Preoperative radiologic patent blue localization for intracorporeal laparoscopic resection of a terminal ileal submucosal lipoma: A case report

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ABSTRACT

BACKGROUND: Ileal submucosal lipomas are rare cases and surgical intervention was necessary in case of abdominal pain and intussusception. Laparoscopic resection may be difficult for the intraluminal submucosal lesion. Herein, we report a case of terminal ileal submucosal lipoma resected by radiologic-assisted laparoscopic surgery.

CASE PRESENTATION: The 31-year-old female was admitted for intermittent abdominal pain. The colonoscopy showed a 1.5 cm diameter subepithelial lesion in terminal ileum and computed tomography showed a hypodense lesion in distal ileum. The diagnosis of terminal ileal submucosal lipoma without obstruction was impressed and surgical strategy of minimal invasive surgery was taken. Preoperative CT-guided patent blue dye injection near the terminal ileal submucosal lipoma for localization was performed by Radiologist. Then laparoscopic resection with intracorporeal suture was done smoothly without complications. The pathology proved lipoma and she had good recovery within one week.

CONCLUSIONS: There are many kinds of intervention methods to treat the small bowel lipoma. Our experience supports that laparoscopic surgery with radiologic localization assistance is feasible for terminal ileal non-intussusceptive submucosal lipoma resection.

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1. Background

The small bowel tumors account for 1 ~ 2% of gastrointestinal tract tumors [1,2]. Benign tumors account for 30% of all small-bowel tumors and lipomas are the second most common benign tumor [1]. Patients usually presented with abdominal pain, nausea, vomiting, gastrointestinal (GI) bleeding and intestinal obstruction. Intraluminal lipomas were left untreated in case of no discomfort because of no malignancy potential. There are some case reports which ileal lipoma patients with intussusception treated by laparoscopic surgery with advance devices and techniques [1,3–9]. However, if the intraluminal submucosal lipoma is small without intussusception, it is difficult to be found during laparoscopic surgery. Thus, we report a case of terminal ileal submucosal lipoma that presented with intermittent abdominal pain and was treated by radiologic-assisted laparoscopic surgery. This case report was conducted, and is reported in accordance with the SCARE criteria [10].

2. Case presentation

The 31-year-old female complained intermittent abdominal cramping pain for 4 years and she also had difficulty in stool passage sometimes. No vomiting, nausea nor GI bleeding presented. She had cesarean section once for malpresentation and no history of medical disease. She went to out hospital for help. There was no specific physical examination finding and her laboratory studies were all within normal limits. She received series exams: the plain abdomen was normal without ileus. Then colonoscopy was performed and showed a 1.5 cm diameter subepithelial lesion in terminal ileum (Fig. 1a). Then small bowel series was performed and showed a submucosal lesion at terminal ileum (Fig. 1b). Computed tomography was also arranged and showed a hypodense submucosal lesion (1.5 cm, Hounsfield unit: −61.5) suspected lipoma at distal ileum.

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without ileal obstruction or intussusception (Fig. 1c, d). The diagnosis of terminal ileal submucosal lipoma without obstruction was impressed and she was admitted for surgery.

She underwent minimal invasive surgery for priority. We arranged pre-operative CT-guided patent blue dye injection near the lesion for localization following the below steps. First, one day before operation, the patient was under nothing by mouth for at least 4 hours before CT-guided procedure. Intervventional radiologist performed the procedure as the patient was on supine position. Pre-procedural CT scanning was done firstly to delineate location of lesion. 10 cc of Xylocaine (2%) was administered as local anesthesia and 20 mg of Buscopan was injected intravenous simultaneously.

Under CT-guidance, a 21G needle with stylet was used to puncture into lesion. The location of needle tip was checked by CT (Fig. 2a) and about 1 cc of patent blue was injected into lesion as pigment mark for localization. The post-procedure CT scan was done as to evaluate any complication. Then laparoscopic tumor resection was arranged on the next day. The operation was performed step by step: a skin incision below umbilicus was created and a 12 mm Trocar was inserted. Pneumoperitoneum was created by carbon dioxide to pressure of 12 mmHg. Under the laparoscopy, another three wounds were created and 5 mm Trocars were inserted. One at middle lower abdomen above pubic bone, one at right lower abdomen and the other at left lower abdomen. After entering abdominal cavity, the blue dye mark at terminal ileum was seen. The terminal ileum was opened around two centimeters at antimesenteric side near the blue dye mark by energy device. The submucosal lesion was seen when entering the lumen of distal ileum and it was externalized out of the ileum (Fig. 2b). The lipoma was resected at base by monopolar-scissor device and the lesion was taken out via 12 mm trocar. Then ileum submucosal defect and ileotomy were sutured by Dexton 3.0 intracorporeally for the lesion very near ileocecal junction (Fig. 2c). The bleeding was minimal, and one Jackson-Pratt drain was left in the Cul-de-sac. The wound was closed. The gross specimen was showed (Fig. 2d) and pathology proved lipoma. The postoperative condition was uneventful with smooth gastrointestinal function resumption and she was discharged within one week.

3. Discussion and conclusions

The small bowel tumors account for 1~2% of gastrointestinal tract tumors [1,2]. They can be classified as malignant or benign origin. Benign tumors account for 30% of all small-bowel tumors and lipomas are the second most common benign tumor [1]. The symptoms of small bowel lipomas include abdominal pain, nausea, vomiting, GI bleeding and intestinal obstruction. The indication of surgical intervention is according to clinical symptoms. In our case, she suffered intermittent abdominal pain for 4 years and was indicated for surgery.

There are many intervention methods for small bowel lesions including laparotomy [11], laparoscopic surgery [1,3–9], endoscopic mucosal resection (EMR), endoscopic polypectomy [1,12,13] and endoscopic submucosal dissection (ESD) [14,15] (see Table 1).
Table 1
Literature review of management for terminal ileum submucosa lesion.

| Case | General information | Tumor | Management method |
|------|---------------------|-------|-------------------|
|      | Age | Sex | Clinical presentation | Pathology | Location | Size, max (mm) | Approach method | Bowel resect | CT-guided blue dye localization |
| Tsushimi et al. [1] | 63 | F | Abdominal pain, Intussusception | Lipoma | Terminal ileum | 25 | Laparoscopic-assisted, extracorporeal anastomosis | Yes | No |
| Hou et al. [3] | 64 | F | Abdominal pain | Lipoma | Terminal ileum | N.D. | Laparoscopic-assisted, extracorporeal anastomosis | Yes | No |
| Lin et al. [4] | 47 | F | Abdominal pain | Lipoma | Ileum | 30 | Laparoscopic-assisted, extracorporeal anastomosis | Yes | No |
| Abbasakoor et al. [5] | 52 | F | Abdominal pain | Lipoma | Terminal ileum | 40 | Laparoscopy, intracorporeal anastomosis by staple | Yes | No |
| Park et al. [6] | 39 | M | Abdominal pain | Lipoma | Terminal ileum | 40 | Laparoscopic-assisted, extracorporeal anastomosis | Yes | No |
| Shimazaki et al. [7] | 87 | M | Abdominal distension | Lipoma | Ileum | 40 | Laparoscopic-assisted, extracorporeal anastomosis | Yes | No |
| Saito et al. [8] | 31 | M | Intussusception | Lipoma | Terminal ileum | 40 | Laparoscopic-assisted, extracorporeal anastomosis | Yes | No |
| Takahashi et al. [9] | 70 | F | Abdominal pain | Lipoma | Terminal ileum | 50 | Laparoscopic-assisted, extracorporeal anastomosis | Yes | No |
| Jiang et al. [11] | 50 | M | Abdominal pain | Lipoma | Terminal ileum | 40 | Laparotomy, intracorporeal anastomosis | Yes | No |
| Yoshimura et al. [12] | 80 | F | Abdominal pain | Lipoma | Terminal ileum | 25 | ESD | No | No |
| Matsumoto et al. [13] | 72 | M | Nil | Lipoma | Terminal ileum | 30 | Endoscopic polypectomy | No | No |
| Noda et al. [14] | 78 | F | Abdominal pain | Lipoma | Terminal ileum | 40 | ESD | No | No |
| Morimoto et al. [15] | 62 | M | Hematochezia | Lipoma | Terminal ileum | 50 | ESD | No | No |
| Present case | 31 | F | Abdominal pain | Lipoma | Terminal ileum | 15 | Laparoscopy, intracorporeal hand suture | No | Yes |

a CT-guided blue dye localization is assisted.
b Patient status post ileocecal resection due to cecal cancer. 40 cm proximal to neo-terminal ileum.
c Two tumors, the maximum size is 40 mm.
d Multiple submucosa lipoma. N.D.: No data. EMR: endoscopic mucosal resection. ESD: endoscopic submucosal dissection.
EMR and ESD needs experienced techniques and has been widely used in gastric and colorectal tumors [16,17]. However, there are only two case reports for ESD [14,15] used successfully in ileal lipomas resection. Surgical resection is still the most common management for ileal lipomas. According to previous case reports about laparoscopic surgery of lipoma or adenoma, operator saw the intussuscepted pointed lesion under laparoscopy. They can find the location of lesion and resect easily [1,3–9]. For the small lesion without intussusception, it is more difficult to identify the lesion under laparoscopy. Because of elective surgery in this case, we considered laparoscopic surgery as priority. Pre-operative localization was discussed with this patient. However, the patient refused colonoscopy assisted dye injection because of severe abdominal pain during colonoscopy examination. We discussed with Radiologist and arranged CT-guided blue dye injection near the lesion by Radiologist. During surgery, we can find the lesion easily because of the blue dye mark. The surgery was performed totally under the laparoscopic method successfully.

Our successful experience supports that laparoscopic surgery with radiologic localization assistance is feasible for terminal ileal nonintussusceptive submucosal lipoma resection.

**Conflicts of interest**

All authors had no financial and personal relationships with other people or organisations.

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**Ethical approval**

The study was approved by Institutional Review Boards, Chang Gung Memorial Hospital (IRB No.: 201701356B0).

**Consent**

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

**Author contribution**

Hsin-Yi Wu and Song-Fong Huang are contributed to this paper equally.

Hsin-Yi Wu and Song-Fong Huang draft the work.

Kuang-Tse Pan is responsible for lesion localization.

Ming-Chin Yu is responsible for treatment design and paper revision.
Registration of research studies

The research registry UIN is researchregistry3415.

Guarantor

Ming-Chin Yu is the guarantor.

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