

A survey of colonoscopic polypectomy practice amongst Israeli gastroenterologists

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Abstract

Background Polypectomy techniques have been implicated as factors in the effectiveness of polyp resection. The range of polypectomy practices among gastroenterologists in Israel is unknown.

Methods A structured survey was sent to all Israeli gastroenterology departments in all 15 major academic hospitals and to 3 central outpatient clinics.

Results The survey was completed by 100 clinicians (45% contacted) derived from 13 of 15 academic centers (85%) and from all 3 outpatient clinics. Significant differences were noted in the preferred polypectomy for the resection of polyps 1-3 mm and 7-9 mm in diameter whereas for those polyps 4-6 mm in diameter, both the hot forceps and hot snare were most commonly used technique. Coagulation was employed in 42% of cases, pure cutting in 20% and blend current in 38% of cases. Narrow band imaging was used by 54% of practitioners, and only 33% of gastroenterologists regularly used dye spraying techniques. When removing pedunculated polyps >1 cm in diameter, 75% did not use any specific measures designed to prevent perforation or hemorrhage. Performance of >300 colonoscopies per year was associated with a greater use of dye spraying techniques and working in a hospital was more likely to be accompanied by clip deployment to larger polypectomy stalks as part of the procedure.

Conclusion Our results demonstrate considerable heterogeneity in the techniques used for removal of polyps <1 cm. Most practitioners do not regularly use advanced techniques for polyp detection or for the prevention of post-polypectomy bleeding.

Keywords Colonoscopic polypectomy, practice survey

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Introduction

Colonoscopic polypectomy effectively reduces the incidence of colon cancer [1-3]. Variations in performance techniques of polypectomy have been described with differences in their effectiveness [4-6] and in their complication rates [7-9] and with different techniques utilized to prevent complications in different sized polyps [10-12]. The major complications of polypectomy include immediate and delayed hemorrhage and perforation, particularly in those deemed to be of high risk [13,14]. Practice parameters of polypectomy techniques

amongst American gastroenterologists have been previously reported [15] along with reports of practice techniques in endoscopic mucosal resection [16], showing for polypectomy a predominance of hot and cold polypectomy techniques for small polyps between 1 and 3 mm in diameter and for electrosurgical snare resections in larger polyps between 7-9 mm in diameter. There is considerable variability of use of ancillary methods such as endoclips, epinephrine injection or submucosal saline injection for the resection of larger polyps [15]. No such similar study has so far been conducted in Israel. We herein report the first assessment of polypectomy practice techniques amongst Israeli gastroenterologists.

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Conflict of Interest: None

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Materials and methods

Two hundred and twenty fully trained gastroenterologists currently practice in Israel with most practicing in hospitals and in health maintenance organizations (HMOs). A structured survey based on that by Singh *et al* [15] was sent by mail to all Israeli Gastroenterology Departments in all of the

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major academic hospitals (n=15) and to 3 central busy HMO Gastroenterology clinics (Table 1). A designated lead clinician was allocated to deliver all questionnaires and to return the completed surveys. The National survey was conducted between January and November 2011 and acquisition and collation of data were approved by our local Institutional Review Board. Statistical analysis was performed using the SPSS for windows program (16.0; SSS Inc., Chicago, IL) with the Chi-square test and Fisher's exact probability test (where appropriate) for dichotomous variables and with p values <0.05 being reported as significant. Logistic regression analysis was conducted assessing type of practice, years in practice and colonoscopy volume per annum to determine if there was an independent association with favored polypectomy technique.

Results

The survey was completed by 100 clinicians (45% of all practicing gastroenterologists in Israel) derived from 13 of 15 academic centers (85%) and from all 3 HMO Gastroenterology clinics. Unfortunately, we did not get any completed surveys from 2 small size centers. We did not exclude any completed

Table 1 Survey questionnaire of polypectomy practice parameters (based on Singh *et al*) [15]

1. How many years have you been in specialist practice? (1-5 y, 6-10 y, 11-15 y, 16-20 y)
2. Approximately how many colonoscopies do you perform in a year? (<300, 300-600, >600)
3. Is your practice mainly in a hospital or a health maintenance organization?
4. What method do you most commonly use to remove polyps: 1-3 mm, 4-6 mm, or 7-9 mm in size? (Cold forceps, hot forceps, cold snare, hot snare, respectively for each polyp size)
5. What electrocautery current do you prefer for polypectomy? (Cutting, Coagulation, Blend)
6. Do you adjust the current type for the polyp size, location or morphology? (Y/N)
7. Have you ever used dye spraying (chromoscopy) or image enhancing techniques (narrow band imaging, NBI) in the evaluation of colonic polyps? (Y/N) Did it assist? (Y/N)
8. Do you take any routine precautionary measures to prevent bleeding from pedunculated polyps >1 cm in diameter? (Y/N) If yes, what technique is used (Clips, saline injection, adrenaline injection, colloid injection, endoloop)
9. Have you ever used submucosal saline injection? (Y/N)
10. Have you ever used clips on polypectomy stalks? (Y/N)
11. What measures do you take in the event of immediate post-polypectomy bleeding? (Saline injection, adrenaline injection, clip deployment, argon plasma coagulation)

Table 2 Techniques used for the excision of polyps. The number relates to total number of answers and percent (n=100)

	1-3 mm	4-6 mm	7-9 mm
Cold forceps	76	15	0
Hot forceps	9	30	6
Cold snare	7	10	4
Hot snare	3	25	86
Cold and hot snare	0	3	0
Cold and hot forceps	2	5	1
Cold snare and cold forceps	2	1	0
Hot snare and hot forceps	0	1	2
Hot forceps and cold snare	0	5	0
Cold or hot forceps and cold snare	1	4	1
Hot forceps and hot snare	0	1	0

questionnaire. All participating physicians were practicing gastroenterologists actively engaged in colonoscopic practice. Twenty-six percent had been in specialist practice between 1 and 5 years, 21% between 6-10 years, 13% between 11-15 years, 18% between 16-20 years and 22% for more than 20 years. Eighty-seven percent worked in academic hospitals with 86% performing >300 colonoscopies per annum and 50% performing >600 colonoscopies per year.

The techniques used for polypectomy are summarized in Table 2. Significant differences were noted in the preferred polypectomy techniques (cold forceps and hot snare, respectively) for the resection of polyps 1-3 mm and 7-9 mm in diameter. However, for polyps 4-6 mm in diameter, both the hot forceps and hot snare were most commonly used technique (30% and 25%, respectively), though no particular method was used more often than the other among the clinicians. When

Table 3 Techniques used for managing immediate post-polypectomy bleeding

Method	Percent (n=100)
Saline or adrenaline injection	14
Coagulation or argon plasma	5
Clip	9
Saline or adrenaline injection and coagulation or argon plasma	27
Saline or Adrenaline injection and clip	16
Argon plasma and clip	2
Saline or Adrenaline injection and coagulation or argon plasma and Clip	27

electrosurgical current was used, coagulation was employed in 42% of cases, pure cutting in 20% and blend current in 38% of cases. Most clinicians did not adjust the electrosurgical current for differences in polyp morphology (78%), polyp size (65%) or polyp location (75%). Narrow band imaging or other image-enhancing techniques were used by 54% of practitioners, being judged as clinically useful by only 32% of regular users. Only 33% of gastroenterologists regularly used dye spraying techniques in their endoscopic practice. When removing pedunculated polyps >1 cm in diameter, 75% did not use any specific measures designed to prevent perforation or hemorrhage. For those who did employ ancillary measures,

the mainstay of use was epinephrine (39%) and saline injection (35%). Fifty-eight percent confirmed that they used at least one preventative clip on polyp stalks after polypectomy, however, only 10% questioned used this method routinely.

In the event of post-polypectomy hemorrhage, most clinicians used combined techniques to stop bleeding with most employing adrenaline and/or saline injection (Table 3). Multiple logistic regression (Table 4) showed that in those practicing >10 years there was association with a greater likelihood of using pre-polypectomy measures in order to prevent post-polypectomy hemorrhage (OR=2.4; 95%CI 1-5.7; P=0.05). Performance of >300 colonoscopies per annum

Table 4 Association of practice type, years in practice, and annual colonoscopy volume with polypectomy practices

Predictor	OR	95%CI	p value
Current change due to polyp morphology			
Hospital practice vs. HMO	5.4	0.6-45	0.15
Years in practice	0.9	0.4-2.1	1
Colonoscopy volume	0.6	0.15-2.5	0.7
Current change due to polyp location			
Hospital practice vs. HMO	3.3	0.4-28	0.44
Years in practice	1.26	0.5-3.3	0.8
Colonoscopy volume	1.1	0.2-6	1
Take routine measures to prevent bleeding			
Hospital practice vs. HMO	0.17	0.02-1.4	0.15
Years in practice	2.4	1-5.7	0.05
Colonoscopy volume	1	0.3-3.7	1
Submucosal saline injection			
Hospital practice vs. HMO	4	0.7-24	0.15
Years in practice	1.15	0.2-5.4	1
Colonoscopy volume	0.9	0.1-8	1
Clip deployment on polyp stalk			
Hospital practice vs. HMO	9.3	1.8-47	0.003
Years in practice	0.5	0.2-1.8	0.14
Colonoscopy volume	2.9	0.8-10	0.1
Use of narrow band imaging			
Hospital practice vs. HMO	0.8	0.2-2.9	0.7
Years in practice	1	0.43-2.3	1
Colonoscopy volume	1.26	0.4-4.2	1
Dye spraying			
Hospital practice vs. HMO	0.7	0.2-2.7	0.7
Years in practice	1.1	0.4-2.6	0.8
Colonoscopy volume	7.2	0.9-58	0.005

HMO, health maintenance organization; OR, odds ratio; CI, confidence interval

was associated with a greater use of dye spraying techniques (OR=7.2; 95%CI 0.9-58; P=0.05) and working in a hospital was more likely to be accompanied by clip deployment to larger polypectomy stalks as part of the procedure (OR=9.3; 95%CI 1.8-47; P=0.003).

Discussion

This is the first National report of Israeli gastroenterology practice concerning colonoscopic polyp detection and polypectomy. It shows considerable heterogeneity in the techniques used for removal of polyps <1 cm where the greatest diversity was found in the method used for the excision of polyps 4-6 mm in diameter. In the event of immediate post-polypectomy hemorrhage, most gastroenterologists use a combination of measures including the submucosal injection of either saline or adrenaline. Most do not regularly use advanced techniques for polyp detection or for the prevention of post-polypectomy bleeding.

Data from the present survey indicate that forceps are the most commonly employed method for the removal of polyps ranging from 1-6 mm in diameter with their occasional use for the removal of larger polyps between 7 and 9 mm in size. A high incomplete resection rate (up to 61%) has been reported with this technique [17,18], whereas a study by Tappero *et al* has shown that a snare never left behind residual polyp tissue when used for diminutive polyps when compared with a cold forceps technique [19] particularly when the latter technique was employed in a piecemeal fashion [20]. The cold forceps polyp removal technique is the simplest method available and the most commonly used practice in our study cohort, being the procedure of choice in other reports for polyps between 1 and 3 mm in diameter [15]. Although the advantages of this simple technique include the avoidance of electrocautery and the negligible risk of perforation, bleeding in the area following the initial bite may obscure the polypectomy field increasing the risk of leaving a residual polyp behind. Therefore, this technique would seem inadequate even for the complete resection of diminutive polyps.

The use of coagulation and blended electrocautery for polypectomy was common in our study cohort, mostly for polyps >4 mm, whether by the use of hot forceps or a hot snare in accordance with recommended guidelines [21]. Pure coagulation current is associated with a higher risk of delayed post-polypectomy hemorrhage whereas pure cutting or blended current is more often associated with immediate bleeding [22]. In this respect, pure cutting current use for polypectomy has been discouraged by the European Society of Gastrointestinal Endoscopy [23,24]. The risks of polypectomy are almost entirely related to electrocautery use, since electrical burning is relatively uncontrolled, causing transmural injury and potentially resulting in perforation. Few reports confirm the hazards of hot biopsy forceps use, particularly in the right colon [25,26]. Recently even in diminutive polyps <6 mm in diameter hot biopsy has somewhat fallen out of favor where

there is a moderate rate of residual polyp tissue left behind when compared with either a cold or a hot snare [27].

Given the low probability of cancerous transformation of diminutive polyps, the safety of endoscopic resection is the main priority where the use of hot forceps for excision of polyps should be limited to polyps <5 mm in size [21,24]. For larger polyps exceeding 1 cm in diameter, snare polypectomy is the preferred method [15] where the cold snare has been found to be superior to the hot snare in removing small polyps in terms of procedural time and the incidence of post-procedural abdominal pain [28]. Consequently, the cold snare is recommended as the first-line technique for the removal of diminutive and small polyps where the safety of this method has been demonstrated even in patients taking anti-aggregant and anticoagulant therapy [29,30]. Larger polyps or those deemed to be difficult to resect by virtue of their size, shape or location may require specialized techniques particularly designed to reduce post-polypectomy hemorrhage or perforation [31]. Post-polypectomy bleeding is more likely in polyps exceeding 15 mm in size, those with thick stalks >5 mm and in sessile or malignant polyps [32]. Post-polypectomy perforation carries a higher risk where there are prolonged electrocautery times, where larger polyps are removed, where piecemeal resection of sessile polyps is conducted or in cases where cecal polyps are resected [33].

Standardized preventative methods to avoid post-polypectomy bleeding were utilized in these polyps more commonly by experienced gastroenterologists whose specialist practice exceeded 10 years. In this respect, submucosal injection prior to excision of large sessile polyps has been shown to substantially reduce the risk of both post-polypectomy perforations and hemorrhage [34-36]. Our study showed infrequent utilization of this preventative method where its use did not correlate with clinical experience, colonoscopic workload volume or the primary place of endoscopic work. Furthermore, the deployment of clips for large polyp stalks was infrequent in our study cohort, although more common amongst gastroenterologists working in public hospitals. Endoclipping may be followed by snare excision which has been shown to be safer than conventional polypectomy in selected patients with large pedunculated polyps [10].

Conventional white-light colonoscopy has a moderate polyp miss rate ranging from between 1-25%, particularly when the polyps are small and non-adenomatous [37,38]. Enhanced polyp detection and classification methods include high definition colonoscopy [39], chromoendoscopy, and narrow band imaging (NBI) [40]. Chromoendoscopy demonstrates polyp architecture and vascular pattern enhancing polyp detection [41]; however, it is time consuming and does not permit ready switching between the conventional and chromoendoscopy images. NBI highlights surface and vascular architecture and is more useful in the differentiation of hyperplastic from adenomatous polyps, although it does not improve the adenoma detection rate [42]. Both techniques were performed infrequently by our study cohort, possibly consequent upon the variably reported value of NBI despite being available on most modern colonoscopes as well as time

Summary Box

What is already known:

- Colonoscopic polypectomy effectively reduces the incidence of colon cancer
- Variations in performance techniques of polypectomy have been described with differences in their effectiveness and in their complication rates
- A predominance of hot and cold polypectomy techniques for small polyps between 1 and 3 mm in diameter and for electrosurgical snare resections in larger polyps between 7-9 mm in diameter was described in American gastroenterologists

What the new findings are:

- Amongst Israeli gastroenterologists, a considerable heterogeneity in the techniques used for removal of polyps <1 cm where the greatest diversity was found in the method used for the excision of polyps 4-6 mm in diameter
- Most gastroenterologists use a combination of measures including the submucosal injection of either saline or adrenaline in the event of immediate post-polypectomy hemorrhage
- Most gastroenterologists do not regularly use advanced techniques for polyp detection or for the prevention of post-polypectomy bleeding

constraints in colonoscopic lists and relative lack of familiarity with the method.

In summary, colonoscopic polypectomy is evolving in Israel with clinicians needing to be proficient in ancillary endoscopic techniques for the management of difficult colonic polyps. This first survey of Israeli gastroenterologists found that there is a variable use of techniques for polyp excision with only the occasional use of advanced techniques for polyp detection and for the prevention of complications. The reasons for this high variability in polypectomy techniques are unclear; however, it may reflect the lack of a standardized National polypectomy protocol, time constraints within busy endoscopic workload lists limiting specialized techniques, the high cost of advanced endoscopic enhancement systems and minimal local data concerning their clinical benefit in polyp detection and differentiation.

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