



Laparoscopic resection of the first jejunal loop for adenocarcinoma: a case report

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Background: Small bowel cancer is a very uncommon tumor and the treatment of malignant tumors at the duodenojejunal junction (DJJ) represents an interesting challenge for the surgeon even with the traditional approach. The difficulties in resection and reconstruction around the DJJ area are mainly due to its anatomical complexity and to the position of the regional lymph nodes, necessary for the staging. In this case was reported our experience with minimally invasive approach at the DJJ and adequate number of lymph nodes harvested according to oncological principles

Case Description: Presently reported was a case of a 71-year-old woman presented with weight loss and marked anemia requiring blood transfusions. Contrast enhanced CT scan and an upper gastrointestinal endoscopy showed an annular lesion. Histology showed high-grade dysplasia. There are no reports providing quality scientific evidence on the best surgical technique. Histology revealed a moderately differentiated adenocarcinoma. the patient underwent laparoscopic tumor resection with en-bloc lymphadenectomy. A total of 22 lymph nodes were examined and one was found to harbour cancer cells. The final tumor stage was pT3N1 G2. The patient had a regular postoperative course and was discharged on the 10th postoperative day.

Conclusion: In the hand of expert surgeons with advanced laparoscopic skills, resection for SBA is feasible and can comply with established oncological standards.

Keywords: Jejunal loop; small bowel adenocarcinoma; case report

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Introduction

The treatment of malignant neoplasms at the duodenojejunal junction (DJJ) represents an interesting challenge for the surgeon even with open surgery.

The difficulties in resection and reconstruction around the DJJ area are mainly due to its anatomical position.

The last portion of the duodenum originates from the left duodenal flexure and runs upward from the retroperitoneum and anteriorly until it continues in the jejunum through the DJJ.

The complexity of this anatomical area is due to its close proximity to the mesenteric vessels and the superior part of the mesenteric root.

The Treitz ligament represents the suspensory apparatus

of the last tract of the duodenum. It's a remnant of the dorsal mesentery and descends from the right crus of the diaphragm, in this way the Treitz ligament conventionally marks the DJJ (1). These anatomical characteristics make it more complex to show the surgical field and visualize the bowel completely.

Thus, one of the most important critical point concerns anastomosis. In fact, the main difficulty of this anastomosis consists in having a short stump of the small bowel available after resection of the tumor at the DJJ.

Furthermore, regional lymph nodes, necessary for the staging, are immediately in the mesenteric root, close to the vessels with consequent difficulties.

Over the years, numerous surgical techniques have been used and improved for the treatment of DJJ tumors, thanks

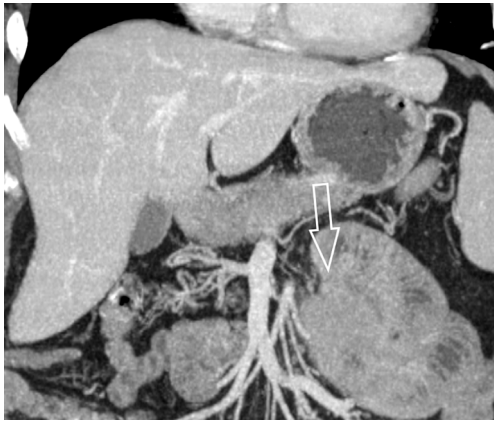


Figure 1 Preoperative contrast enhanced CT scan demonstrating the DJJ tumor (arrow). DJJ, duodenojejunal junction.

to the experiences of emergency surgeons on trauma or occlusion of the DJJ.

For the reconstructive stage, the various techniques described in the literature could be reduced to two main types of anastomosis: end-to-end duodenojejunostomy with hand-sewn manner or end-to-side anastomosis with staplers or with hand-sewn manner (2-4).

At the same time, minimally invasive surgery has also evolved and expanded the field of action, in fact, the advantage of minimally invasive surgery in duodenojejuno anastomosis in patients suffering from superior mesenteric artery syndrome has recently been reported, having as advantages a reduction in postoperative pain and in the length of postoperative hospital stay (5-7). Therefore, minimally invasive surgery has also been applied to segmental resections for DJJ tumors.

There are no reports providing quality scientific evidence on the best surgical technique; in this case was reported our experience with minimally invasive approach at the DJJ and adequate number of lymph nodes harvested according to oncological principles.

We present the following article in accordance with the CARE reporting checklist (available at <https://ls.amegroups.com/article/view/10.21037/ls-20-135/rc>).

Case presentation

A 71-year-old woman presented with weight loss and marked anemia (7.8 g/dL), requiring blood transfusions. Her past medical history revealed arterial hypertension, gastritis and colonic diverticulosis helicobacter pylori-

related.

Contrast enhanced CT scan showed an anular lesion with a thickness of 3 cm and involving the bowel for a length of 6 cm (Figure 1). Enlarged lymph nodes were evident in the mesenteric root along with fat streaking and thickening. The first jejunal arterial was involved just a few mm off the main trunk of the SMA, while branches from the second jejunal arcade were strictly adherent to the tumor (Figure 2A,2B). The first jejunal vein was also involved (Figure 3).

An upper gastrointestinal endoscopy showed an ulcerated and stenosis tumor, located immediately after the DJJ. Histology showed high-grade dysplasia.

All laboratory test were within the normal range and tumor markers (Ca 19-9 and CEA) were negative.

After presentation of the case at tumor board, the patient underwent laparoscopic tumor resection.

All procedures performed in studies involving human participant was in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Declaration of Helsinki (as revised in 2013). 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 editorial office of this journal.

The patient was placed supine with the legs parted and was secured to the operative table with large bandings. The 11 mm camera port was placed on the midline, approximately 3 cm below the umbilicus. Other two ports were placed along the right (11 mm) and left (12 mm) pararectal lines few cm below the transverse umbilical line (Figure 4). Laparoscopic exploration did not show distant tumor deposits. To expose the surgical site, the greater omentum was reflected over the stomach and the transverse colon was anchored to the anterior abdominal wall using several transparietal sutures thrown through epiploic appendices. The tumor was first mobilized by dividing the Ligament of Treitz. The root of the mesentery was approach next. Once the main trunk of the SMA was identified dissection proceeded proximally along the periadventitial plan until the left renal vein was reached thus achieving *en-bloc* lymphadenectomy. Arterial collaterals and venous branches were divided between Hem-o-lok® (Teleflex Medical, Research Triangle Park, NC, USA) or ligatures. Once the specimen was detached from the mesenteric root the bowel was divided using an endoscopic stapler loaded with a vascular cartridge. In preparation for the intestinal anastomosis the duodenum was further

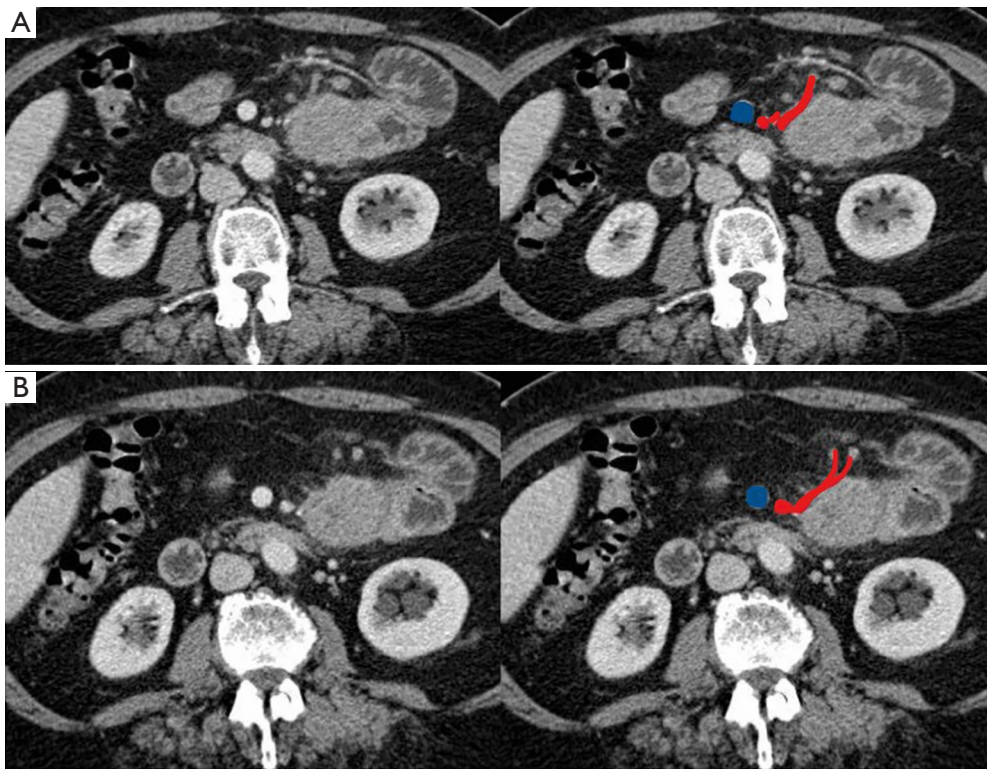


Figure 2 CT scan. (A) Relationship between the tumor and the first jejunal artery. (B) Relationship between the tumor and additional arterial branches.

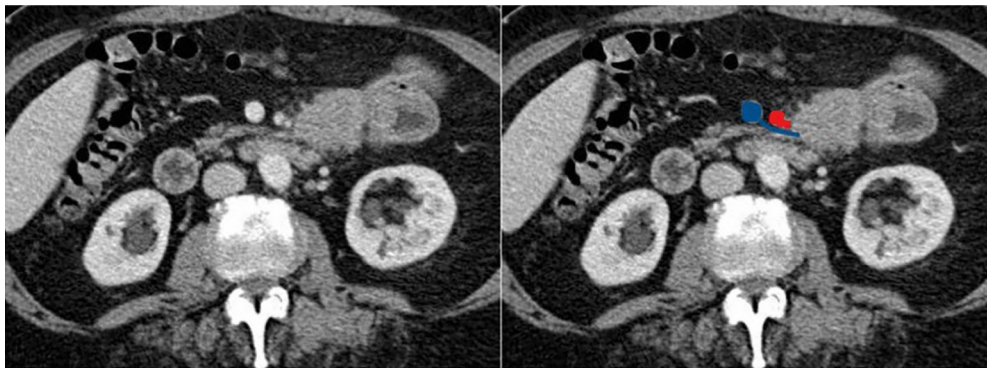


Figure 3 Relationship between the lesion and the first jejunal vein.

mobilized on a posterior plane until the second duodenal portion. An end-to-end anastomosis was then performed in a double layer using 4-0 polydioxanone sutures (PDS®, Ethicon, Inc., Piscataway, NJ, USA). Two half-running sutures were used for the inner layer while interrupted, seromuscular, sutures were used for the outer layer. The specimen was placed in an endoscopic jar and retrieved

through a small transverse suprapubic incision.

The procedure is shown in detail in the video (*Video 1*) provided as supplementary material.

Operative time was 305 minutes. Estimated blood loss was minimal and the patient required no blood transfusions. Histology revealed a moderately differentiated adenocarcinoma. A total of 22 lymph nodes were examined

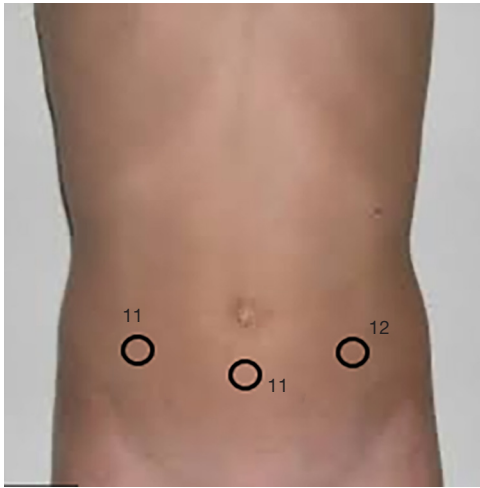


Figure 4 Operative ports.

and one was found to harbour cancer cells. The final tumor stage was pT3N1 G2. Postoperative hospital stay was regular and the patient was discharged on day 10.

Discussion

Small bowel cancer is a very uncommon tumor, representing about 3% of cancers of the gastrointestinal tract (8). The main histological types of the small intestine tumors are adenocarcinoma, neuroendocrine tumor, gastrointestinal stroma tumor (GIST), and lymphoma (9,10). The incidence of small bowel adenocarcinoma (SBA) is between 30% to 40% of all small intestinal malignancies (10). At diagnosis, patients usually complain about local complications associated with the tumor growth such as bowel obstruction, bleeding, or abdominal pain (11-13). According to the NCCN, the preoperative evaluation of these patients must include complete blood count, carbohydrate antigen 19-9 and CEA assays, and CT scan. An upper gastrointestinal endoscopy is also required to obtain tissue diagnosis (14). Surgical resection with en bloc removal of the regional lymph nodes is mandatory for local (stage I-III) SBA. The type of surgical resection for SBA depends on the position of the tumor, ranging from segmental resection of the small bowel for tumor of the jejunum or ileum to extensive pancreatic resections for duodenal tumors. There are no reports providing quality scientific evidence on the best surgical approach. However, anticipated difficulties in dissection and reconstruction suggest that a minimally invasive approach should be considered selectively and only



Video 1 Video of laparoscopic resection of the first jejunal loop for adenocarcinoma.

in centers with sound experience in advanced minimally invasive procedures.

The case described herein and presented in the video (*Video 1*) shows the resection of a bulky tumor located at the DJJ. Position and size of the tumor, as well as the presence of enlarged lymph nodes in the mesenteric root, clearly make this case very complex. Challenges, however, were not limited just to the dissection phase as reconstruction was at least equally demanding. Difficulties in creating the duodenojejunal anastomosis are multifold even in open surgery. First, the anastomotic site is located in a deep and narrow area. Second, the proximal stump is typically very short. Third appropriate configuration of the anastomosis is required to avoid angulation and functional bowel obstruction.

The extent of resections for adenocarcinoma involving the third or fourth duodenal portion and the anti-mesenteric side of the intestine is still a matter of debate. The main topic of debate concerns the number of harvested nodes, that could not be adequate in segmental resections of the duodenum as compared to radical pancreaticoduodenectomy due to the lack of dissection in the deepest retroperitoneal sites. However, a retrospective study found no difference in overall survival and disease-specific survival comparing segmental bowel resections and radical resection for SBA located at the DJJ (15). The NCCN advises a retrieval of at least 8 regional lymph nodes for adequate staging for all SBA (14).

The second critical point concerns anastomosis. In fact, the main difficulty of this anastomosis consists in having a short stump of the small bowel available for side-to-side anastomosis, after resection of the tumor at the DJJ. End-to-end duodenojejunostomy with hand-sewn

manner or end-to-side anastomosis with staplers or with hand-sewn manner have both been described. The end-to-end anastomosis seems more logical and there is no caliber discrepancy between the two extremities. Particular attention needs the vascularization of duodenal and jejunal loop, often precarious at the terminal portion of the stumps.

An end-to-end anastomosis was performed using a minimally invasive approach in our patient due to the extension of the resection and the shortness of the duodenal stump.

Conclusions

Laparoscopic resection for SBA of the DJJ is a challenging procedure due to its anatomical complexity. Nevertheless, in the hands of expert surgeons with advanced laparoscopic skills, resection for SBA is feasible and can comply with established oncological standards.

The rarity of these tumors makes it difficult to achieve high level evidence on surgical and oncologic outcomes.

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Footnote

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Ethical Statement: The authors are accountable for all

aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participant was in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Declaration of Helsinki (as revised in 2013). 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 editorial office of this journal.

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