

Oncology

A rare malignant periurethral carcinosarcoma with aggressive behavior: A case treated with a multimodal treatment approach

Seok Ho Lee^{a,*}, Myunghee Kang^b, Young Saing Kim^c, Khae Hawn Kim^d

^a Department of Radiation Oncology, Gil Medical Center, Gachon University College of Medicine, Incheon, South Korea

^b Department of Pathology, Gil Medical Center, Gachon University College of Medicine, Incheon, South Korea

^c Department of Internal Medicine, Gil Medical Center, Gachon University College of Medicine, Incheon, South Korea

^d Department of Urology, Chungnam National University Sejong Hospital, Chungnam National University, Sejong, South Korea



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ABSTRACT

Carcinosarcoma is an aggressive tumor that can develop in any organ but is rarely observed in the urinary tract. Given the radioresistant nature of carcinosarcoma and the rapidly regrowing tumor after primary surgery, carcinosarcomas that developed in the body showed poor outcomes regardless of aggressive management. However, the specific optimal treatment for periurethral carcinosarcoma remains unknown. The present study reports a rare case of periurethral carcinosarcoma with metastasis of the skull after receiving surgery for primary tumors with adjuvant concurrent chemoradiation therapy.

Introduction

Carcinosarcoma is an aggressive tumor that can develop in any organ but is rarely observed in the urinary tract.^{1,2} The most common sites are the uterus and the bladder. However, periurethral carcinosarcoma has rarely been reported.² Herein, we describe a case of periurethral carcinosarcoma employed chemoradiation therapy (CCRT) followed by chemotherapy after surgery as a primary treatment scheme. For radiation therapy (RT), the volumetric modulated radiation therapy (VMAT) technique was employed to reduce morbidity by maintaining the local control effect.

Case presentation

A 54-year-old woman with no significant clinical history presented with frequent dysuria, which developed about 3 weeks before visiting the clinic. The abdominopelvic CT showed an approximately 5.3-cm low attenuated lesion in the right periurethral area without any enlarged lymph node in the pelvic cavity or the inguinal area (Fig. 1). A surgery termed periurethral mass removal and urethroplasty was performed. Operative findings showed a large mass with a hard and solid nature extending into the bladder. The pathologic results revealed carcinosarcoma measuring 9*4.6*2.5 cm with sarcoma and adenocarcinoma components involving the resection margin. The tumor was composed of

carcinomatous and sarcomatous elements. The carcinoma components were composed of atypical glands (adenocarcinoma), and sarcoma components showed spindle cells with focal smooth muscular differentiation (leiomyosarcoma). Necrosis and lymphovascular tumor emboli were noted. These histologic findings were suitable for the diagnosis of carcinosarcoma (Fig. 2). After surgery, the patient maintained the foley catheter for about two weeks. The major postoperative voiding symptom was incontinence, which lasted about a month and a half. After surgery, adjuvant CCRT was scheduled. However, a follow-up urinary bladder MRI at 1 month after surgery showed an approximately 5-cm bulging contoured T1 low T2 intermediate signal intensity mass lesion in the periurethral space that was radiologically diagnosed as progressed carcinosarcoma. Further subcentimeter lymph nodes in both obturator areas were also detected as probable metastatic lymph nodes (Fig. 1). For this patient, CCRT was planned immediately without performing reoperation. About a month and a half after surgery, RT with the simultaneous boost technique using the VMAT technique was introduced for this case (Fig. 3). Chemotherapy was also administered simultaneously during RT. A total of 54 Gy using 1.8 Gy daily fractions was delivered with a fractionated dose for PTV (planning target volume) elective 1.6 Gy, CTV (clinical target volume) 2.12 Gy and GTV (gross tumor volume) 2.3–2.5 Gy. The patient received six weekly cycles of 40 mg/m² cisplatin intravenously during RT, followed by four cycles of 60 mg/m² doxorubicin and 60 mg/m² cisplatin, administered

* Corresponding author. Department of Radiation Oncology, Gachon University of Medical and Science, Incheon, South Korea.

E-mail address: souko@gilhospital.com (S.H. Lee).

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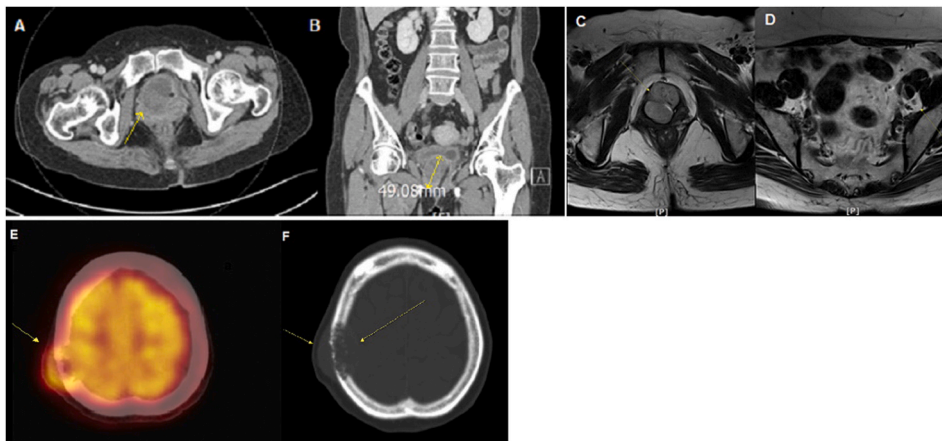


Fig. 1. The findings of CT before surgery and MRI after surgery. (A (axial), B (coronal)) Pre-operative CT showed an approximately 5.3-cm low attenuated lesion in the right periurethral area. Postoperative MRI showed an approximately 5-cm bulging contoured T1 low T2 intermediate signal intensity mass lesion (C) in the periurethral space and subcentimeter pelvic lymph node (D). The PET (E) and CT (F) findings showed a hypermetabolic lesion (maximal SUV = 8.26) in the right parietal bone of the skull and a mass involving the right parietal bone.

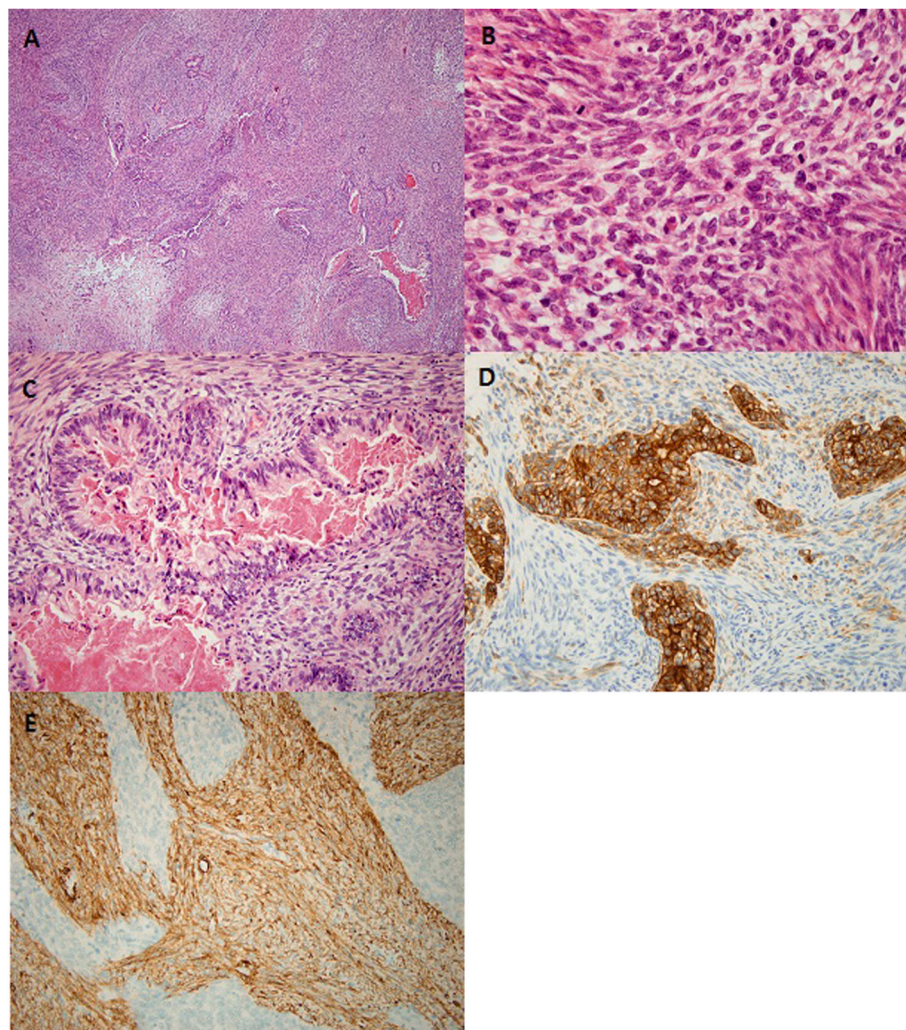


Fig. 2. Mixture of carcinomatous and sarcomatous elements with necrotic changes (A, H&E stain, x4) (B, H&E stain, x40); atypical glands in carcinosarcoma showing pancytokeratin positivity (C, H&E stain, x20) (D, pancytokeratin, x20); positive staining for caldesmon in sarcomatous components (E, caldesmon, x20).

intravenously at 21-day intervals. During chemotherapy, the patient received a blood transfusion once, due to leukopenia. There were no other side effects. Approximately 6 months after completing RT, the follow-up MRI showed no remaining viable tumor in the periurethral space and no enlarged lymph nodes in the pelvic cavity. However, approximately 8 months after completion of RT, skull metastasis in the

right parietal bone was detected by PET/CT and brain CT (Fig. 1). The patient underwent removal surgery termed skull mass excision and cranioplasty, and pathology showed metastatic carcinosarcoma. After surgery, the patient received further adjuvant RT of 30 Gy in 10 fractions. Since then, the patient has been followed up with for 7 months, with periodic imaging studies done to check for recurrence.

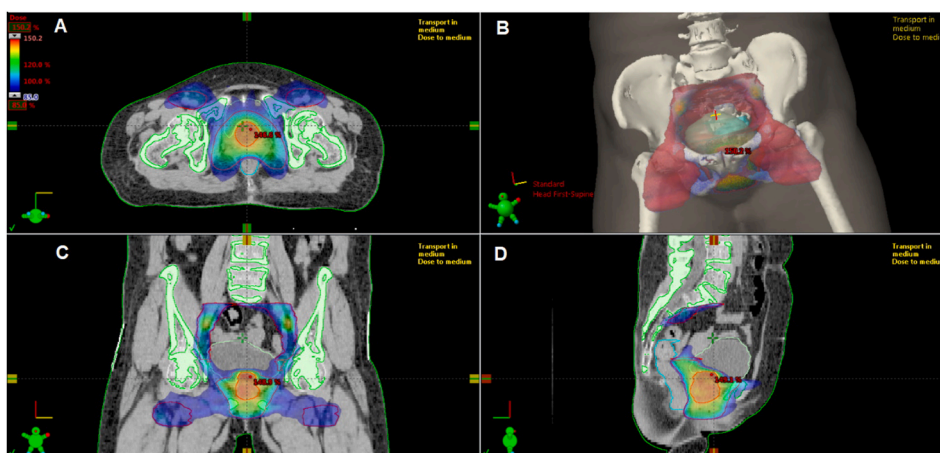


Fig. 3. (A–D) Radiation therapy with the simultaneous boost using the volumetric modulated radiation therapy technique was introduced for this case. This VMAT dose distribution showed that the target radiation therapy dose is well distributed (A, C, D) and matches the shape of the planned target volume (B).

Discussion

We report a 54-year-old female patient with periurethral carcinosarcoma who showed aggressive behavior, even though aggressive management was performed. However, the management of carcinosarcoma in the genitourinary tract has not been well established. Badhiwala et al. reported a case of urethral carcinosarcoma that developed multiple brain metastases despite a very aggressive, multimodal treatment approach.¹ Similarly, in our case, a few months after completing treatment, distant metastasis developed in skull. Bone metastasis, especially of the skull, had not been reported in carcinosarcoma patients without any recurrence. In our case, distant metastasis developed despite adjuvant chemotherapy with the AP regimen after completion of CCRT after primary surgery. Although local recurrence was not reported in our study, which might be due to aggressive adjuvant CCRT to the pelvis, there are reports that the loco-regional recurrence occurred quickly after primary treatment, and the patient died for a year and a half after the primary surgery.^{3,4} One report describes a patient with urethral carcinosarcoma who was treated with local RT after surgery, and no recurrence or metastasis occurred.² However, at 12 months after treatment, pelvic bone metastasis was developed. Given the radioresistant nature of carcinosarcoma and the rapidly regrowing tumor after primary surgery,⁵ in our case, adjuvant CCRT was performed after primary surgery. Furthermore, we employed the VMAT technique for RT, which is known as one of the most developed RT techniques, in our case to spare normal tissue by maintaining the local control effect (Fig. 3). The multimodal treatment approach should be considered given the opportunity to prevent rapid progression, although a poor outcome is expected in the case of periurethral carcinosarcoma. As a result, in our case, even though the rapidly regrowing mass in the periurethral area was detected after surgery but before starting CCRT, local control was achieved after the completion of CCRT.

Conclusions

We report a rare case of periurethral carcinosarcoma with skull metastasis in a 54-year-old female patient after she underwent surgery for primary tumors with adjuvant CCRT. Primary periurethral carcinosarcoma is extremely rare and can rapidly show distant metastasis despite aggressive treatment. Although survival after progression is

dismal, aggressive management, including metastatic mass excision, indicates that better overall survival can be expected for primary periurethral carcinosarcoma.

Ethic statement and informed consent

This study was approved by the ethic committee of Gachon University Gil Medical Center (GDIRB2020-450). The patient's consent was waived by our institution legislation because the data was anonymized and retrospectively obtained.

Author contributions

SH Lee and KH Kim designed the research, the main conceptual ideas, and proof outline. MH Kang contributed to the data collection. MH Kang and YS Kim contributed to the writing of the manuscript. All authors discussed the results and commented on the manuscript. All authors approved the final manuscript.

Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declaration of competing interest

The authors declare that there are no competing interests.

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