Case Report

Laparoscopy-Assisted Jejunal Resection for Leiomyoma Preoperatively Diagnosed as Jejunal Gastrointestinal Mesenchymal Tumor by Double-Balloon Endoscopy : Report of a Case

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The advent of double-balloon endoscopy (DBE) has enhanced the precision of small-intestinal neoplasm diagnosis and enabled preoperative diagnosis. Laparoscopy-assisted surgery for small-intestinal neoplasms allows direct visualization, appropriate resection and safe anastomosis with low-invasiveness. We report a case of laparoscopy-assisted jejunal resection for jejunal gastrointestinal mesenchymal tumor (GIMT) preoperatively diagnosed by DBE. A 56-year-old woman complaining of abdominal pain and vomiting was referred to our hospital with radiographic evidence of jejunal obstruction. DBE revealed a well-defined smooth jejunal submucosal tumor. CT showed a homogeneous low-density mass of 6 cm in diameter inside and outside the jejunal lumen. Laparoscopy-assisted surgery was conducted for suspected jejunal GIMT. The tumor was found outside the jejunal lumen. A trocar incision was extended to exteriorize the jejunum, and a limited jejunal resection and anastomosis was performed. GIMT, smooth muscle type (leiomyoma), was diagnosed by histopathological and Immunohistochemical examination. Postoperative course was favorable, with no complications, and less pain than conventional surgery.

Key Words : GIMT (gastrointestinal mesenchymal tumor), laparoscopy-assisted resection, double-balloon endoscopy

Introduction

The advent of double-balloon endoscopy (DBE) has enhanced the precision of small-intestinal neoplasm diagnosis and enabled preoperative diagnosis. Leiomyoma in the small intestine is still treated by surgery, which produces favorable prognosis particularly when performed before excessive blood loss or before perforation¹⁾.

We report a case of low-invasive laparoscopy-assisted jejunal resection for jejunal gastrointestinal mesenchymal tumor (GIMT) preoperatively diagnosed DBE.

Case Report

A 56-year-old woman with a history of appendectomy consulted a local physician with complaints of vomiting and tarry stool. She underwent detailed investigation such as upper and lower gastrointestinal endoscopy and ^{99m}Tc-RBC scintigraphy, which, however, failed to establish definite diagnosis. Five months later, she experienced abdominal pain and vomiting,

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Fig. 1 Abdominal contrast-enhanced CT (a, axial view, b, coronal view).

A well-defined, smooth-margined, non-enhanced, homogeneous low-density mass is observed inside and outside the small intestinal wall (arrow).

and again consulted the local physician. Upper gastrointestinal radiography revealed jejunal obstruction. She was referred to our hospital and was immediately admitted. Physical examination showed a body weight of 49 kg, a 5-kg loss over the past 6 months. The abdomen was soft and flat, with no palpable mass. Hematology showed a hemoglobin value of 13.8g/dL, indicating the absence of anemia. Tumor markers CEA and CA19-9 were 1.0ng/mL and 30.9U/mL, respectively. Abdominal contrast-enhanced CT (**Fig. 1**) disclosed a well-defined, smooth-margined, non-enhanced, homogeneous, low-density mass growing inside and outside the small-intestinal wall. There was no invasion into surrounding organs nor

Fig. 2 Double-balloon endoscopy. A well-defined, smooth, elastic-firm, submucosal tumor is observed over one-quarter circumference of the jejunum.

the presence of peritoneal fluid. Small-intestinal radiography revealed a smooth-margined protuberant mass in the jejunal lumen. DBE (**Fig. 2**) showed a well-defined, smooth, elastic-firm, submucosal tumor over one-quarter circumference of the jejunum. A white coating was observed on the top of the tumor, but cytology around that area failed to achieve definite diagnosis. On the basis of these diagnostic imaging findings, a preoperative diagnosis of jejunal GIMT was made and laparoscopy was selected as a treatment.

Under general anesthesia, a 12-mm trocar for laparoscopy and a 5-mm trocar for working forceps were inserted in the infraumbilical and left abdominal regions, respectively, to observe the peritoneal cavity. A tumor was detected inside and outside the jejunal wall approx. 50 cm from the Treitz ligament. The 5-mm trocar incision was extended 5 cm in size to exteriorize the jejunum for jejunal resection. The resected specimen (**Fig. 3**) showed a 60×28×30 mm dumbbell-shaped tumor with a smooth surface. Histopathology (**Fig. 4a**) demonstrated

Fig. 3 Resected specimen. A 60×28×30 mm dumbbell-shaped tumor with a smooth surface is observed.

that the tumor was composed of spindle cell bundles and showed a palisade arrangement of nucleus proliferating between the submucosal and the subserous layer, showing mild nuclear atypia with 1/50 HPF or less mitosis. Immunohistochemical staining (**Fig. 4b**) showed positive for desmin, α -smooth muscle actin, HHF35, and caldesmon, and negative for KIT, CD34, S-100, and vimentin, leading to a diagnosis of jejunal GIMT, smooth-muscle type, so-called leiomyoma. Postoperative course was favorable, associated with no complications and only mild pain. The patient resumed oral intake on postoperative day 3 and was discharged on postoperative day 14.

Discussion

Gastrointestinal smooth-muscle tumor originates from smooth muscle, and comprises benign leiomyoma and malignant leiomyosarcoma. Formerly, gastrointestinal stromal tumor (GIST) was also included among gastrointestinal smooth-muscle tumor, but is now generally classified as KIT (CD117)-positive mesenchymal spindle cell or epithelioid neoplasm, separately from the original smooth-muscle tumors (leiomyoma and leiomyosarcoma), as a result of recent progress in immuno-

histology²⁾. GIMT types can be roughly divided into GIST, smooth muscle tumor and Schwannoma, and the majority of GIMT are GIST. Leiomyoma is shown to be predominant in the esophagus and rectum, but relatively rare in the small intestine. As GIST reportedly accounts for 87.3% of small-intestinal GIMT, while small-intestinal leiomyoma accounts for only 1.2%³⁾, the latter can be considered a rare disease. Small-intestinal neoplasms often present insidiously with non specific complaints such as intermittent abdominal pain, anemia, bleeding, or obstruction. Because of the anatomical location and morphology, the small intestine is relatively inaccessible to routine endoscopy and its preoperative diagnosis is often difficult⁴⁾. Radiological imagings, such as enteroclysis and CT, are useful for diagnosis of small-intestinal diseases, but are complementary and have been unlikely to achieve definite diagnoses⁵⁾.

DBE is a new small-intestinal endoscopy reported for the first time by Yamamoto, et al. in 2001⁶⁾. This technique has enabled direct detailed observation of the lumen of the small intestine, thereby enhancing precision in the diagnosis of small-intestinal diseases. Although DBE enables biopsy for histological diagnosis, many cases of GIMT, which are

Fig. 4a, b Histopathological and Immunohistochemical findings. The tumor was composed of spindle cell bundles and showed a palisade arrangement of nucleus proliferating mainly in the muscular layer, showing mild nuclear atypia with 1/50 HPF. (HE staining, $\times 100$) (a). Immunohistochemical staining showed positive for desmin (desmin, $\times 100$) (b).

covered with normal mucosa, are difficult to diagnose by biopsy. The present patient was diagnosed as small-intestinal GIST on findings of preoperative diagnostic DBE, which showed a well-defined single submucosal tumor, and CT, which showed a homogeneously enhanced, dumbbell-shaped tumor. Once GIST is preoperatively diagnosed, a therapeutic method

is selected based on various considerations including the size and mitotic figures as well as the presence or absence of invasion to the surrounding organs, metastasis or peritoneal dissemination, with differential diagnosis from GIST taken into account^{7,8)}. With regard to the present case, surgical treatment was selected because of the patient's past history of tarry

stool and for the purpose of definite diagnosis.

Laparoscopy-assisted small-intestinal surgery, as used for the present case, allows observation of the whole peritoneal cavity via a small incision, thereby enabling simultaneous investigation of the tumor location and morphology as well as the status of invasion/metastasis to organs or disseminated metastasis. Furthermore, the surgical technique is advantageous in that an optimal incision site can be determined depending on the tumor location, and therefore the surgical wound in the abdominal wall can be minimized for safe anastomosis. Especially when information on the small-intestinal lumen is also provided by DBE, as seen in the present case, the optimal extent of small-intestinal resection can be determined, enabling lower invasiveness of the surgery^{9,10}. With an increase in use of DBE in the future, small-intestinal neoplasms will be increasingly diagnosed preoperatively. Laparoscopy-assisted surgery should be considered as a low-invasive standard procedure for small-intestinal neoplasms.

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