

The Role of Extended Resection in Locally Recurrent Colorectal Cancer with Invasion of the Aortoiliac Bifurcation: a Rare Clinical Case

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Abstract

Colorectal carcinoma (CRC) is the third most common cancer and the fourth deadliest. Despite recent advances in screening methods and preoperative imaging techniques, the threat of colorectal cancer remains at an all-time high. Moreover, even after curative treatment, disease recurrence occurs in up to 40% of all cases. However, half of patients with recurrent disease do not register any distant metastases. Therefore, much effort should be expended in identifying and evaluating these patients, as many of them are suitable candidates for en bloc resections with perioperative chemoradiation. In fact, it has recently been found that overall survival benefits greatly from extended resections, provided that free margins are achieved intraoperatively. In this case report, we will present a case of locally advanced recurrent colorectal cancer invading the aortoiliac axis and our approach to achieving a R0 resection.

Keywords

aortoiliac bifurcation, large vessel grafting, locally recurrent colorectal cancer

INTRODUCTION

Colon cancer remains one of the most common cancers worldwide and is a leading cause of cancer-related deaths. In colon cancer patients, multimodal treatment focused on surgical resection is the only curative option, despite the fact that up to 35%–40% of patients experience recurrence.^[1,2] It is important to differentiate between primary locally advanced and recurrent rectal cancer, as the 5-year survival of patients treated for recurrent rectal cancer is between 15% and 55%^[3], whereas primary locally advanced rectal

cancer registers a 5-year survival of about 40% to 70%^[4].

An extended analysis of necropsy reports in patients with recurrent colorectal carcinoma, reveals that approximately 50% of recurrences are without evidence of distant disease. Therefore, complete surgical resection offers the potential for a cure, granted that negative margins at the time of surgery are achieved.

To back this up, the Mayo Clinic identified 12 patients (7 women and 5 men) with aortoiliac involvement in a series of 406 patients who underwent surgery for local recurrence.^[5] The median age of patients was 51 years, with a

range of 31 to 74 years. Major vessel involvement was based on preoperative imaging studies, and the findings report involvement of the internal iliac artery (n=7), common iliac artery (n=5), external iliac artery (n=3), aorta (n=3), internal iliac vein (n=2), and external iliac vein (n=1). Seven patients required arterial reconstruction (3 aorta, 5 common iliac, 3 external iliac), and 1 patient underwent synthetic venous reconstruction. The most common techniques included synthetic interposition grafts^[6], femoral-femoral bypass, or primary anastomosis. The post-operative period in most patients was unremarkable and a follow-up registered an overall and disease-free survival at 4 years of 55% and 45%. This study concluded that in a large number of patients (58%), R0 resection was achieved with minimal severe morbidity and no mortality, with long-term survival in more than 50% of patients.

CASE REPORT

A 37-year-old female with a prior history of sigmoid resection due to colorectal carcinoma with proceeding adjuvant chemotherapy was admitted to the general surgery clinic after a colonoscopy confirmed a spontaneously sanguinating polypoid growth at the level of anastomosis, located 15 cm from the anal verge. The patient reported that she had recently gone through episodes of severe stomach pain, nausea, vomiting, appetite loss, and flatulence cessation. Preoperative CT-scanning revealed a local recurrence with invasion of the left ureter^[7] and hydronephrosis. The patient was deemed a viable candidate to undergo resection and a laparotomy was performed. A large mass on the anastomotic border was identified as invading the uterus, the left ureter, and the appendix. Large lymph nodes were noted in the para-aortic space, along the common iliac arteries and in intimate relation to the aortoiliac bifurcation. In addition, there were two ventral metastatic lesions in the region of the rectus abdominis muscle. An en bloc resection was then carried out, removing the left hemicolon, appendix, uterus, left ureter, and all visualized lymph nodes, as well as the lesions in the

abdominal wall. The aorta and iliac vessels were dissected from the surrounding tissue. After heparinization, the abdominal aorta was clamped 2 cm proximally to the tumor. The two iliac arteries were clamped 3 cm distally to the tumor. The aortic bifurcation was then transected. A #12 vessel graft was interposed between the aorta and left iliac artery, and an end-to-end anastomosis was done using a 5-0 running suture. An end-to-side anastomosis was done, placing a #8 graft and a side-to-side anastomosis with a 4-0 running Prolene suture connected that to the right iliac artery. The graft patency was verified and three flasks of protamine sulphate were administered. No leakage along the anastomoses was noted. The proximal rectum was transected with the aid of a TA-45 stapler and a temporary colostomy was placed. Postoperatively, the patient experienced an episode of lower limb ischemia as a result of cloth formation, which was treated via endarterectomy. Also, due to obstruction of the left ureter as a result of mass compression, the patient had been diagnosed with hydronephrosis, which was managed by placement of a nephrostomy to facilitate drainage. She was transferred back to the surgical ward after receiving intensive care in an ICU and was discharged almost a month after the initial surgery. Follow-ups were uneventful, and it was decided that the patient should continue chemotherapy and undergo radiation therapy (Figs 1-4).

DISCUSSION

The largest reported series of attempted salvage surgeries for locoregional recurrences was made by Memorial Sloan-Kettering Cancer Center (MSKCC) and the Mayo Clinic. The Mayo Clinic series included 73 patients who underwent surgical exploration for locoregional recurrence. All patients received either external beam radiation and/or intraoperative radiation in the course of their treatment. For the entire cohort, the actuarial 5-year survival was 25%, and the median survival was 33 months. Complete R0 resection was accomplished in 38 patients (52%) and was associated with significantly improved 5-year survival rate of

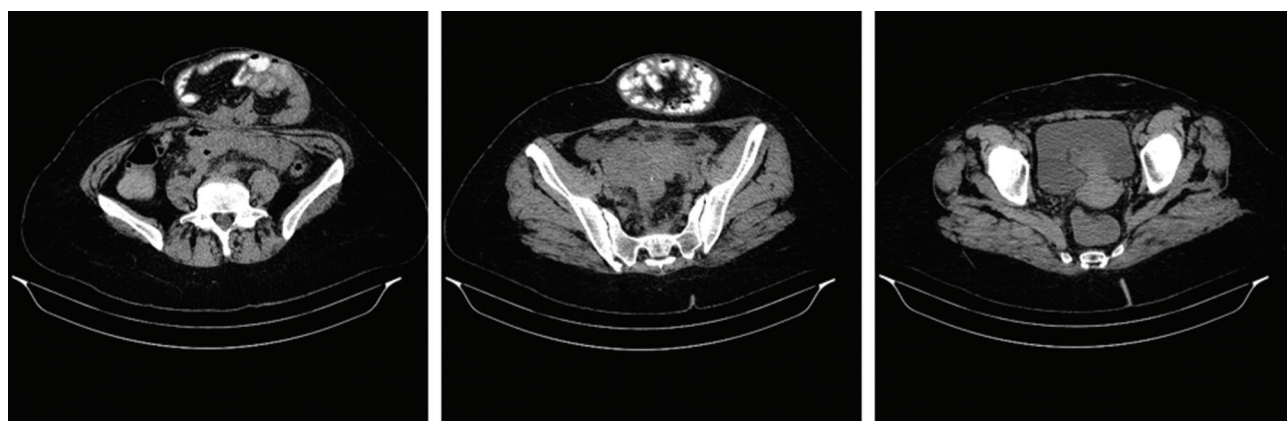


Figure 1. The sequence of cross-section images taken from the preoperative CT scan.

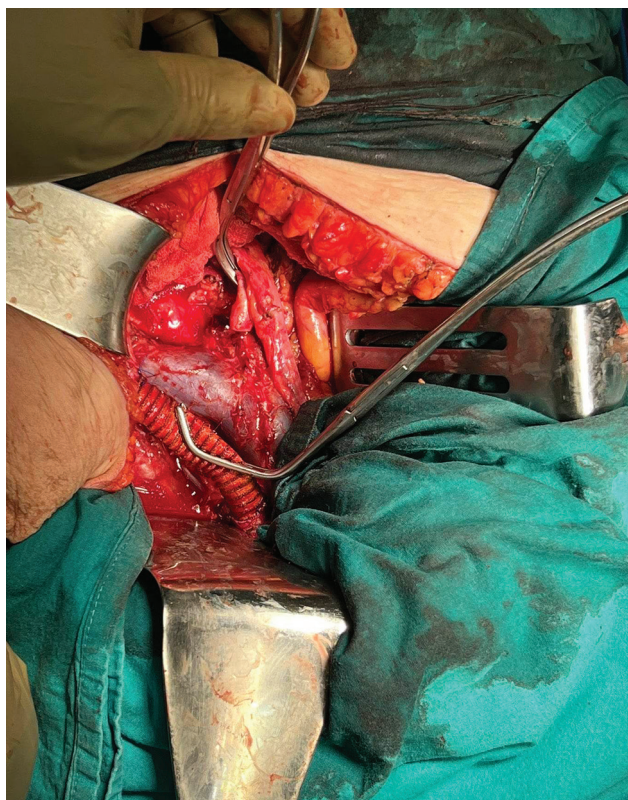


Figure 2. The first conduit connecting the aorta and the left iliac artery has been placed, the right iliac artery and the side of the graft have been clamped in preparation for end-to-side anastomosis.



Figure 3. The two-component graft has been placed and all clamped vessels have been released. No visible leaks are noted confirming patency.

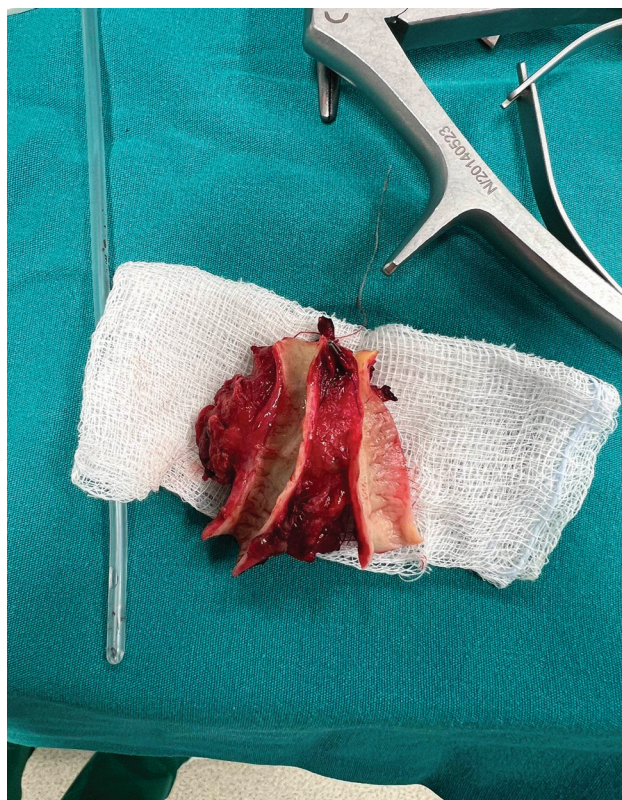


Figure 4. The final view of the en bloc resection. The whole specimen is further examined to confirm clear margins.

37%. Thirty-five patients had incomplete resection with a 25% 5-year survival noted in the R1 cohort and no 5-year survivors in the R2 group.

The MSKCC outlines a series of 100 patients who underwent surgery with curative intent, 56 of which were completely resected. Forty-one of these 56 patients required extended resection with en bloc removal of adjacent organs or structures. The ureter, kidney, stomach, uterus, pancreas, and abdominal wall were the most commonly affected structures. Nine patients required resection of multiple organs. In the 56 patients who underwent complete R0 resection, the 5-year survival was 58% and the median survival was 66 months. Incomplete resection resulting in either microscopic R1 or macroscopic R2 residual disease was associated with significantly worse results. Median survival for the R1 group (n=11) and R2 group (n=9) was 25 months. There were no 5-year survivors in either of the incomplete resection cohorts. This study also notes some factors associated with complete R0 resection of locoregional recurrence. Patients with a single site disease, perianastomotic versus mesenteric, retroperitoneal or peritoneal recurrence, low pre-salvage CEA and an absence of distant disease were more likely to be rendered free of disease after salvage surgery. Patients with peritoneal disease and nodal/mesenteric recurrence, two sites of local recurrence, elevated CEA and synchronous distant disease are unlikely to be completely resected and may be better suited for neo-adjuvant therapy.

Because large vessel involvement in recurrent colorectal cancer poses technical challenges, many doctors, until recently, regarded invasion of the aortoiliac bifurcation as a contraindication to curative resection. Despite the small number of cases, recent reports indicate that extended en bloc resections for recurrent colon cancer with aortoiliac axis involvement may improve survival and quality of life when compared to palliative surgery.^[8] Therefore, a multimodality approach is mandatory in such cases. Preoperative imaging is key to determining the extent of the disease. Magnetic resonance imaging (MRI) is currently at the forefront, with newer-generation CT scans gaining ground. Treatment includes pre and postoperative chemotherapy, preoperative and intraoperative radiation^[9], and adequate surgical excision^[10]. Absolute contraindications for resection are: unresectable distant metastases, bilateral pelvic sidewall disease involving the lumbosacral plexus, extension to the lumbar spine, and those in whom gross residual disease is anticipated.

CONCLUSIONS

Locally advanced colon cancer and recurrent colon cancer can invade almost every surrounding organ. Until recently, it was thought that invasion of the larger vessels of the abdomen was a contraindication for surgery. However, with recent advances in surgical techniques and pre-operative diagnostic imaging, we are confident that en bloc resections will become more common in the future.^[11] In support of this, recent studies have shown a significant increase in the survival of patients who have undergone extended resections, provided that a meticulous pre- and postoperative treatment plan is formed. A tight collaboration between different specialties is essential.

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Competing Interests

The authors have declared that no competing interests exist.

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Роль расширенной резекции при локально-рецидивном колоректальном раке с инвазией аорто-подвздошной бифуркации: редкий клинический случай

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Резюме

Колоректальная карцинома является третьим по распространённости раком и четвёртым по смертности. Несмотря на недавние достижения в методах скрининга и методах предоперационной визуализации, угроза колоректального рака остаётся на рекордно высоком уровне. Более того, даже после радикального лечения рецидив заболевания происходит в 40% всех случаев. Однако у половины больных с рецидивом заболевания не регистрируют отдалённых метастазов. Следовательно, необходимо приложить много усилий для выявления и оценки этих пациентов, поскольку многие из них являются подходящими кандидатами для резекции единым блоком с периоперационной химиолучевой терапией. Фактически, недавно было обнаружено, что общая выживаемость значительно увеличивается при расширенных резекциях при условии, что свободные края достигаются интраоперационно. В этом отчёте мы представим случай местно-распространённого рецидивирующего колоректального рака с поражением аорто-подвздошной оси и наш подход к выполнению резекции R0 резекции.

Ключевые слова

аорто-подвздошная бифуркация, пластика крупных сосудов, местно-рецидивирующий колоректальный рак