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Total sacrectomy for recurrent rectal cancer – A case report featuring technical details and potential pitfalls



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ABSTRACT

INTRODUCTION: Total sacrectomy for recurrent rectal cancer is controversial. However, recent publications suggest encouraging outcomes with high sacral resections. We present the first case report describing technical aspects, potential pitfalls and treatment of complications associated with total sacrectomy performed as a treatment of recurrent rectal cancer.

PRESENTATION OF CASE: A fifty-three year old man was previously treated at another institution with a low anterior resection (LAR) followed by chemo-radiation and left liver tri-segmentectomy for metastatic rectal cancer. Three years following the LAR, the patient developed a recurrence at the site of colorectal anastomosis, manifesting clinically as a contained perforation, forming a recto-cutaneous fistula through the sacrum. Abdomino-perineal resection (APR) and complete sacrectomy were performed using an anterior–posterior approach with posterior spinal instrumented fusion and pelvic fixation using iliac crest bone graft. Left sided vertical rectus abdominis muscle flap and right sided gracilis muscle flap were used for hardware coverage and to fill the pelvic defect. One year after the resection, the patient remains disease free and has regained the ability to move his lower limbs against gravity.

DISCUSSION: The case described in this report features some formidable challenges due to the previous surgeries for metastatic disease, and the presence of a recto-sacral cutaneous fistula. An approach with careful surgical planning including consideration of peri-operative embolization is vital for a successful outcome of the operation. A high degree of suspicion for pseudo-aneurysms formation due infection or dislodgement of metallic coils is necessary in the postoperative phase.

CONCLUSION: Total sacrectomy for the treatment of recurrent rectal cancer with acceptable short-term outcomes is possible. A detailed explanation to the patient of the possible complications and expectations including the concept of a very high chance for recurrence is paramount prior to proceeding with such a surgery.

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1. Report

1.1. Background

Traditionally, cancer rectal surgeries requiring S1 and S2 nerve root resections have been considered inoperable. This is mostly due to perceived low possibility for cure and high morbidity rates.^{1,2} However, recent reports suggest encouraging outcomes with high sacral resections.^{3,4} A nine patient series from the Mayo Clinic, which included one resection at L5–S1 level, was recently published suggesting that high sacrectomy can be performed with acceptable results. The reported median survival was 31 months. All deaths were due to metastatic disease.³

Although complete sacrectomy for recurrent rectal cancer is often rejected by colorectal surgeons, it is part of an extended skill set for spinal and reconstructive surgeons that deal with primary malignant tumors such as chordoma, chondrosarcoma, and plasmacytoma.⁵ A review of surgical management of these lesions has been published by a team from Stanford University Medical Center.⁶

This is the first case report which describes technical details, potential pitfalls and treatment of complications of total sacrectomy when performed as a treatment for recurrent rectal cancer.

2. Presentation of case

A fifty-three year old man was initially treated at another institution with LAR for a T3N0M0 rectal cancer located 5 cm from the anal verge. Because of obstructive symptoms, it was decided to proceed with a resection up-front without neo-adjuvant

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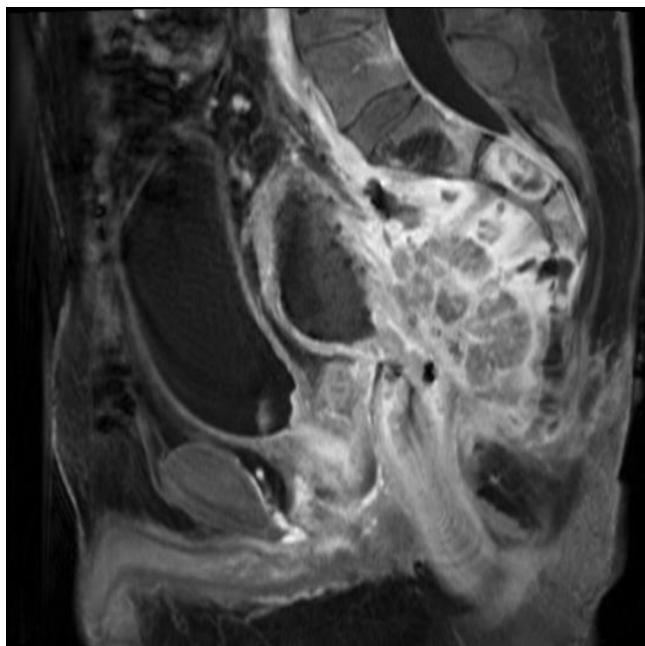


Fig. 1. Sagittal CT scan view of recurrent rectal cancer which presented as a retroperitoneal perforation forming a recto-cutaneous fistula through the sacrum with extensive adjacent soft tissue infection and necrosis.

treatment. Subsequently, the patient developed an anastomotic leak, which required a diverting loop ileostomy. Following recovery, the patient was treated with adjuvant chemo-radiation therapy, after which, the diverting ileostomy was reversed. A year after the initial diagnosis, the patient was found to have extensive left-sided liver metastases which were treated with chemotherapy, and left-sided liver tri-segmentectomy. As a consequence of all these surgeries, the patient developed a large incisional hernia extending from the site of the Kocher incision to the site of prior ileostomy. The hernia was repaired laparoscopically with a prosthetic mesh. Three years following the initial diagnosis, the patient was referred to our center with an anastomotic recurrence. This recurrence presented as a retroperitoneal perforation forming a recto-cutaneous fistula through the sacrum with extensive adjacent soft tissue infection and necrosis (Fig. 1). The patient's quality of life was poor.

The diagnosis and treatment options were reviewed in a multidisciplinary setting and with the patient. Both operative and non-operative options were discussed. An APR with total sacrectomy was offered. With respect to the proposed surgery, the patient was made aware of inevitable loss of bowel, bladder and sexual functions. Other risks discussed included significant blood loss, permanent lower extremity neurological injury, lower body mobility impairment, cerebrospinal fluid leak, persistent infection, hardware failure, structural non-union, tumor recurrence, and death. The surgical team involved colorectal, spinal, and plastic surgery consultants.

APR with complete sacrectomy was performed using an anterior–posterior approach with posterior spinal instrumented fusion and pelvic fixation using iliac crest bone graft. Left-sided vertical rectus abdominis and right-sided gracilis muscle flaps were used for closure of the perineal and pelvic defects.

2.1. Operative details

2.1.1. Rectal mobilization

In supine position, after insertion of ureteric stents, a generous laparotomy extending from the xiphoid process to the pubic symphysis was performed. A dilated descending colon was observed,

proximal to the disease complex, due to the stenosing nature of the recurrent pelvic lesion. The left colon was dissected off the retro-peritoneum and the splenic flexure was mobilized. Dissection of the rectum was started anteriorly until the seminal vesicles were reached and then continued down to the levator ani. The lateral rectal space contained purulent fluid related to the perforation. This fluid was promptly aspirated. Once the dissection of the anterior and lateral side of the rectum was completed from the abdominal approach, the operation continued through the perineal approach. The dissection of the anus was carried around the external sphincter cephalad reconnecting with the abdominal dissection. The rectum was then divided above the sacral promontory.

After opening of the posterior peritoneum, the aorta and the vena cava were dissected off the spine distal to the paramesenteric bursa. The dissection continued with the isolation of the common iliac artery and common iliac vein on the right side and ligation of the right internal iliac vessels. Pre-surgery radiation therapy and extensive inflammation triggered by the anastomotic leak made the dissection of the left iliac vessels very challenging since they were completely adherent to the pelvis. It was possible to ligate and divide the left internal iliac artery but it was not feasible to isolate the left common iliac vein and safely ligate the left internal iliac vein. The decision was made to continue the mobilization of the remainder of the pre-sacral soft tissue to free up the sacrum as much as possible anteriorly. The team elected to carry out the surgery in two steps and perform embolization of the left iliac vein and coiling of the internal iliac branches under radiological guidance, before completing the sacrectomy, to reduce bleeding during the posterior phase of the operation.

The plastic surgery team was called in and a left-sided vertical rectus abdominis myocutaneous flap was raised. The origin of the deep inferior epigastric artery was dissected. Although the patient had a previous incisional hernia repair done laparoscopically, the tacks used to anchor the mesh to the abdominal wall were easily dissected off the muscle. Marking sutures were used in order to maintain orientation of the flap at all times.

2.1.2. Sacral resection – anterior approach

The psoas muscles lateral to the sacrum were incised and the lumbosacral plexus was visualized bilaterally. The L5 and S1 nerve roots were identified and the S1 nerve roots were sacrificed bilaterally by transecting them sharply with a scalpel after tying them off with a #2 silk. The sacroiliac joints were identified bilaterally first with intraoperative fluoroscopic imaging and subsequently by direct visualization after continuation of the psoas mobilization down to bone. The L5–S1 disk space was exposed just above the sacral promontory at the bifurcation of the aorta and vena cava. A discectomy at the L5–S1 disk space was completed. The annulus fibrosus was incised anteriorly with a disk knife. The nucleus pulposus was then evacuated with pituitary rongeurs, and finally, the annulus fibrosus and posterior longitudinal ligament were incised to expose the thecal sac. Assisted by both direct visualization and intraoperative fluoroscopic imaging, an osteotome was used to create a longitudinal osteotomy (anterior to posterior) 5 mm lateral to the sacroiliac joints bilaterally. While protecting the L5 nerve roots, the psoas muscle incisions were then continued in a horizontal fashion above the sacral ala to communicate with the L5–S1 discectomy.

The colostomy was fashioned on the right side of the abdomen since the left side of the abdominal wall had been raised to make the vertical rectus abdominis myocutaneous flap. The flap was then put inside the abdomen in its anatomical orientation through a small inferior fascial incision. The abdomen was closed and the patient was then turned prone.

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