Locally Recurrent Rectal Cancer Successfully Treated by Total Pelvic Exenteration with Combined Ischiopubic Rami Resection: Report of a Case

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INTRODUCTION

Locally recurrent rectal cancer (LRRC) occurs in 6–17% of cases after curative primary resection even in the current era of total mesorectal excision (1,2). Various treatments for LRRC have been performed, either singly or in multimodal therapy, such as external beam and/or intraoperative radiotherapy, chemotherapy and surgery (3–5). However, it is generally agreed among clinicians that the only treatment for a cure lies in a R0 resection (5–7).

LRRC easily progresses with local invasion to the adjacent pelvic organs and/or pelvic wall. Therefore, resection of LRRC is a challenging operation, which often requires a combined resection. Although this surgical procedure is difficult involving long operative times and high morbidities, it nonetheless results in the highest rate of R0 resections (5,8).

The sacrum is often resected together with other pelvic organs in the extended surgery for LRRC. However, combined ischiopubic rami resection is extremely rare in the field of gastroenterologic surgery. Lopez et al. (9) reported that, in their rare series of 34 cases with pelvic malignancy which required combined resection of the bony structure, ischiopubic rami resection was performed only for 3 cases with rectal cancer. We report a case of LRRC successfully treated by total pelvic exenteration (TPE) with combined ischiopubic rami resection.

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CASE REPORT

A 58-year-old male with a locally recurrent rectal tumor and liver metastases was referred to our hospital. He underwent an abdominoperineal resection for lower advanced rectal cancer at another hospital in April 2006. Pathological findings at that time indicated a stage IIA tumor which had infiltrated beyond the muscularis propria with no lymph node metastases (pT3N0M0). Twenty-nine months after the primary resection, computed tomography (CT) revealed a locally recurrent tumor in the pelvis and two liver metastases. He was judged to be contraindicated for curative rescue surgery and treated with infusional 5-fluorouracil (FU), levofolinate (LV) and oxaliplatin (mFOLFOX6) as first-line chemotherapy followed by subsequent infusional 5-FU, LV and irinotecan (FOLFIRI) for 1 year.

On admission, he had severe perineal pain and urinary retention due to obstruction of the urethra, requiring the placement of a urethral catheter. The serum carcinoembryonic antigen level was 17.8 ng/ml (normal range, <5 ng/ml). CT and magnetic resonance imaging (MRI) showed the perineal recurrent tumor, which invaded the prostate, urethra and obturator internus muscle, and two liver metastases with calcification in segments 4 and 7 (Figs 1 and 2). For achieving complete resection of the pelvic tumor, combined resection of the prostate and the proximal urethra, requiring division of the dorsal vein complex (DVC), was essential. However, the tumor invaded very closely to the DVC to open the Retzius space and to divide the DVC using the bunching method was judged to involve the risk of tumor exposure and to threaten the oncologic safe margins. To obtain secure R0 resection, TPE with ischiopubic rami resection, total emasculation and partial liver resection were planned.

SURGICAL APPROACH

According to the surgical approach, to achieve R0 resection and prevent massive bleeding is the most important points. Prior to transection of the pelvic bone, interception of the intrapelvic venous network is essential to avoid copious hemorrhage. In treating the internal iliac vessels (both artery and vein), first the arterial trunk was doubly ligated and divided bilaterally, and then several branches of the internal iliac vessels perforating the pelvic wall were divided. Finally, the trunk of internal iliac veins were tied and divided. After that, orthopedic surgeons performed transection of the bilateral superior pubic rami and right inferior pubic ramus using a threadwire, and of the left ischial tuberosity to the lateral margin of the obturator foramen sparing the hip joint (Figs 3 and 4). Left obturator nerve and vessels were divided. Although this type of pelvic resection causes a discontinuity of the pelvic ring, reconstruction was not performed (Fig. 5).

The operative time was 20.5 h and the blood loss was 2070 ml. There were no intraoperative complications. Macroscopically, surgical margins were well secured covering the surrounding bony pelvis and soft tissues (Fig. 6). Pathological examination of resected specimens revealed a moderately differentiated adenocarcinoma with no lymph node metastases, and the surgical margins were negative.

Figure 1. Abdominal CT showing two liver metastases with calcifications (a: segment 4, b: segment 7) and locally recurrent tumor in the pelvis (c).
for cancer cells. The patient had a perineal wound infection but it was treated by open drainage. The postoperative hospital stay was 92 days. According to the ambulatory function, the patient was able to ambulate by himself with crutch at the time of hospital discharge. The patient returned to his previous life style and to work after following judicious physiotherapy and rehabilitation at 14 months after the operation.

Figure 2. Magnetic resonance imaging showing the recurrent tumor, which invaded the prostate, urethra and the obturator internus muscle. The tumor was very close to the dorsal vein complex (DVC) and the pubic symphysis.

Figure 3. Schema of the resection line of the bony pelvis.

Figure 4. Intraoperative photographs. (a) Bilateral superior pubic rami, right inferior pubic ramus and left ischial tuberosity were divided. (b) After removal of resected specimen.

Figure 5. According to the classification of the resection site of the pelvic ring, this surgical procedure is classified as type III. Although this type of resection causes a discontinuity of the pelvic ring, reconstruction is not necessary.
DISCUSSION

R0 resection provides the best chance for cure in patients with LRRC (5–7). Even in cases involving a combined resection of the pelvic wall that achieved a R0 resection, the overall survival rate reported at 40–50% is none too low (5,10). However, the technique of extended surgery is difficult with the long operative time and the risk of massive bleeding. Therefore, such an operation should be performed only by an experienced and skillful surgical team. Moreover, the surgical indication should be decided strictly on the basis of preoperative imaging findings. Although the standard indication is a lesion limited in the pelvis, a few liver metastases amenable to R0 resection qualifies for curative resection in our hospital.

In Western countries, multimodal therapy is a standard treatment for LRRC, similar to locally advanced rectal cancer (3,4). An important advantage of preoperative radiotherapy is verifying a safe resection margin through tumor shrinkage. However, in our case, the approach to the lower edge of the pubic symphysis followed by division of the DVC while maintaining oncologic safety was considered difficult even with tumor shrinkage. Conversely, there was a high expectation of achieving a R0 resection with safe margin by en bloc resection of the ischiopubic rami. Moreover, the patient had liver metastases which would not benefit from radiotherapy. For these reasons, preoperative radiotherapy was not performed in our case.

The possible resection sites of the bony pelvis are the pubic symphysis, superior or inferior pubic ramus and ischial tuberosity. In cases with enough margin from the pubic symphysis, combined resection of the unilateral ischiopubic ramus is indicated. The superior and inferior pubic rami are easily dissected using a threadwire saw after encircling, because these parts of the bone are thin and run along the body surface. However, the dissection of the ischial tuberosity using a flat chisel is quite difficult because it is fairly thick and its deep location. Thus, the intimate collaboration with experienced orthopedic surgeons is essential.

The commonest site of combined bony structure resection for LRRC is the distal sacrum (3–10). In our hospital, the standard surgical method for LRRC with invasion to the posterior or lateral pelvic wall is TPE with distal sacrectomy. This extensive radical surgery is widely accepted as a useful procedure. On the other hand, TPE with ischiopubic resection is strikingly different from distal sacrectomy with respect to whether or not the continuity of the pelvic ring is preserved. It is naturally feared that a discontinuity results in the instability of the pelvic ring, proposing a reconstruction. However, in the orthopedic field, it is common knowledge that this type of resection of the pelvic ring for bone and soft tissue tumors does not require the reconstruction (11). In fact, the patient could walk around by himself and is able to perform daily life functions without great inconvenience. It is necessary however, to start walking exercises early after the operation.

TPE and hepatic resection were performed simultaneously, because the hepatectomy involved a short operative time, and had only a slight influence on general status. However, in other cases requiring a major hepatectomy or a more complicated resection taking longer time, the choice would be a two-stage surgery for curative resection. In such cases, hepatectomy should take precedence over pelvic surgery. Extended pelvic surgery is not indicated for patients in whom complete liver tumor resection cannot be achieved or who develop early remnant liver recurrence. For marginally resectable intrapelvic lesions, preoperative chemoradiotherapy would be an option at this point. This concept could be applied to locally advanced primary rectal cancer with synchronous liver metastasis, i.e. a reverse strategy (12).

Combined resection of the bony pelvis is an essential technique to achieve R0 resection for LRRC. Combined ischiopubic rami resection can be safely performed by an experienced surgical team.

Conflict of interest statement

None declared.

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