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Case Report

Robot-Assisted Resection of Exposed Colon With TaTME After Heavy Ion Radiotherapy for Locally Recurrent Rectal Cancer: A Case Report

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Introduction: Heavy ion radiotherapy has shown promising results in treating pelvic recurrence of rectal cancer. We report a case in which a patient underwent robot-assisted low anterior resection with transanal mesorectal excision (TaTME) following heavy ion radiotherapy, owing to challenges associated with spacer placement.

Case presentation: A 54-year-old man was diagnosed with upper rectal cancer. He underwent robot-assisted low anterior resection. Eight courses of CapeOX were administered as postoperative adjuvant chemotherapy. Immediately after completion of adjuvant chemotherapy (8 months postoperatively), computed tomography (CT) scan revealed a 30-mm large nodule on the dorsal surface of the oral anastomotic intestine, which was detected by positron emission tomography–CT. Given that the tumor had an indistinct border with the sacrum and its superior margin extended to the second sacrum, it was concluded that a combined sacral resection was not advisable, and heavy ion radiotherapy was indicated. Robot-assisted low anterior resection combined with TaTME was performed approximately 2 months after heavy particle radiotherapy [73.6 Gy (relative biological effectiveness)/16 sessions]. CT scan conducted 3 months after irradiation revealed substantial shrinkage of the recurrent tumor.

Conclusion: Robot-assisted resection of exposed colon with TaTME after heavy ion radiotherapy is regarded as an effective strategy for treating locally recurrent rectal cancer.

Key words: Heavy ion radiotherapy – Local recurrence – Robot-assisted resection – TaTME

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Locally recurrent rectal cancer affects 10% to 20% of patients who undergo curative resection of rectal cancer.[1–3] Heavy ion radiation has the physical property of Bragg peak, which allows for highly dose-concentrated irradiation. Moreover, promising results have been documented for pelvic recurrence of rectal cancer.[4–7] However, when the tumor and the digestive tract are in close proximity, a spacer must be inserted between the tumor and digestive tract before particle irradiation. Here, we report a case in which a patient underwent robot-assisted low anterior resection with transanal mesorectal excision (TaTME) after heavy ion irradiation owing to difficulty with spacer placement.

Case Report

A 54-year-old man was diagnosed with rectal cancer. He underwent robot-assisted low anterior resection with lymph node dissection and diverting ileostomy creation. The resected specimen harbored a poorly differentiated adenocarcinoma measuring 45 mm × 40 mm and was classified as Stage IIIb [por, T3, N1b(2/14), H0, M0, P0, INFb, Ly0, V1b, Pn1a] according to the Japanese Classification of Colorectal, Appendiceal, and Anal Carcinoma. The surgical margin was negative. Eight courses of CapeOX were administered as postoperative adjuvant chemotherapy. Immediately after completion of adjuvant chemotherapy (8 months postoperatively), a computed tomography (CT) scan revealed a 30-mm large nodule on the dorsal surface of the oral anastomotic intestine, which was detected by positron emission tomography–CT (Fig. 1).

Because the tumor had an indistinct border with the sacrum and its superior margin extended to the second sacrum, it was concluded that a combined sacral resection was not advisable, and heavy ion radiation therapy was indicated. However, because of the proximity of the tumor to the rectum and its invasion into the mesorectum (Fig. 2), placing a spacer was challenging. Therefore, robotic-assisted low anterior resection combined with TaTME was performed approximately 2 months after heavy particle radiotherapy [73.6 Gy (relative biological effectiveness)/16 sessions].

Regarding intraperitoneal manipulation, the procedure commenced with the previous medial approach, progressing through the sigmoid mesentery and mesocolon before proceeding to the rectal dissection. The tumor area had an indistinct dissection layer; however, we incised into the mesorectum and proceeded to dissect the rectum (Fig. 3). We incised the omental bursa and mobilized the splenic flexure.

During the transanal manipulation, we closed the rectal lumen just below the previous anastomosis using a purse-string suture. Subsequently, the rectum

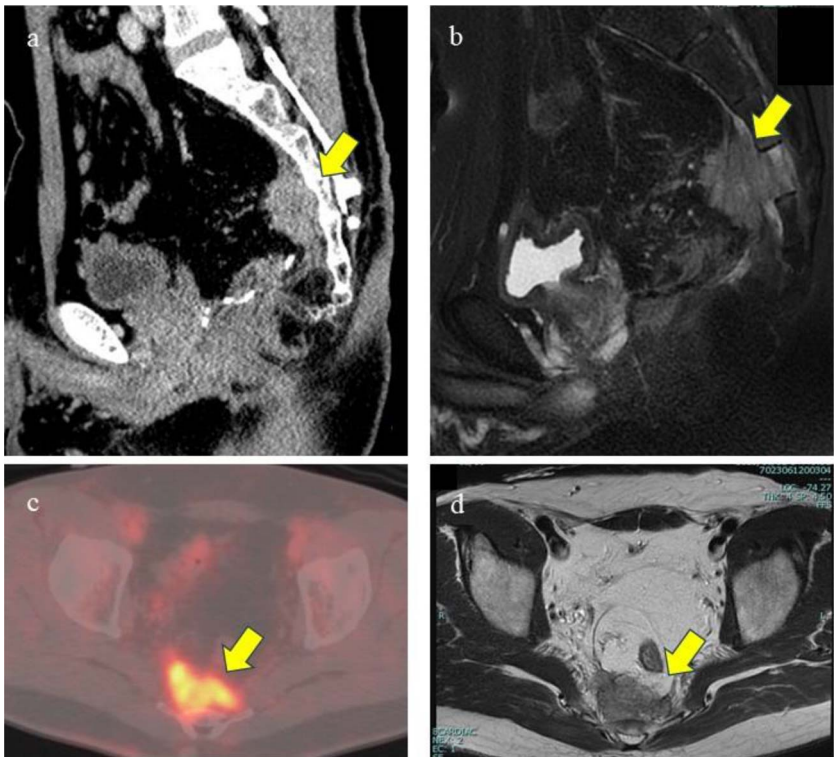

Fig. 1 CT, magnetic resonance imaging (MRI), and positron emission tomography (PET)-CT show a recurrent tumor of 30 mm in size on the dorsal surface (arrows). (a) CT, sagittal plane. (b) Fat-suppressed T2-weighted MRI, sagittal plane. (c) PET-CT, axial plane. (d) T2-weighted MRI, axial plane.

Fig. 2 CT and magnetic resonance imaging (MRI) show a tumor in close proximity to the rectum (arrows). (a) CT, axial plane. (b) T2-weighted MRI, axial plane.

was circumferentially incised using an electric cautery hook. We dissected the rectum upward along with the mesentery and surrounding fatty tissue (Fig. 3). When the 2 surgical fields were merged, the rectum was pulled out through the anus. Double stapling technique anastomosis was performed. The resected intestinal tract showed no mucosal damage with the unaided eye (Fig. 4) and no cancer cells pathologically. The postoperative course was good and the patient was discharged 14 days after the surgery.

CT scan conducted 3 months after irradiation revealed substantial shrinkage of the recurrent tumor.

Discussion

Surgical resection is the recommended treatment for local recurrence of rectal cancer when R0 resection is possible[8]; however, combined resection of the spine superior to the second sacrum is not advisable, and even when radical resection is achievable, serious complications are common.[9] Conversely, favorable results of heavy ion radiation for local recurrence of rectal cancer have been reported.[4–7] Heavy ion radiation therapy for local recurrence of rectal cancer has been reported to have a 5-year local control rate of 88%[7] and is noninferior to surgical resection. We believe that heavy ion radiation therapy is extremely useful in terms of radical cure and preservation of organ function. Additionally, chemoradiotherapy and total neoadjuvant therapy are increasingly being performed as multidisciplinary treatment for advanced rectal cancer.[10] Performing adequate X-ray re-irradiation for local recurrence of rectal cancer after X-ray irradiation is challenging because of the tolerable dose to the surrounding organs. However, heavy ion radiation can be effective in such cases.[11] Heavy ion radiation has high-dose concentration to target; however, some gastrointestinal complications have been reported in phase II trials for cervical and prostate cancer.[12,13] For this reason, a distance of at least 5 mm between the tumor and the intestinal tract is required to prevent complications such as intestinal perforation.

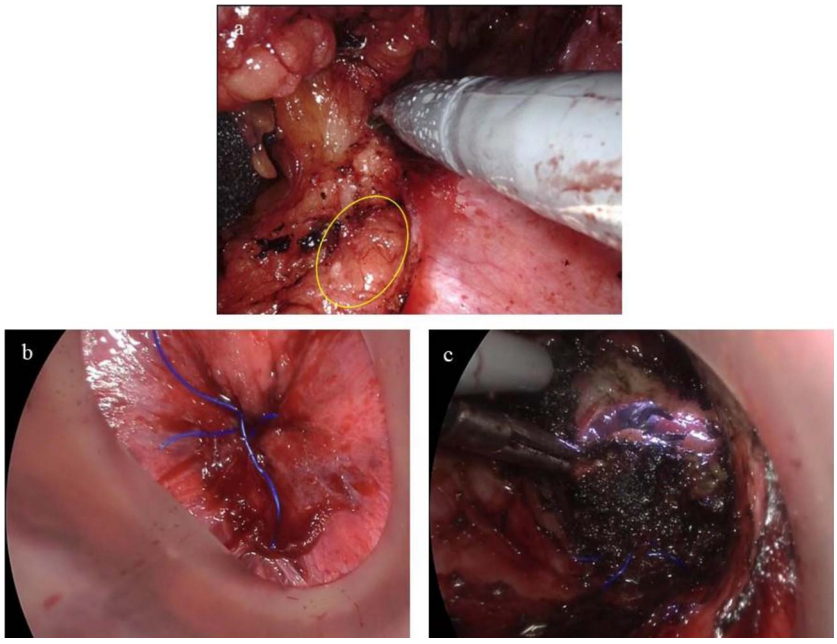

Fig. 3 (a) The tumor area (circle) has an indistinct dissection layer. Despite this, we incised into the mesorectum and proceeded to dissect the rectum. (b) The rectal lumen was closed just below the previous anastomosis using a purse-string suture. (c) The 2 surgical fields were merged.

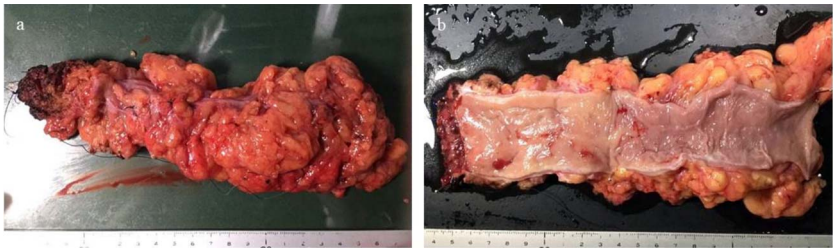

Fig. 4 (a) Serosal side. (b) Mucosa side.

If the tumor is in close proximity to the intestinal tract, insertion of a spacer before irradiation is recommended[14]; however, if they are in contact, as in the present case, tumor exposure or damage to the intestinal tract may occur. Because intestinal perforation caused by heavy ion radiation has a delayed onset,[12,13] we chose to resect the exposed colon after irradiation. This resection of the exposed colon was extremely challenging because it was a reoperation and the anastomosis of the first operation was very low. By using the robot in combination with TaTME, safe resection of the intestinal tract to an appropriate extent was possible.

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