Laparoscopic Treatment of Cystadenocarcinoma of the Appendix Penetrating in the Sigmoid Colon

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ABSTRACT

Adenocarcinoma of the vermiform appendix is a rare neoplasm of the gastrointestinal tract that most commonly presents as right lower abdominal pain, mimicking acute appendicitis. Presentation caused by loco-regional spread with involvement of adjacent structures is rare. An accurate and complete preoperative diagnosis has been rare in the past; however, modern imaging techniques allow recognition of most complications and associated conditions. The diagnosis is confirmed postoperatively. Aggressive surgical management is the treatment of choice in appendicular adenocarcinoma. We report the case of appendicular mucinous cystadenocarcinoma in a 55-year-old lady with penetration of the sigmoid colon treated with laparoscopic-assisted sigmoid and en block right hemicolecctomy.

It was possible to manage this complex case by using a laparoscopic procedure with all the known benefits of minimally invasive surgery.

Key Words: Appendix tumor, Laparoscopic procedure, Laparoscopic hemicolecctomy.

INTRODUCTION

Adenocarcinoma of the vermiform appendix is a rare neoplasm of the gastrointestinal tract with an incidence of about 0.1% to 0.2%. Primary appendiceal cancer is diagnosed in 0.9% to 1.4% of appendectomy specimens.1,2 Age-adjusted incidence of cancer of the appendix is 0.12 cases per 1 000 000 per year. These rare tumors are seldom suspected before surgery, and <1/2 are diagnosed intraoperatively.1,3–6

The most common presentation of appendiceal malignancy is right lower abdominal pain that often mimics acute appendicitis. Right iliac fossa mass and intestinal obstruction have also been reported; these presentations reflect various stages of a locally expanding tumor causing luminal obstruction of the appendix. Presentation caused by loco-regional spread with involvement of adjacent structures is rare.

There are other clinical presentations, and we report herein a case of appendicular adenocarcinoma found unexpectedly in a patient who presented to the gastroenterology unit with per-rectal bleeding. The patient is a 55-year-old lady admitted with rectal bleeding due to the penetration of mucinous adenocarcinoma of the appendix into the sigmoid colon. We performed laparoscopic-assisted sigmoid and en block hemicolecctomy. Based on a review of the literature, this is the first reported case of an appendiceal malignancy presenting and being treated in this manner.

CASE REPORT

We diagnosed a case of appendicular mucinous cystadenocarcinoma found unexpectedly in 55-year-old lady admitted to the gastroenterology unit with per-rectal bleeding. The patient is a 55-year-old lady admitted with rectal bleeding due to the penetration of mucinous adenocarcinoma of the appendix into the sigmoid colon. We performed laparoscopic-assisted sigmoid and right en block hemicolecctomy. Based on a review of the literature, this is the first reported case of an appendiceal malignancy presenting and being treated in this manner.

Her past medical history revealed hyperthyroidism for 12 years treated by radioactive iodine. She was operated on 2 years earlier for left atrial myxoma.

Colonoscopy revealed evidence of external compression in the rectosigmoid junction with tumor infiltration of the sigmoid mucosa. In the rest of the colon, there was a small...
polyp in the ascending colon that was removed by snaring.

Gastrografin enhanced CT-scan after per rectal filling and maximal distension of the rectum and sigmoid colon revealed a tightly stenosed 6.5-cm lumen in the distal part of the sigmoid colon. Specifically, this segment of the sigmoid colon was infiltrated by a 6 cm x 6 cm large hypo-dense irregular tumor mass that also infiltrated part of the adjacent ileum. This tumor mass was connected to the end of the appendix, which had a diameter of 1.2 cm (Figure 1). The surrounding fat tissue was increasingly dense with no significant lymphadenopathy.

The clinical investigations, CT and colonoscopy, indicated the possibility of appendicular carcinoma with an infiltrated sigmoid colon. The patient was prepared for laparoscopic exploration and further intervention.

**Procedure**

A laparoscopic sigmoid colectomy was performed first. With the patient in the supine position, pneumoperitoneum was established with the so-called open technique, and 4 trocars were placed in the upper, lower, left, and right abdomen. The operation was carried out with a Harmonic scalpel. The chief surgeon operated from the right side via the first monitor placed at the left side of the patient, and the assistant was on the left side. Exploration of the abdomen showed a conglomerate tumor in the pelvis with involvement of the cecum and sigmoid colon. For sigmoid and right colon resection, we mobilized, devascularized, divided, and resected the colon intracorporally.

The retroperitoneum was incised medial to the left ureter, and the left hypogastric nerve was cautiously identified. The lateral peritoneal attachment of the sigmoid colon was divided. After the sigmoid colon had been mobilized, 2 mesenteric windows were created at the sigmoid mesentery, one at the level of the rectosigmoid junction, and the second at the midsigmoid level. The inferior mesenteric vessel was divided with a vascular stapler, and the mesosigmoid was dissected up to the proximal part of the sigmoid colon. Tubular resection of the sigmoid colon was accomplished. After that, the distal part of the sigmoid colon and the proximal rectum were mobilized under the tumor mass attachment.

Following this, we mobilized the right colon as described previously. The chief surgeon operated from the left side of the patient, and the endoscope was placed into the left paraumbilical trocar. To carry out the lymphadenectomy simultaneously with the resection of the vascular stem, primarily the laterally running ileocolic/right colic arteries and the branches of the superior mesenteric artery were sought out, exposed, and ligated using a window technique.

The laterocaudal mobilization extended to the cecal pole and the terminal ileum, cranially to the ascending and meso-ascending colon until the mesenteric root in the outflow area of the lateral colonic vessels.

After the terminal ileum was mobilized, the ileum was divided with a stapler. At this stage, the tumor mass including the sigmoid colon and fully mobilized cecum and distal part of the sigmoid colon under the tumor were well visualized and easily divided. With this action, the involved sigmoid colon was intracorporally resected.

As the preparation was advanced cranially, the lateral abdominal wall ties were released, at first, using the ultrasonic dissector or scissors step-by-step until the flexure. Then, the ascending colon was released of its retroperitoneal ties. With a properly layered dissection towards the aorta between the posterior side of the meso ascending colon and the renal fascia, the preparation was continued until the horizontal part of the duodenum came into view and the stump was detached from its mesenteric ties. A dissection rod was indispensable for the traumatic dissec-
tion, because the embryonically preformed tissue strands were best detached from one another by blunt dissection.

With detachment of the right colonic flexure, the status of the already mobilized colomesenteric segment changed in such a way that a caudal dissection of the flexure could become complicated, eg, at the vascular stems, due to visual obstruction by the falling intestinal convolution.

After complete mobilization of the right-sided colon intended for resection, the pneumoperitoneum was released, the trocar removed, and the incision extended for minilaparotomy. Externalization of the prepared sigmoid and right colon was carried out through a foil ring introduced into the minilaparotomy over the symphysis pubis for wound protection. After the right transverse colon was divided extracorporeally and the specimen removed, the distal ileum was exteriorized (Figure 2). Side-to-side ileo-transverse anastomosis was performed with a linear stapler.

Sigmoid anastomosis was achieved in the typical manner. After the anvil was placed in the descending colon, then retained into the abdomen, the incision was closed. We placed the stapler through the rectum and mated it with the anvil laparoscopically to complete the colorectal anastomosis.

Operation time was 120 minutes, and estimated blood loss was 100mL. The postoperative course was uneventful. First flatus was recognized on the second postoperative day, a solid diet was started on the third postoperative day, and the patient was discharged and went directly home on the eighth postoperative day (Figure 4). Histopathological examination showed mucinous adenocarcinoma of the appendix with infiltration of the sigmoid colon of about 6 cm (Figure 3). About 20 examined lymph nodes were negative for malignancy. Staging was T4N0Mx.

The patient seen 2 months after surgery was in good general condition with no complications.

DISCUSSION

Primary adenocarcinoma of the appendix is a rare neoplasm of the gastrointestinal tract and constitutes about...
0.5% of all gastrointestinal tract tumors. More than 500,000 appendectomies are performed each year in the United States. Primary appendiceal cancer is diagnosed in 0.9% to 1.4% of appendectomy specimens. These rare tumors are seldom suspected before surgery, and less than one-half are diagnosed intraoperatively. Several studies describing primary tumors of the appendix have appeared in the literature since 1903, when Elting published a review and case series.

There are 4 major histological subtypes: cystic, colonic, carcinoid, and adenocarcinoid. Carcinoids are most common, constituting nearly 90% of all the primary tumors of the appendix. Mucinous cystadenocarcinoma is the second most common type of appendicular tumor. Macroscopically, they produce mucin-filled cystic dilatation of the appendix indistinguishable from that associated with benign tumors.

Diagnosis of malignancy is made using 2 features: invasion of the appendicular wall and identification of epithelial cells in peritoneal mucous collections. Spread of the neoplasm above the diaphragm or invasion of the abdominal viscera is exceptional, and lymphatic and hematogenous spread is also very rarely seen.

Sometimes this tumor may present in an unusual manner like polyplody infiltration of the abdominal wall, bladder infiltration mimicking bladder carcinoma, cecocecal intussusceptions, retroperitoneal abscess, vaginal hydronephrosis, or per-rectal bleeding.

Carcinoma of the appendix has always been a diagnostic dilemma. Patients usually present with features of appendicitis. Sometimes they may present with distension of the abdomen due to pseudomyxoma peritoneum and obstruction of the gut due to involvement of the colon. Even if an appendicectomy has been performed previously, cystadenocarcinoma of the appendicular stump may develop; therefore, the possibility of carcinoma in the appendicular stump that increases in size should be born in mind.

Accurate and complete preoperative diagnosis has been rare in the past, but modern imaging techniques today allow us to recognize most of the complications and associated conditions.

Laparoscopy has benefits for patients. Also in such advanced cases with clear preoperative examination, it should not to be considered a contraindication to performing laparoscopic surgery.

CONCLUSION

Due to intraperitoneal spread of the appendicular carcinoma, invasion of the abdominal viscera, as in our case, and the poor prognosis of this tumor, an aggressive approach should be taken when treating patients with this type of tumor.

We performed laparoscopic-assisted sigmoid and right en block hemicolectomy.

Further development of instruments and techniques has made it possible to apply laparoscopic surgery to malignant diseases in such complex cases as we have described. Compared with conventional surgery, laparoscopic surgery is beneficial with respect to short-term outcomes, including earlier recovery and less need for postoperative analgesia.

Radiotherapy, chemotherapy, and new therapeutic modalities like radioimmunotherapy and matrix metalloproteinase inhibitors have still to be proven by prospective analysis.

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