Endoscopic Resection of a Large Colonic Leiomyoma

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A 48-year old man suffered from intermittent hematochezia and abdominal cramping over a period of four weeks. A colonoscopy revealed a 4.5 cm semi-pedunculated tumor in the transverse colon. Using a 2-channel colonoscope, the tumor was successfully removed with an electro-surgical snare after normal saline submucosal injection. Microscopic examination revealed it to be a smooth muscle tumor without mitosis. The patient recovered well, and did not have a residual tumor in a follow-up colonoscopy.

We found no reports of a colonic leiomyoma larger than 3 cm which was completely removed by a colonoscope. According to the case presented here, intraluminal colonic leiomyoma can be completely resected with skillful manipulation of a colonoscope, even if the tumor is as large as 4.5 cm. Successful endoscopic polypectomy of colonic leiomyoma reduces the cost of treatment and eliminates unnecessary surgery. *(Chang Gung Med J 2002;25:39-44)*

Key words: leiomyoma, colon, colonoscopy, polypectomy.

Most gastrointestinal leiomyomas are found in the stomach,[1-2] but they may also occur in the esophagus,[3] small intestine,[4] colon[5] and rectum.[6-7] However, leiomyomas arising in the colon and rectum are uncommon, for only about 3% of all gastrointestinal leiomyomas.[2,5,6] Generally, large leiomyomas are believed to be best treated by surgical resection, because conventional colonoscopic resection of large and deep-seeded tumors poses a high risk of perforation.[8] We report on a patient with a 4.5 cm semi-pedunculated colonic leiomyoma, which was successfully removed by endoscopic polypectomy after normal saline submucosal injection. To our knowledge, this is the first case of a colonic leiomyoma larger than 3.0 cm which was successfully resected by colonoscopy.

CASE REPORT

A 48-year old man had intermittent hematochezia and abdominal cramping for one month. There was no fever, chills, nausea, vomiting or body weight loss. His medical history and physical examination, including a rectal examination, did not reveal any abnormalities.

After colon preparation with polyethylene glycol electrolyte solution, a colonoscopic examination was performed. It revealed a mobile semi-pedunculated tumor, approximately 4-5 cm, in the transverse colon (Fig. 1A). The tumor had many erosions and hemorrhagic spots on the surface, and partially obstructed the colon lumen. It was firm and blood

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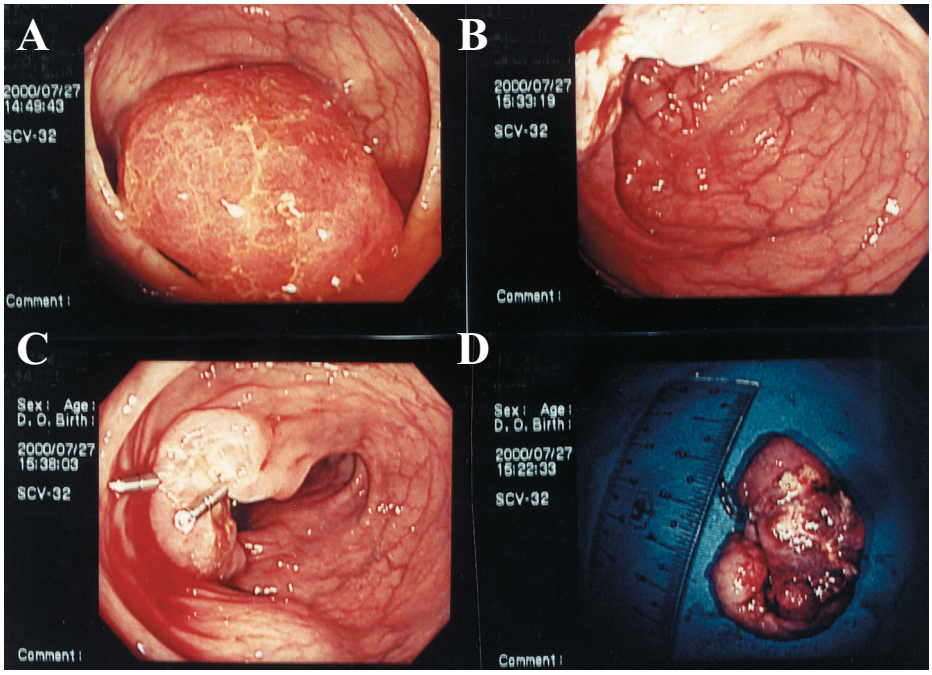

Fig. 1 Endoscopy revealing a large intraluminal tumor in the transverse colon. (A) A semi-pedunculated tumor in the transverse colon. (B) Mild blood oozing after polypectomy. (C) The bleeding subsided after two hemoclips applied. (D) The polypectomized specimen.

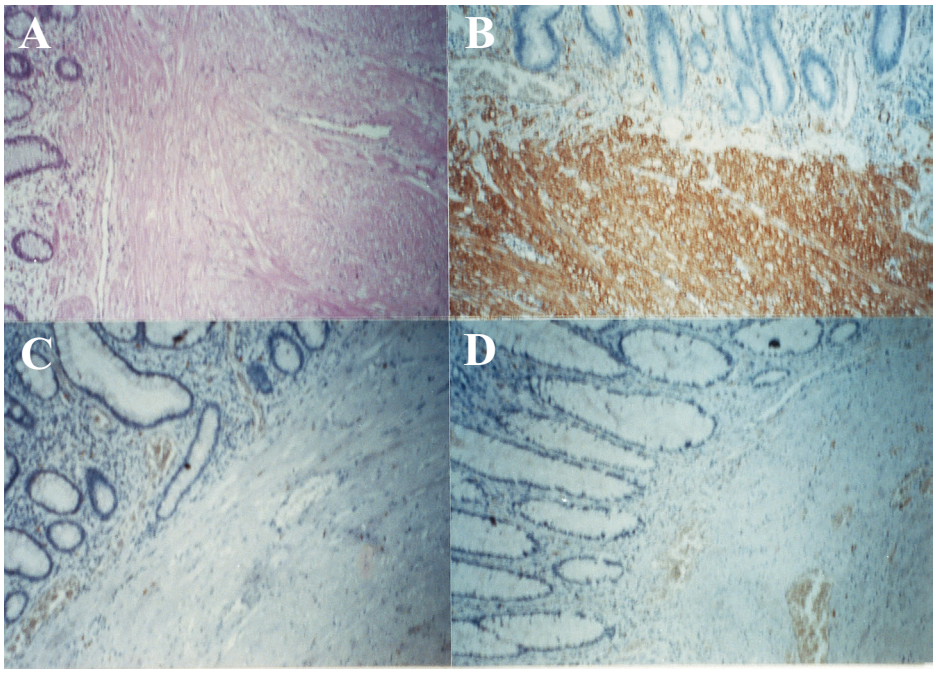

Fig. 2 Microscopy of the resected tumor. (A) Spindle-shaped smooth muscle tumor (HE stain, 40¡). (B) Positive smooth muscle actin stain (100¡). (C) Negative C-kit stain (100¡). (D) Negative S-100 stain (100¡).

oozing developed when we manipulated it with a biopsy forceps.

To remove the large tumor safely, we performed a colonoscopic polypectomy with a 2-channel colonoscope (CF 2T-240, Olympus). First, 10 milliliters of normal saline was injected into the base and the vicinity of the tumor with a local injection needle (NM-40, Olympus). With the mucosa bulging after the normal saline injection, we could prevent hemorrhage. Second, a snare was placed on the tumor via a working channel, while a grasping forceps (FG 49L-1,Olympus) caught and lift the tumor via another channel. Using the forceps, the snare could be placed downwards onto the base of the tumor. A colonoscopic polypectomy was then performed with the electro-surgical snare placed underneath the tumor base. Bleeding via the wound occurred after tumor resection (Fig. 1B). Two hemoclips were then applied and successfully stopped the bleeding (Fig. 1C).

The resected tumor was measured as 40 ¡ 28 ¡ 28 mm and it had a thick stalk (Fig. 1D). The cut surface revealed a submucosal elastic white tumor without necrosis or hemorrhage. Histological assessment revealed diffuse well-defined spindle-shaped smooth muscle cells with no mitosis (Fig. 2A). Immunohistochemical staining was positive for smooth muscle actin (Fig. 2B), but negative for c-kit (Fig. 2C) and S-100 (Fig. 2D). All these findings contributed to the diagnosis of leiomyoma.

The patient recovered uneventfully and had no further bloody stools or abdominal pain. Follow-up colonoscopy and abdominal computed tomography revealed no remarkable findings one month after polypectomy.

DISCUSSION

Smooth muscle tumors may occur throughout the entire gastrointestinal tract, but are rarely seen in the colon and rectum.[2,5-10] Baker and Good, in a survey of smooth muscle tumors of the alimentary tract, reported that, of 195 leiomyomas and 74 leiomyosarcomas, 65% were in the stomach, 23% were in the small intestine and 3% were in the colon.[9] The clinical manifestations of these smooth muscle tumors depend on the location, size and direction of tumor growth. They include intestinal obstruction, hemorrhage, and perforation into the peritoneal cavity.[10] Intraluminal lesions can be detected earlier because of the earlier presentation of symptoms, and thus may be resected endoscopically. On the other hand, exoluminal lesions tend to be found only when they are much larger. In Stavorovsky' series,[10] 17 of 32 smooth muscle tumors in the colon were intraluminal lesions, and 15 were exoluminal.[10] Intraluminal and exoluminal tumors occur in approximately equal numbers.

The submucosal injection technique for colonic submucosal tumors (SMT) separates the resection line from the muscularis propia, and helps make polypectomy safer when compared to conventional polypectomies. The disadvantage of this technique is that the tumor became more difficult to trap with a snare loop since the stalk is thick because of the injection. Ishiguro et al. used methylene blue in their submucosal injection prior to polypectomy, to confirm that the SMT was completely resected.[11] In this case, we used normal saline as the submucosal injection reagent, and the SMT was also successfully resected by endoscopic polypectomy. There was no massive bleeding after tumor resection. We feel this is because of the effect of the submucosal injection prior to polypectomy.

Leiomyomas are similar in appearance to gastrointestinal stromal tumors (GISTs) under light microscopy.[12] With the advent of immunohistochemistry and electron microscopy, we have learned that they are of distinct origins. GISTs are believed to grow from GI pacemaker cells, "Cajar cells", and usually react with c-kit.[13] On the other hand, leiomyomas and leiomyosarcomas are myogenic in origin, and usually react positively for smooth muscle actin and negatively for c-kit.[12] The tumor resected in our case was positive for smooth muscle actin and negative for c-kit and S-100. No mitosis was seen on microscopic examination, and no evidence of distal metastasis was found. Therefore, this tumor was clearly a leiomyoma.

Smooth muscle tumors of the gastrointestinal tract are usually treated with surgical resection because of their lesion depth and large size. Only 3 cases of successful endoscopic removal of colonic leiomyomas have been reported.[11,14-15] However, all 3 tumors were smaller than 2 cm in diameter (Table 1). Successful resection, therefore, was not difficult.

Table 1. Cases Reports of Colonic Leiomyomas Removed Endoscopically

	Age/Gender	Size	Location	Symptoms	Growth direction/ appearance	Submucosal injection
Friedman et al.[14] 1979	60 y/o Man	0.6 cm	Sigmoid colon	Hematochezia	Intaluminal sessile	Nil
Kadakia et al.[15] 1992	65 y/o Man	2.0 cm	Transverse colon	Iron deficiency anemia	Intaluminal sessile	Nil
Ishiguro et al.[11] 1999	63 y/o Man	2.0 cm	Rectum	Constipation	Intraluminal semi-pedunculated	Methylene blue 0.05%
Our case	48 y/o Man	4.5 cm	Transverse colon	Hematochezia and abdominal pain	Intraluminal semi-pedunculated	Normal saline

The leiomyoma presented here was 4.5 cm, but it was still resected uneventfully. This implies that colonoscopic resection is an attractive alternative for treating a large smooth muscle colonic tumor in the hands of an experienced endoscopist.

Endoscopic ultrasonography (EUS) can provide valuable information when contemplating endoscopic resection of a submucosal tumor. Unfortunately, in this case, EUS was not done because the semi-pedunculated tumor was not suspected to be a submucosal tumor initially. However, it is difficult to distinguish leiomyoma from leiomyosarcomas. Kusminsky et al. suggested that tumors larger than 5 cm should be considered malignant even if biopsy suggests that they are benign, and further suggested that these tumors be surgically resected.[16] When a symptomatic smooth muscle tumors smaller than 2 cm are incidentally found on colonoscopy, surgical resection is unnecessary. Hoshika et al. suggested that if a tumor can be lifted with a snare and is either pedunculated or semi-pedunculated, endoscopic resection might be a safe option.[17] For those tumors with wide-based or exoluminal growth, endoscopic removal should be avoided due to the high risks of bleeding and perforation.

When we encounter a tumor during a colonoscopic examination, we usually evaluate the tumor carefully and perform an endoscopic resection when we judge it is appropriate. The histological findings of the resected tumor are important. If there is any malignant element that can not be completely eradicated, we would suggest surgical treatment. We believe our process avoids unnecessary surgery and reduces medical costs.

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