P1 and P2 we found significant increases in both facilities for cold snare polypectomy for polyps < 5 mm, 5-10

mm, < 10 mm and ≥ 5 mm. In contrast we observed a significant decrease of the cold snare polypectomy rate for polyps > 10 mm in hospitals ($p < 0.001$) and no difference in private practices ($p = 0.742$) (Table 4).

For hot snare polypectomy we observed a significant decrease for polyps < 5 mm, 5-10 mm and ≥ 5 mm in both, hospitals and private practices (all $p < 0.001$). Regarding polyps > 10 mm, there was no difference between P1 and P2 in private practices ($p = 0.756$), but a significant increase in hospitals ($p < 0.001$) (Table 5).

Comparison between period 0 and period 1

Among polyps ≥ 5 mm we observed a significant decrease in the FRR of 16.85% (P1: 52.58 [95%CI %: 51.49-53.67] vs. P2: 35.73% [95%CI: 30.03-41.42]) and 2.13% (P1: 22.75% [95%CI: 20.97-24.61] vs. P2: 20.62% [95%CI: 12.89-28.35]) after the study publication in private practices and hospitals (both $p < 0.001$) (Figure 1).

Interestingly, the FRR for polyps < 5 mm decreased significantly in private practices ($p < 0.001$) but showed no differences in hospitals ($p = 0.002$). When comparing the FRR for polyps between 5 and 10 mm we found significant decreases for both, endoscopists in hospitals and private practices (both $p < 0.001$). For polyps > 10 mm there was no difference in hospitals ($p = 0.527$). In contrast the FRR decreased in private practices ($p < 0.001$) (Table 3).

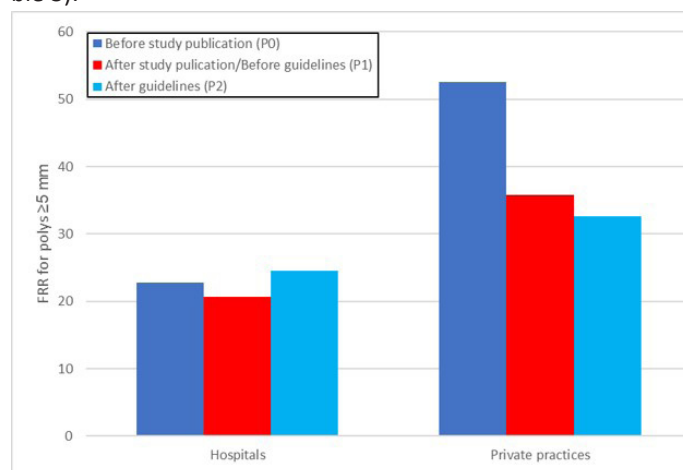


Figure 1: Forceps resection rates for polyps ≥ 5 mm by facilities before and after the publications of the study and the guideline.

Table 1: Patients characteristics.

Patients characteristics	All colonoscopies n=90,279	Period 1 n=43,941	Period 2 n=46,338
Female – no (%)	47,081 (52.15)	22,771 (51.82)	24,310 (52.46)
Male – no (%)	43,198 (47.85)	21,170 (48.18)	22,028 (47.54)
Mean age (SD)	60.35 (9.03)	60.19 (9.04)	60.49 (9.02)
Cecal intubation (%)	87,832 (97.29)	42,721 (97.22)	45,111 (97.35)
Sedation (%)	83,472 (92.46)	39,993 (91.02)	42,479(91.67)
Polyp detection rate (%)	34,826 (38.58)	16,731 (38.08)	18,095 (39.05)
Polyp resection rate (%)	31,948 (91.74)	14,323 (85.61)	16,682 (92.19)

Table 2: Polypectomy technique according on polyp size.

	Overall resection n=31,948	Forceps n= 23,336	Cold snare n= 3,462	Hot snare n= 5.150
≤5mm (%)	22,944 (71.82%) P1: 10,743 (46.82%) P2: 12,201 (53.18%)	20,815 (89.20%) P1: 9,825 (47.20%) P2: 10,990 (52.80%)	1,217 (35.15%) P1: 440 (36.15%) P2: 777 (63.85%)	912 (17.71%) P1: 478 (52.41%) P2: 434 (47.59%)
6-10mm (%)	7,220 (22.60%) P1: 3,709 (51.37%) P2: 3,511 (48.63%)	2,398 (10.27%) P1: 1,377 (57.42%) P2: 1,021 (42.58%)	2,065 (59.65%) P1: 900 (43.58%) P2: 1,165 (56.42%)	2,757 (53.53%) P1: 1,432 (51.94%) P2: 1,325 (48.06%)
>10mm (%)	1,784 (5.58%) P1: 871 (48.82%) P2: 913 (51.18%)	123 (0.53%) P1: 64 (52.03%) P2: 59 (47.97%)	180 (5.20%) P1: 75 (41.67%) P2: 105 (58.33%)	1,481 (28.76%) P1: 732 (49.43%) P2: 749 (50.57%)
≥5mm (%)	9,004 (28.18%) P1: 4,580 (50.87%) P2: 4,424 (49.13%)	2,521 (10.80%) P1: 1,441 (57.16%) P2: 1,080 (42.84%)	2,245 (64.85%) P1: 975 (43.39%) P2: 1,270 (56.61%)	4,238 (82.29%) P1: 2,164 (51.06%) P2: 2,074 (48.94%)

Table 3: Forceps resections rates (FRR) before and after both publications; RR, relative risk; CI, confidence interval.

	Period 0 (P0) (95%CI), %	Period 1 (P1) (95%CI), %	Period 2 (P2) (95%CI), %	RR (P0-P1) (95%CI), %	P-value (P0-P1)	RR (P1-P2) (95%CI), %	P-value (P1-P2)
<5 mm							
Overall	90.97 (90.54-91.40)	90.00 (87.64-92.37)	86.81 (84.05-89.58)	0.99 (0.98-1.00)	0.094	0.96 (0.95-0.97)	<0.001
Hospital	88.51 (87.46-89.49)	87.10 (82.93-91.27)	83.85 (78.54-89.16)	0.98 (0.97-0.99)	0.002	0.96 (0.95-0.97)	<0.001
Private Practice	98.01 (95.41-99.35)	91.18 (88.38-93.99)	88.51 (85.26-91.76)	0.93 (0.92-0.94)	<0.001	0.97 (0.96-0.98)	<0.001
5-10 mm							
Overall	51.41 (50.29-52.53)	36.00 (30.89-41.12)	33.46 (28.73-38.18)	0.70 (0.68-0.72)	<0.001	0.93 (0.90-0.97)	<0.001
Hospital	28.43 (26.19-30.76)	23.97 (15.20-32.74)	27.67 (18.99-36.35)	0.84 (0.82-0.88)	<0.001	1.15 (1.11-1.20)	<0.001
Private Practice	56.29 (47.99-64.34)	40.62 (34.40-46.83)	35.75 (29.98-41.52)	0.72 (0.70-0.74)	<0.001	0.88 (0.85-0.91)	<0.001
>10 mm							
Overall	32.38 (30.65-34.15)	8.68 (5.01-12.34)	8.05 (4.70-11.39)	0.27 (0.25-0.29)	<0.001	0.93 (0.89-0.96)	<0.001
Hospital	6.90 (4.93-9.34)	7.03(0.38-13.68)	4.30 (0.01-8.59)	1.02 (0.96-1.08)	0.527	0.61 (0.56-0.66)	<0.001
Private Practice	39.93 (37.86-42.02)	9.58 (5.02- 14.14)	9.57 (5.14-14.00)	0.24 (0.23-0.26)	<0.001	1.02 (0.68-1.55)	0.912
≥5 mm							
Hospital	22.75% (20.97-24.61)	20.62 (12.89-28.35)	24.58 (16.49-32.67)	0.91 (0.86-0.96)	<0.001	1.19 (1.13-1.26)	<0.001
Private Practice	52.58% (51.49-53.67)	35.73 (30.03-41.42)	32.61 (27.25-37.96)	0.68 (0.66-0.70)	<0.001	0.91 (0.89-0.94)	<0.001

Table 4: Cold snare resection rates before(P1) and after(P2) the publication of the ESGE guideline;

	Period 1 (P1) (95%CI), %	Period 2 (P2) (95%CI), %	RR (P1-P2) (95%CI), %	P-value (P1-P2)
<5 mm				
Overall	5.98 (4.11-7.86)	8.59 (6.27-10.91)	1.44 (1.36-1.52)	<0.001
Hospital	7.77 (4.73-10.80)	8.56 (4.56-12.55)	1.10 (1.06-1.15)	<0.001
Private Practice	5.15 (2.92-7.38)	8.12 (5.30-10.94)	1.58 (1.48-1.69)	<0.001
5-10 mm				
Overall	17.70 (14.07-21.23)	28.77 (24.45-33.08)	1.63 (1.56-1.70)	<0.001
Hospital	18.01 (10.97-25.06)	29.44 (20.22-35.65)	1.64 (1.57-1.71)	<0.001
Private Practice	17.50 (13.14-21.86)	29.08 (23.86-34.30)	1.66 (1.59-1.74)	<0.001

RR: relative risk; CI: confidence interval

>10 mm				
Overall	9.64 (5.63-13.65)	9.62 (5.86-13.38)	1.00 (0.98-1.02)	0.813
Hospital	4.80 (0.00-10.34)	3.34 (0.14-6.55)	0.70 (0.62-0.78)	<0.001
Private Practice	11.75 (6.52-16.97)	11.89 (6.79-16.99)	1.01 (0.94-1.09)	0.742
≥5 mm				
Overall	15.76 (12.49-19.03)	25.06 (21.25-28.86)	1.60 (1.52-1.68)	<0.001
Hospital	15.45 (9.37-21.53)	23.42 (15.50-30.34)	1.52 (1.44-1.60)	<0.001
Private Practice	15.86 (11.89-19.82)	25.81 (21.13-30.49)	1.63 (1.55-1.71)	<0.001
<10 mm				
Overall	8,54 (6.59-10.49)	12.52 (10.24-14.81)	1.47 (1.38-1.56)	<0.001
Hospital	10.33 (7.10-13.57)	13.62 (9.37-17.87)	1.32 (1.25-1.39)	<0.001
Private Practice	7.75 (5.42-10.07)	11.78 (9.06-15.50)	1.52 (1.42-1.62)	<0.001

Table 5: Hot snare resection rates before(P1) and after(P2) the publication of the ESGE guidelines.

	Period 1 (P1) (95%CI), %	Period 2 (P2) (95%CI), %	RR (P1-P2) (95%CI), %	P-value (P1-P2)
<5 mm				
Overall	10.00 (7.63-12.36)	4.59 (2.94-6.24)	0.46 (0.41-0.51)	<0.001
Hospital	12.90 (8.73-17.07)	7.59 (3.38-11.80)	0.60 (0.55-0.65)	<0.001
Private Practice	8.82 (6.01-11.62)	3.37 (1.67-5.07)	0.38 (0.35-0.42)	<0.001
5-10 mm				
Overall	46.00 (41.43-51.37)	37.78 (33.20-42.36)	0.82 (0.80-0.85)	<0.001
Hospital	58.02 (48.64-67.40)	43.89 (34.84-53.94)	0.76 (0.74-0.78)	<0.001
Private Practice	41.88 (35.82-47.95)	35.17 (29.73-40.62)	0.84 (0.82-0.86)	<0.001
>10 mm				
Overall	81.68 (76.43-86.93)	82.31 (77.54-87.08)	1.01 (1.00-1.02)	0.246
Hospital	88.17 (79.29-97.05)	92.36 (87.13-97.58)	1.05 (1.04-1.06)	<0.001
Private Practice	78.68 (72.01-85.26)	78.50 (72.20-84.80)	1.00 (0.98-1.01)	0.756
≥5 mm				
Overall	52.57 (47.74-57.39)	44.67 (40.25-49.08)	0.85 (0.83-0.87)	<0.001
Hospital	63.93 (55.42-72.44)	52.00 (43.43-60.57)	0.81 (0.79-0.83)	<0.001
Private Practice	48.41 (42.61-54.22)	41.58 (36.31-46.86)	0.86 (0.85-0.87)	<0.001

RR: relative risk; CI: confidence interval

Discussion

In this study we evaluated the preferred polypectomy techniques based on the polyp size and compared the results of our prior publication such as the results before and after the ESGE guideline for polypectomy. Our study indicates a strong variation in polypectomy techniques and that 73.04% (n= 23,336) of polyps any size, especially 28.00% (n= 2,521) of polyps ≥5 mm were still resected by forceps.

Although, the adequate polypectomy technique and complete polyp resection is important to reduce tissue recurrence and the risk of interval cancer, several studies have shown that forceps polypectomy is not uncommon and inferior to snare polypectomy [26-31]. Our study showed that 73.04% (n=23,336) of polyps any size, especially 90.72% (n= 20,825) of polyps <5mm

and 28.00% (n=2,521) of polyps ≥5 mm were resected by forceps which does not correspond to the guideline. In contrast only 5.30% (n= 1,217) and 28.60% (n= 2,065) of diminutive and polyps between 5 and 10 mm were removed by cold snare, respectively.

Interestingly, regarding facility type we observed a difference between hospitals (30.63%; n= 2,224) and private practices (17.26%; n= 272) for the usage of forceps in polyps ≥5 mm. After the publication of the ESGE guideline we found an opposite trend in the development of the FRR. In private practices the FRR significantly decreased by 3.12% (P1: 35.73% vs. P2: 32.61%) but increased by 3.96% (P1: 20.62% vs. P2: 24.58%) in hospitals. In comparison, the FRR decreased after period 0

in both, hospitals by 16.85% (P0: 52.58% vs. P1: 35.73%) and private practices by 2.13% (P0: 22.75% vs. P1: 20.62%) (Figure 1). Even if we have not observed a further decrease of the FRR in hospitals, we should not disregard that the FRR in hospitals is eventually much lower than in private practices. Several potential reasons for the variety between the facilities are that e.g. in hospitals there is a better access to education and training. Other important aspects were cost, lack of reimbursement and as often discussed time. Forceps polypectomy is cheaper, quicker and easier to apply than cold snare polypectomy (forceps polypectomy: 14.29 seconds vs. cold snare polypectomy 22.03 seconds, $p < 0.001$) [28,29]. Further reasons for the variety of polypectomy techniques are maybe the lack of knowledge, mis-sizing of polyps and that forceps polypectomy is a simpler technique.

For polyps any size the usage of cold snare increased by 3.08% (P1: 9.23%, $n = 1,415$ vs P2: 12.31%, $n = 2,047$), but decreased for hot snare by 2.15% (P1: 17.24%, $n = 2,642$; P2: 15.09%, $n = 2,508$). Regarding to the ESGE guideline, we found an increase of the adequate usage of cold snare polypectomy. Cold snare polypectomy increased between P1 and P2 in hospitals by 3.29% (P1: 10.33% vs. P2: 13.62%; $p < 0.001$) and in private practices by 4.03% (P1: 7.75% vs. P2: 11.78%; $p < 0.001$).

According to the adequate usage of hot snare 83.02% ($n = 1,481$) of all polyps > 10 mm were resected by the recommended technique. Interestingly, we found an opposite trend. In hospitals the usage of hot snare for polyps > 10 mm increased by 4.19% (P1: 88.17% vs. P2: 92.36%; $p < 0.001$) but no difference (P1: 78.68% vs. P2: 78.50%; $p = 0.756$) was found in private practices. All in all, with 68.31% (95%CI: 64.21-72.41) the mean appropriate polypectomy technique rate is a bit lower than the recommended value of $> 80\%$ by Kaminski et al. [19].

The study was limited due to the polyps only being subclassified in < 5 mm, 5-10 mm and > 10 mm, despite the guideline recommending a particular polypectomy technique for polyps sized between 1 and 3 mm. Furthermore, for each colonoscopy, only the polypectomy technique for the most advanced polyp is described. Strengths of our study are that data are available over a long period allowing to observe trends of the different polypectomy techniques. Furthermore, we have a high number of screening colonoscopies, polypectomies and endoscopists from different facilities.

Conclusion

In conclusion, we have investigated that still 28.00% ($n = 2,521$) of polyps ≥ 5 mm were resected by forceps, which does not correspond to the ESGE guideline. On the opposite already 68.31% (95%CI: 64.21-72.41) of polyps ≥ 5 mm were removed according to guideline, which is a huge improvement in a few years, showing great efficacy of quality improvement programs, publications of papers and the guideline and further need of implementations of such programs in all countries. Further, we observed a rising adherence for cold snare polypectomy in both facilities.

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