

Technique Note

Clinical Outcomes of Polypectomy and Colectomy: Management of Malignant Colorectal Polyps

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Key Words

Malignant polyps;
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Colectomy

Purpose. This study was designed to evaluate the outcomes of patients treated for malignant colorectal polyps by polypectomy or colectomy.

Materials and Methods. From January 2000 to December 2008, we followed the survival outcomes of 67 patients (37 men and 30 women) who had received either polypectomies or colectomies to treat malignant colorectal pedunculated or sessile polyps.

Results. Twenty-nine of the 67 patients had pedunculated polyps, all of which were removed colonoscopically. Thirteen of these 29 patients received subsequent colectomies. Thirty-eight patients had sessile polyps, all of which were removed colonoscopically. Seventeen of the 38 patients had subsequent colectomies. We followed these patients from 2 years to 5 years (median 3 years). Patients in the colectomy and the polypectomy groups had 100 percent two-year survival rates. However, as time passed, of these patients who had received colectomies, one with pedunculated lesion (3.3%) was diagnosed with carcinomatosis four years from initial colonoscopy. Among those who had received polypectomies only, three (8.1%) were found to have distant metastasis: two with sessile lesions were found to have liver metastasis two years later and one with pedunculated lesion found to have lung metastasis died three years later.

Conclusion. Based on our experience, patients who received operative management had better long-term results than those managed by polypectomy alone because of the lower distant metastasis rate (3.3%) and the decreased possibility of lymph node metastasis in malignant sessile lesions.

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Colorectal cancer is the third leading cause of cancer mortality in Taiwan, with more than 4,500 people dying of this disease in 2009.¹ Malignant colorectal polyps represent the majority of early colorectal cancers. The term “malignant polyp” refers to a macroscopically benign appearing adenoma in which the invasive carcinoma is detected after his-

tologic examination of the resected specimen. The muscularis mucosa must be breached to be defined as malignant. Colorectal polyps, both malignant and benign, can be removed via colonoscopy. However, it is not known which is the better treatment for polyps found to be malignant, polypectomy alone or polypectomy plus colectomy. To answer this question, we

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followed the survival and treatment outcomes of 67 patients with malignant colorectal polyps who had been treated by polypectomy alone or polypectomy plus colectomy from 2 years to 5 years.

Materials and Methods

From January 2000 to December 2008, 67 patients (mean age 63.6 years; range 25 to 85 years) were diagnosed with malignant colorectal polyps at our hospital. Thirty-seven patients received polypectomies and the remaining thirty were treated with further colectomies. We followed up these patients from 2 years to 5 years (median 3 years). Patients whose polyps were treated by colonoscopy alone received a colonoscopic examination of the polypectomy site at 6 months followed by an annual double-contrast barium enema or colonoscopy for an additional 2 years. In addition, they received biannual serial serum CEA measurements as well as an abdominal sonography or CT scan and a chest X-ray. Those who received further colectomies were followed in the same way.

Results

Thirty-eight (56.7%) of the 67 malignant polyps were sessile, and twenty-nine (43.3%) were pedunculated (Table 1). Fifty-seven (85.1%) were located within the sigmoid colon and rectum. Thirty-five polyps (52.3%) were 10-19 mm in size. The histopathology of these lesions showed them to be mostly tubular followed by tubulovillous, and villous.

All of the 29 pedunculated polyps were removed colonoscopically, regardless of size or location (Table 2). Sixteen of 29 malignant pedunculated lesions were believed to be cured by polypectomy alone because margins were free of tumor, there was no evidence of lymphatic or vascular invasion, and follow-up co-

lonoscopy found no residual tumor at the polypectomy site. Although one of these 16 patients died of lung metastasis three years later, none of the others was found to have developed recurrent disease at the polypectomy site at six months by colonoscopy and none of them showed signs of metastatic disease. Thirteen of these 29 patients received colectomies because the patients were recommended to undergo op-

Table 1. Characteristics of 67 malignant colorectal polyps

Variables	No.	%
Sex		
Male	37	55.2
Female	30	44.8
Location		
Rectum	20	29.9
Sigmoid	37	55.2
Descending Colon	6	9.0
Transverse Colon	0	0
Ascending Colon	4	6.0
Cecum	0	0
Gross Feature		
Pedunculated	29	43.3
Sessile	38	56.7
Size (mm)		
< 10	9	13.4
10-19	35	52.3
20-29	21	31.3
30-39	2	3.0
Histologic Type		
Tubular	33	49.3
Tubulovillous	30	44.8
Villous	4	6.0
Resection Method		
Polypectomy	37	55.2
Colectomy	30	44.8
Inadequate Margins		
Free	58	86.6
Involved	9	13.4
Lymph Nodes Metastasis		
Negative	64	95.5
Positive	3	4.5
Distant Metastasis		
Negative	63	94.0
Positive	4	6.0

Table 2. Characteristics of 29 malignant pedunculated polyps

Procedure	Number of Polyps	Distant Metastasis	Positive of Lymph Nodes at Operation	Inadequate Margins
Polypectomy	16	1	---	0
Colectomy	13	1	0	0

eration “to be sure.” At the six-month follow up, there were no signs of recurring disease or metastasis. However, four years later, one patient died of carcinomatosis.

The outcomes of the 38 patients with malignant sessile lesions, shows that 21 were removed colonoscopically (Table 3). Nine patients with inadequate margins all have sessile type lesions. Five of these patients underwent further resection and no positive lymph nodes involvement was found following operation by pathology. During the follow-up period, none of these five patients had any evidence of recurrent disease. Residual malignant polypoid tissue was documented at the polypectomy site in four of these 21 patients. Those four patients did not undergo surgery because they refused or they were unsuitable for surgery because of comorbidity and advanced age. However, no local recurrence or distant metastasis was noted during follow up over two years. Besides the above-mentioned four with inadequate margins, two others from the 21 patients receiving polypectomies alone were found to have distant liver metastasis after two years. Seventeen of those with malignant sessile lesions received colectomies because histologically they were found to have definite or questionable stalk involvement and the patients were suggested to undergo operation “to be sure.” Three of seventeen patients were found to have lymph node involvement, but no residual tumors were found in the sections of colon removed. These cases must have been tumor recurrence because those three patients did not select colectomy surgery. None of these 17 patients developed metastatic disease. Demography data, polyp characteristics, and follow-up of four patients with distant metastasis is shown in Table 4.

This study found a 100 percent two-year survival rate for both groups. However, with regard to recurrence in those who received polypectomies, the patient who had received surgery was found to have carcinomatosis four years after the time of initial polypectomy. Of the three other patients who received

polypectomies, two were diagnosed as having liver metastasis two years later and one was diagnosed as having lung metastasis and died three years after the initial polypectomy. In the polypectomy group, 8.1% were found to have distant metastasis past the two-year median follow-up mark while 3.3% distant metastasis were found in the colectomy group (Table 5). Thus, patients who received colectomies had lower distant metastasis (3.3%) than those managed by polypectomy alone (8.1%) after two years of follow-up.

Discussion

Polyps or adenomas of the colon and rectum are usually removed via colonoscopy. Problems often arise regarding on what to do when these adenomas contain an invasive carcinoma. Polyps with invasive carcinoma or malignant polyps are invariably early carcinomas, but invasion is usually limited to the submucosa at the time of their discovery.² Malignant colorectal polyp is defined as an adenoma with cancer cells penetrating the muscularis mucosa into the submucosal layer. These polyps usually have a TNM classification of T1NxMx.

In 1997, the prevalence of malignant polyps in a review of several series of colonoscopically removed polyps was reported to range between 2% and 5%.³ Nowadays, because of an increase in use of screening programs, the number of malignant polyps that are removed is increasing. Adenocarcinomas have been detected in between 3% and 4.6% in these screenings and confirmed by positive immunological faecal occult blood test results.⁴ Malignant polyps consist of epithelial growths of abnormal glands accompanied by varying amounts of villous components (87% of adenomas being tubular, 8% tubulovillous and 5% villous). Polyps can be classified by their macroscopic structural configuration (i.e., sessile (broad base) or pedunculated) or by their histologic appearance, in-

Table 3. Characteristics of 38 malignant sessile polyps

Procedure	Number of Polyps	Distant Metastasis	Positive of Lymph Nodes at Operation	Inadequate Margins
Polypectomy	21	2	---	4
Colectomy	17	0	3	5

Table 4. Patients with distant metastasis

Patient	Age	Gender	Location	Gross Feature	Size	Histologic Type	Resection Method	Inadequate Margins	Follow-Up
1	57	M	Ascending colon	Pedunculated	2.5 cm	Adenocarcinoma arising from tubulovillous adenoma Moderately differentiated Involves submucosal layer and the stalk (Haggitt level 4 invasion) Absent vascular invasion	Polypectomy+Right hemicolectomy	Free	48 months Carcinomatosis
2	63	F	Descending colon	Pedunculated	2.5 cm	Focal adenocarcinoma transformation Moderately differentiated Involves submucosal layer and the stalk (Haggitt level 4 invasion) Absent vascular invasion	Polypectomy Refused operation or chemotherapy	Free	36 months Lung metastasis Expired
3	58	F	Sigmoid colon	Sessile	2.1 cm	Adenocarcinoma arising from tubulovillous adenoma Moderately differentiated Involves submucosal layer Absent vascular invasion	Polypectomy	Free	30 months Liver metastasis Chemotherapy
4	54	F	Rectum	Sessile	2.2 cm	Adenocarcinoma arising from tubulovillous adenoma Moderately differentiated Involves submucosal layer Absent vascular invasion	Polypectomy	Free	25 months Liver metastasis Liver wedge resection and Chemotherapy

Table 5. Treatment outcomes

Procedure	Patients (No.)	Distant metastasis (%)	Lymphovascular invasion	Cancer deaths	Two years survival (%)
Polypectomy	37	3 (8.1)	---	1	100
Colectomy	30	1 (3.3)	3 (10)	0	100
Total	67	4 (6.0)	3	1	100

cluding villousness and degree of dysplasia. Although most of these polyps are benign, varying degrees of dysplasia may be seen within them. Those found in situ to be severe dysplasia, high-grade dysplasia, or carcinoma in situ denote a high risk of malignant transformation over time. Other factors affecting risk of malignancy include polyp size, extent of villous component, and patient age.⁵ The size of the polyp is associated with risk of malignancy, with studies showing the presence of cancer in 1.3% of adenomas

< 10 mm in size, 9.5% of adenomas between 10 and 20 mm, and 46% of adenomas \geq 20 mm.⁶ Finally, the risk of finding a cancer in an adenomatous polyp increases with age. Colonoscopic studies in average-risk individuals have reported adenoma rates ranging from 21% to 28% in those aged 50 to 59, 41% to 45% in those aged 60 to 69, and 53% to 58% in those aged 70 or older.^{7,8} The management of these malignant polyps varies depending on histologic features, surgical risk of the patient, depth of invasion into the bowel

wall, and level of involvement of the polyp.

Recognizing the risk of lymph node metastasis, particularly in the pedunculated type polyp, Haggitt et al.⁹ proposed a morphologic classification based on the depth of invasion in 1985: level 0, carcinoma in situ or intramucosal carcinoma, not invasive; level 1, carcinoma invading through the muscularis mucosa into the submucosa but limited to the head of the polyp; level 2, carcinoma invading the level of the neck of the adenoma; level 3 carcinoma invading any part of the stalk; and level 4, carcinoma invading into the submucosa of the bowel wall below the stalk of the polyp but above the muscularis propria. According to Haggitt et al., all sessile polyps with invasive carcinoma are considered to be level 4 by definition.

The risk of lymph node metastasis in each level 4 sessile lesions is not the same. Haggitt's system gives no detail for sessile lesions. In 1993, Kudo¹⁰ classified the submucosal invasion of the sessile lesions into three levels: Sm1, invasion into the upper third of the submucosa; Sm2, invasion into the middle third of the submucosa; and Sm3, invasion into the lower third of the submucosa.

The risk of lymph node metastasis in pedunculated polyps with invasive carcinoma is different from that in sessile lesions and it is generally low. For Haggitt, levels 1, 2, and 3 carry a risk of < 1%.^{11,12} The risk of lymph node metastasis in pedunculated level 4 is the same as in sessile lesions. Sessile lesions have a relatively high incidence of lymph node metastasis. In many series, this ranges from 12% to 25%.^{13,14} In our study, two patients with carcinomatosis and lung metastasis had level 4 invasion (Table 4). Inadequate excision or positive margins are often regarded by some authors as adverse risk factors. In reality, they should be regarded indicators of inadequate treatment.¹⁵ Among the increased risk factors reported in the literature are lymphovascular invasion,¹⁶⁻¹⁸ poor differentiation, gender, extensive budding, microacinar structure, flat or depressed lesion, and depth of invasion in Sm3. The pedunculated lesions of Haggitt levels 1, 2, and 3 can be treated safely with a complete excision or snaring, since the risk of lymph node metastasis is less than 1%. Level 4 pedunculated lesions should be treated as sessile lesions. Some sessile lesions with invasive carcinoma < 2 cm in diameter can be ade-

quately snared in one piece via colonoscopy. A microscopic free margin of at least 2 mm is considered large enough for snaring.¹⁹ A sessile lesion that is removed piecemeal requires further excision or resection. High-risk sessile lesions, including lymphovascular invasion, deep invasion into Sm3 level, or locations in the lower third of the rectum, should receive oncologic resection. In case of a lower third rectal lesion, an alternative approach to treatment is to perform a full thickness excision followed by adjuvant post-operative chemoradiation.^{20,21}

The anatomic landmarks of the depth of invasion for pedunculated lesions (Haggitt level) and the Sm system for the sessile lesions give excellent objective information in the management of malignant colorectal polyps. Malignant polyps with a low risk of lymph node metastasis include pedunculated lesions with invasion into Haggitt levels 1, 2, and 3. Level 4 pedunculated lesions and sessile lesions can be treated by colectomy because they have a high risk of lymph node metastasis.

The decision to resect or observe is based on two considerations: the incidence of residual cancer in the bowel wall and the incidence of nodal metastases. It is possible to evaluate the incidence of residual cancer only in a pedunculated polyp. Malignant sessile polyps always need formal resection, as it is impossible to orient the specimen to evaluate margins and there is no separation between polyp and bowel wall. Using the levels of invasion described by Haggitt et al., every malignant sessile polyp is level 4. A stalk provides a degree of separation of polyp from bowel wall which allows easy orientation of the specimen so that the margin can be examined. Therefore, patients with malignant pedunculated polyps with a suitable margin between cancer and the cut end of the stalk can be observed and it can confidently be decided that no mucosal cancer remains. Virtually all malignant sessile polyps require colectomy because of the technical inability to remove them totally and safely by colonoscopy.

Conclusion

Our study has limited follow-up after polypec-

tomy, often < 3 years. This precludes accurate assessment of the outcome of various treatment modalities, as subsequent metastatic colon carcinoma could be underreported. Based on our experience, patients who received operative management had better long-term results than those managed by polypectomy alone because of the lower distant metastasis rate and the decreased possibility of lymph node metastasis in malignant sessile lesions. Proper patient selection lowers operative mortality and morbidity in the treatment of malignant polyps. Patients in whom the polypectomy margin of resection cannot be confirmed to be cancer free or whose tumors have significant risk factors should undergo colectomies. Even with a clear margin, patients should be informed about the possibility of the presence of residual tumor. Close follow-up is recommended.

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技術新知

經大腸鏡息肉切除術或結腸切除術治療 惡性結腸直腸息肉的臨床結果

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目的 這項研究旨在評估以經大腸鏡息肉切除術或結腸切除術治療惡性結腸直腸息肉的臨床結果。

方法 從 2000 年 1 月至 2008 年 12 月，我們追蹤 67 例患者 (37 名男性和 30 名女性) 以經大腸鏡息肉切除術或結腸切除術治療有蒂或無蒂惡性結腸直腸息肉的預後。

結果 67 例患者中，29 位有蒂息肉皆以大腸鏡息肉切除術切除。而其中 13 位更進一步接受結腸切除術。另外 38 位無蒂息肉以大腸鏡息肉切除術切除後，其中 17 位後來再接受結腸切除術。平均追蹤時間從 2 年至 5 年 (平均 3 年)。所有的患者不論是只接受息肉切除術或是更進一步接受結腸切除術，兩年的存活率都是 100%。然而，隨著時間的推移，有一位有蒂息肉患者 (3.3%) 當初接受結腸切除術，四年後被診斷出癌擴散。三位 (8.1%) 只接受大腸鏡息肉切除術患者，被發現有遠處轉移。其中兩位無蒂息肉患者兩年後被發現有肝轉移，另一位有蒂息肉患者有肺轉移並於三年後去世。

結論 根據我們的結果，對於發現有蒂或無蒂惡性結腸直腸息肉患者，接受結腸切除術患者比只接受經大腸鏡息肉切除術患者有更好的臨床結果。因為，接受結腸切除術患者有比只接受經大腸鏡息肉切除術患者更少的遠端轉移機率 (3.3%) 及減少了淋巴轉移的機會。

關鍵詞 惡性息肉、結腸直腸息肉、息肉切除術、結腸切除術。