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GASTROINTESTINAL ENDOSCOPY

Endoscopic snare excision of "giant" colorectal polyps

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Background: **Endoscopic treatment of giant colorectal polyps remains controversial because of concerns regarding coexistent malignancy, incomplete resection, and safety.**
Methods: **We reviewed the clinical course after removal of 176 benign-appearing large (>3 cm) colorectal polyps, which were removed by endoscopic snare resection in 170 patients. These were termed "giant" polyps. Sessile polyps (n = 129) were removed piecemeal and pedunculated polyps (n = 47) transected at the stalk.**
Results: **Bleeding was the only complication in 24% of polypectomy procedures (procedural in 58, immediate in 3, delayed in 6 patients). Except for one conservatively treated delayed bleed, all bleeds were treated endoscopically. Histology of resected polyps showed coexistent malignancy in 12%. Eight patients had malignant polyps that met "unfavorable" criteria and underwent surgery. Following complete endoscopic resection, 16 patients were lost to follow-up and 124 patients had follow-up of at least 6 months (117 benign and 7 "favorable" malignant polyps). Nineteen patients with benign polyps developed recurrences (18 benign, 1 malignant); one patient with a favorable malignant polyp had a malignant recurrence and underwent surgery.**
Conclusion: **Endoscopic resection of benign-appearing giant colorectal polyps is feasible and safe. Complete excision is possible in patients with benign and favorable malignant polyps, but recurrence rates are high. Close surveillance to detect and treat recurrence is required. (Gastrointest Endosc 1996;43:183-8.)**

Although endoscopic polypectomy is now an established procedure, the treatment of large polyps is still preferentially surgical, mainly because of concerns regarding procedural risk, the possibility of inadequate removal, and an increased risk of coexistent malignancy. Large sessile polyps in particular are believed to be the most difficult and dangerous to remove owing to the need for piecemeal excision.

Few reports over the past years have evaluated the endoscopic treatment of large polyps. To assess the technical feasibility, efficacy, and safety of endoscopic removal in large polyps, we performed a prospective study of endoscopic snare resection for pedunculated and sessile polyps greater than or equal to 3 cm in size, which we have labeled "giant" polyps.

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MATERIAL AND METHODS

Over an 8-year period (July 1985 to October 1993), 170 patients with benign-appearing colorectal polyps on colonoscopy 3 cm or larger were included in this study. Polyps were judged to be benign if endoscopic inspection and instrumental palpation showed absence of ulceration, induration, or friability. The age range was 3 to 90 (mean, 66 years). The majority of patients had undergone colonoscopy (n = 124) or air contrast barium enema studies (n = 23) prior to referral to our department, a tertiary care center for therapeutic endoscopic procedures.

Patients were prepared for colonoscopy in the standard

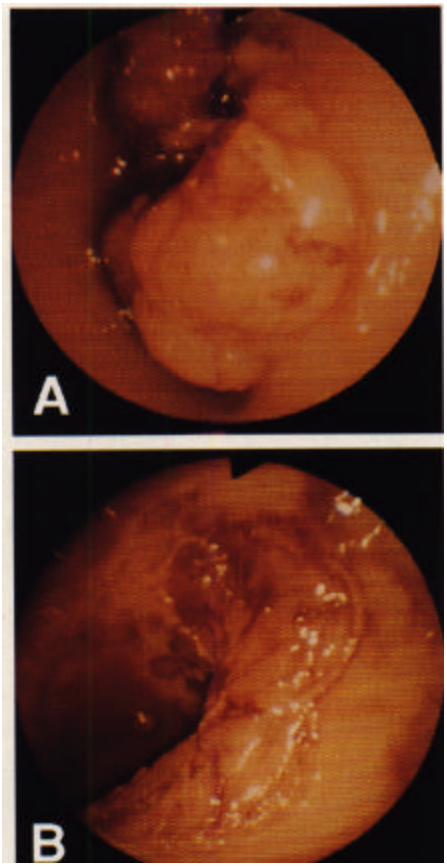

Figure 1. (A) Endoscopic view of a 5 cm multilobulated sessile polyp engulfing a haustral fold. (B) Exposed muscularis propria after snare polypectomy.

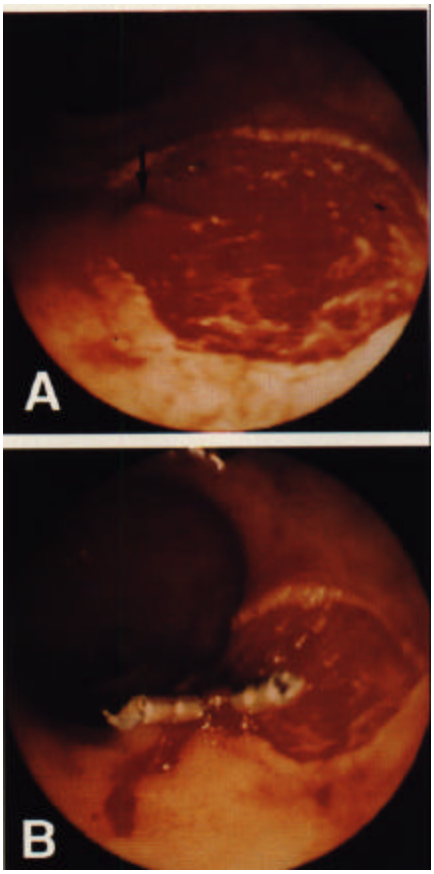

Figure 2. Endoscopic views showing (A) pulsatile bleed (arrow) after polypectomy and (B) complete hemostasis achieved with two hemoclips.

manner by oral colonic lavage and a laxative. Sedation, if necessary, was achieved with a benzodiazepine, occasionally in combination with an opiate. Colonoscopy was performed with the Olympus ITL, lOL, or V10L instrument (Olympus Optical Co., Tokyo, Japan). All polyp resections were performed with a K. Storz polypectomy snare (Tuttlingen, Germany, oval-shaped, 4 x 3 cm loop size, monofilament wire). Electrocautery was applied after appropriate grounding with either an Erbotom T 300 B cautery unit (Erbe Co., Tuebingen, Germany) or Elektrotom 400 (Martin Co., Tuttlingen, Germany) using pure coagulating current at settings of 4.5 (70 watts at 300 Ohm resistance) and 2.6 (25 watts at 300 Ohm resistance), respectively. All procedures were performed on an outpatient basis with the option of hospital admission for postprocedural observation at the discretion of the endoscopist based on technical difficulty of resection, complications, and associated medical conditions.

Polyp size was measured in relation to the opened polypectomy snare. Pedunculated polyps were transected at the stalk just below the polyp head. Complete ensnarement of the head portion with a single application of the snare was first attempted; if this failed, the polyp was trimmed piecemeal until the snare could be maneuvered around the polyp. Before polypectomy, dilute epinephrine (a single injection of 3 to 5 cc at a concentration of 1:20,000) was injected into the base of the stalk as a prophylactic measure to prevent postpolypectomy bleeding. Sessile polyps were resected in a piecemeal fashion. These polyps were shaved off' from the colonic wall along with the mucosa and submucosa. The open snare was pressed flatly against the bowel wall and then gradually closed, with precautions taken to capture only tissue targeted for resection. The ensnared tissue was lifted away from the underlying bowel wall and short, intermittent bursts of cautery were applied as the snare was fully closed. The desired resection depth was achieved if the muscularis propria layer was exposed after resection (Fig. 1). Resection was begun at a portion of the polyp that was easily accessible and relatively level, then cautiously extended to adjacent portions of the polyp along the muscularis propria plane. Remnant adenomatous tissue that could not be ensnared was fulgurated with a monopolar coagulation probe. All resected material was retrieved for histologic examination.

Bleeding was defined as "procedural" if it occurred during polypectomy, "immediate" if it occurred within 24 hours of polypectomy, and "delayed" if it occurred more than 24 hours after completion of the endoscopic procedure. Procedural bleeding was recorded as a complication if endoscopic hemostasis was required to secure complete hemostasis. Between 1985 and 1990, bleeding was treated by injection therapy (dilute epinephrine in a concentration of 1:20,000 with or without 1% polidocanol), or thermal coagulation using

Table 1.
Distribution of polyp size (N =176)

Size	Sessile		Pedunculated	
	(n)	(%)	(n)	(%)
3-4 cm	52	40	29	62
4-5 cm	30	23	14	30
5-6 cm	19	15	-	-
>6 cm	28	22	4	8

Table 2. Number of sessions required for complete polypectomy (N = 176)

Sessions	Sessile	Pedunculated
(n)	(%)	(%)
1	52	96
2	26	4
3	14	-
>4	8	-

a monopolar coagulation probe. After 1990, hemoclips (Olympus Optical Co., Hamburg, Germany) were employed for hemostasis, either alone or in combination with injection therapy (Fig. 2), as described previously.[1]

If multiple sessions for complete polypectomy were required, these were scheduled at 3- to 4-week intervals. Polypectomy of benign polyps was termed complete if a follow-up endoscopic examination showed no macroscopic evidence of residual adenomatous tissue. After complete resection, patients with benign polyps underwent endoscopic surveillance at 3, 6, and 12 months, and then annually. Patients with malignant polyps were categorized as "unfavorable" or "favorable" based on their histologic features. Poorly differentiated malignancies and malignancies demonstrating obvious invasion of the submucosa were classified as unfavorable and referred for surgical resection. Focal, welldifferentiated malignancies with no lymphatic or vascular invasion were classified as favorable and subjected to endoscopic resection with curative intent. They were subjected to the same endoscopic surveillance as benign polyps. In addition to visual inspection of the resection site, multiple biopsies were obtained to confirm absence of residual or recurrent tumor. Polypectomy of favorable malignant polyps was termed complete if a follow-up endoscopic examination showed no macroscopic or microscopic evidence of residual adenomatous tissue.

If recurrence was suspected on a follow-up endoscopic examination, the tissue was resected with the snare and submitted for histopathologic examination. Lesions that were too small to be ensnared were biopsied and subsequently fulgurated with a monopolar coagulation probe. Recurrence was defined as histologically confirmed adenomatous tissue growth at the site of prior snare polypectomy after complete removal.

RESULTS

In all, 176 colorectal polyps were removed in 170 patients, including 129 sessile polyps and 47 pedunculated polyps. The rectosigmoid region was the most

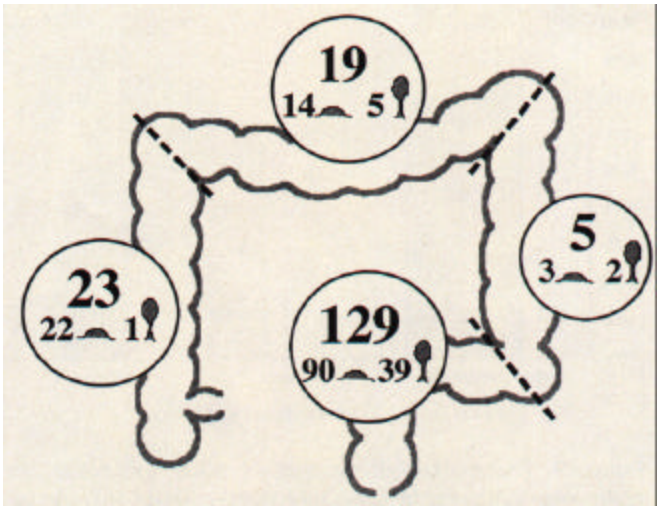

Figure 3. Distribution of pedunculated and sessile colorectal polyps.

Table 3.
Incidence of postpolypectomy bleeding

Polyp type	Polypectomy sessions	Bleeding episodes		
		Procedural	Immediate	Delayed
Pedunculated	49 (n = 47)	11 (n = 11)	0	1 (n = 1)
Sessile	246 (n = 123)	50 (n = 47)	3 (n = 3)	5 (n = 5)
Total	295 (n = 170)	61 (n = 58)	3 (n = 3)	6 (n = 6)

N = no. of patients.

common site for both sessile and pedunculated polyps, followed by the right colon for sessile and the transverse colon for pedunculated polyps (Fig. 3). Distribution of polyp size for sessile and pedunculated polyps is shown in Table 1. The number of sessions required for complete polypectomy of sessile and pedunculated polyps is shown in Table 2. Among sessile polyps, there was a correlation between polyp size and the number of sessions required for complete polypectomy (63% of polyps measuring 3 to 4 cm could be removed in a single session, whereas 65% of polyps measuring 6 to 8 cm required multiple sessions).

Bleeding was the only complication and occurred in 24% of polypectomy procedures in 67 patients (Table 3). Bleeding was procedural in 87%, immediate in 4%, and delayed in 9% (range, 1 to 3 days). With the exception of one delayed bleed that was treated conservatively in an outlying hospital, all bleeding episodes were treated endoscopically in our department and resulted in definitive hemostasis. To achieve hemostasis, the average volume of epinephrine injected was 10 cc and the average number of hemoclips applied was 3 (range, 1 to 10). None of the procedural bleeds were severe enough to warrant a blood transfusion, and only one patient was hospitalized, after a spurting bleed that was arrested with hemoclips. Six patients with immediate and delayed bleeds were admitted

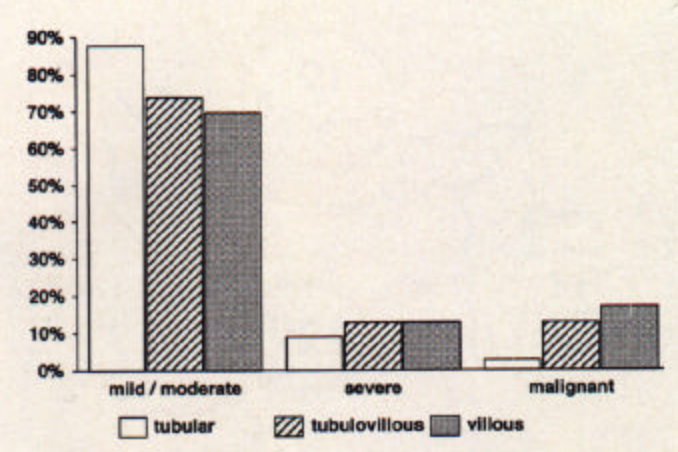

Figure 4. Comparison,of dysplasia grades and coexistent malignancy in tubular (n = 35), tubulovillous (n = 118), and villous polyps (n = 23).

to the hospital; two patients were given blood transfusions.

One patient was admitted to the hospital for monitoring to rule out perforation following difficult removal of a sessile 4 cm polyp. This was not confirmed and the patient was discharged 3 days later following an asymptomatic hospital course.

Histology of resected polyps revealed tubular, tubulovillous, and villous architecture in 20%, 67%, and 13%, respectively. Mild-to-moderate and severe dysplasia was found in 76% and 12% of polyps, respectively. Coexistent malignancy (including carcinoma in situ) was found in 12% of polyps. Sessile and pedunculated polyps showed no significant differences in the architecture findings, dysplasia grades, or presence of coexistent malignancy. Comparing polyps with tubular, tubulovillous, and villous architecture, there were no significant differences in the dysplasia grades or presence of coexistent malignancy (Fig. 4).

Of the 15 patients with malignant polyps, 8 had polyps that fulfilled the unfavorable criteria. This subgroup underwent surgery. None of the patients had nodal metastases; residual tumor was found in the surgical specimens of 3 patients.

Follow-up of at least 6 months (median, 20 months; range, 6 to 89) was available at the time of data analysis in 124 of 162 patients (76%) who underwent complete endoscopic resection of benign polyps or malignant polyps with favorable histology. We felt that a minimum follow-up of 6 months was necessary to provide meaningful information regarding polyp recurrence. Of the 38 patients with less than 6 months of follow-up, 16 were lost to follow-up after snare polypectomy and the remainder were patients who had not been in the study long enough to accrue more than 6 months' follow-up data. Twenty-four of those 38 patients had sessile polyps.

Of the 124 patients with at least 6 months of followup, 117 had histologically benign polyps. Nineteen (16%) developed macroscopic recurrence at the resection site. Repeat endoscopic snare excision showed benign adenomatous growth in all but one patient, who was found to have a moderately differentiated adenocarcinoma in the rectum. This patient underwent surgical resection, which revealed a small tumor focus limited to the submucosa (pT1, N0, MO). Three of the 18 patients with benign recurrences have had at least one additional benign recurrence and have been retreated endoscopically.

The remaining seven patients with at least 6 months of follow-up had malignant polyps that fulfilled the favorable criteria as outlined previously. Five patients have had no recurrence during a mean follow-up of 24 months and two had malignant recurrences. One patient had surgery and the resected specimen showed a tumor growth limited to the submucosa without nodal metastases (pT1, N0, MO). The other patient was 86 years old and in poor health and therefore did not undergo further treatment. The patient expired of metastatic disease 3 years after endoscopic polypectomy.

DISCUSSION

In this study we found endoscopic excision of colorectal polyps measuring 3 cm or more, including 129 sessile and 47 pedunculated polyps, to be technically feasible and safe. Most pedunculated polyps (92%) were between 3 and 5 cm in size, whereas one fifth (22%) of all sessile polyps were larger than 6 cm. All polyps could be completely excised endoscopically.

Pedunculated polyps were transected at the stalk and could usually be ensnared in one piece. Only two patients required a second session to completely remove a pedunculated polyp. By contrast, all sessile polyps required removal in multiple pieces of 1 to 1.5 cm using the piecemeal technique described by Wolff and Shinya.[2] Complete removal required more than one session in approximately half (48%) the cases.

Several authors have reported on the endoscopic removal of large polyps.[3-6] In the majority of these studies, "large" was defined as equal to or greater than 2 cm. In a study of 80 consecutively encountered large sessile polyps measuring 2 to 6 cm, Christie et al.3 found that 47 polyps (58%) were amenable to endoscopic resection. Using the piecemeal technique, Nivatvongs et a1.[4] similarly reported on the removal of 28 large sessile polyps measuring 2 to 6 cm. Walsh et a1.[5] retrospectively reported the removal of 132 large sessile polyps with a mean size of 3.0 cm. Only one studys has reported on the removal of polyps equal to or greater than 3 cm; in it, 66 of 88 large polyps (75%) encountered on colonoscopy were amenable to endo-

scopic resection (66% of the excised polyps were sessile).

Bleeding was the only procedure-related complication seen in our study and it occurred in 24% of polypectomy procedures for both sessile and pedunculated polyps. Other authors have reported lower bleeding rates following endoscopic removal of large rectocolonic polyps. Nivatvongs et a1.[4] reported one case of delayed bleeding in their study of 28 patients; Walsh et al.[5] reported procedural and delayed bleeding in 10 of 132 (7.6%) polypectomies; and Bedogni et al.[6] reported procedural bleeding in 2 of 66 patients with colorectal polyps equal to or greater than 3 cm. The higher rate of bleeding observed in our study might be explained by a more liberal definition of bleeding. According to the study protocol, any procedural bleeding that required endoscopic treatment to secure a dry operative field was recorded as a complication. This included slight oozing if it was not self-limited during the procedure. All bleeding episodes in our study were controlled by endoscopic intervention alone.

On histologic examination, 12% of resected polyps demonstrated coexistent malignancy. Other authors[3-5] have reported higher rates of coexistent malignancy for endoscopically resected large polyps, ranging from 23% to 51%. The lower incidence in our study might be explained by differences in patient selection. Because our department is a referral center for therapeutic endoscopy, patients were preselected for endoscopic treatment based on diagnostic colonoscopy or barium enema findings at the referring institution or practice. At colonoscopy in our department, we evaluated polyps visually and by instrumental palpation for features suggestive of malignancy. Polyps suggestive of malignant involvement were excluded from this study. The relatively low rate of coexistent malignancy found would appear to validate our selection of patients for endoscopic management based on endoscopic features alone.

Several studies[7-12] have reported a correlation of malignant potential with polyp size, histology, and macroscopic growth pattern. The incidences of both severe dysplasia and invasive carcinoma have been found to increase with larger polyp size, villous architecture, and sessile growth. It is noteworthy that we did not find giant villous adenomas and sessile polyps to have significantly higher incidences of malignancy compared to tubular adenomas and pedunculated polyps, respectively.

Piecemeal resection of sessile polyps raises concerns regarding complete removal of adenomatous tissue because it cannot be verified histologically. We relied on the visual appearance of the polypectomy site to assess complete polyp removal. In this context the technique we used to resect sessile polyps deserves emphasis. We shaved off adenomatous tissue along with the submucosa in a radical fashion to expose the muscularis propria layer. The resected margins and any residual foci of adenomatous tissue were then fulgurated with electrocautery. Polypectomy was judged complete if no residual foci of adenomatous tissue were seen on the follow-up examination. Biopsies confirmed the absence of residual tumor if histologic examination of the resected polyp showed coexistent malignancy meeting favorable criteria.

We treated malignant polyps that met favorable criteria in the same fashion as benign polyps. This strategy was based on previous studies that have demonstrated a very low risk of residual tumor and nodal metastases for polyps fulfilling favorable criteria.[13-17] In a review of the literature, Waye[18] estimated the risk of residual tumor or nodal metastases for pedunculated and sessile malignant polyps meeting favorable criteria to be 0.3% and 1.5%, respectively. This risk must be offset against a 0.2% to 2% risk of elective colon surgery, which increases with age (4.4% for patients over 70).[18-20] Patients with rectal lesions may require an abdominoperineal resection, which increases the surgical risk and imposes the inconvenience of a permanent colostomy.

The results of this study suggest that favorable malignant polyps may be cured by endoscopic resection. Of 7 patients who had favorable malignant polyps, 5 have remained free of recurrence during a mean follow-up of 24 months. However, larger patient numbers and longer follow-up are both required before conclusions regarding the curative potential of endoscopic treatment in this subgroup of patients can be made. Until these data are available, endoscopic resection of favorable malignant polyps with curative intent should be restricted to patients who are unfit for surgery.

Endoscopic treatment of benign giant polyps appears to be an effective alternative to surgery. The recurrence rate is high (16%), but recurrences could be retreated endoscopically. Of 117 patients with a mean follow-up of 20 months following removal of benign polyps, only one developed a malignant recurrence. The risk of malignant recurrence in the long term remains unknown and will need to be addressed in future studies.

We conclude that large size and sessile growth should not be a deterrent to endoscopic excision of benign-appearing polyps. This study lends further support to earlier studies, which have demonstrated the technical feasibility and safety of endoscopic treatment of large or giant polyps. The recurrence rate of benign polyps was found to be high; hence, regular and strict endoscopic surveillance is mandatory in patients selected for endoscopic treatment. The resection of malignant polyps fulfilling favorable criteria merits

consideration as a potentially curative procedure in patients who are unfit for surgery.

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