Fifteen-year Survivor of Renal Cell Carcinoma After Metastasectomies for Multiple Bone Metastases

SATOSHI KATO, MD; HIDEKI MURAKAMI, MD; AKIHKO TAKEUCHI, MD; SATORU DEMURA, MD; KATSUHITO YOSHIOKA, MD; NORIO KAWAHARA, MD; KATSURO TOMITA, MD; HIROYUKI TSUCHIYA, MD

abstract

This article describes a patient with multiple metastases from renal cell carcinoma who survived and maintained an ambulatory status for 15 years with no recurrence in the spine after en bloc resection of solitary spinal metastasis. Skeletal metastasis from renal cell carcinoma is common, second only to lung metastasis. Surgery plays an important role in the treatment of the metastasis because of its resistance to chemotherapy and radiotherapy.

A 60-year-old man had T1N2M1 renal cell carcinoma in the right kidney and synchronous bone metastases at T12 vertebral body and the right humerus. The patient underwent right nephrectomy and en bloc resection of T12 metastasis at the same time using a retroperitoneal approach. He also underwent curetted total excision of metastasis in the right humerus. He underwent radiotherapy and an additional 7 tumor excision surgeries in the right humerus due to repeated tumor recurrences and a pulmonary metastasectomy in the right lung. Thirteen years after initial surgery, he underwent right forequarter amputation due to tumor recurrence and surgical site infection. Fifteen years after initial surgery, he is still alive with no evidence of disease. He has been ambulatory with no tumor recurrence in the spine for 15 years. En bloc resection of solitary spinal metastasis allowed the patient to be ambulatory without recurrence. This contrasts with curetted total excision of bone metastasis in the humerus that resulted in repeated recurrences and surgeries and loss of the arm.

The authors are from the Department of Orthopaedic Surgery (SK, HM, AT, SD, KY, KT, HT), Kanazawa University School of Medicine; and the Department of Orthopaedic Surgery (NK), Kanazawa Medical University, Kanazawa, Japan.

The authors have no relevant financial relationships to disclose.

Correspondence should be addressed to: Satoshi Kato, MD, Department of Orthopaedic Surgery, Kanazawa University School of Medicine, 13-1 Takaramachi, Kanazawa, 920-8641, Japan (skato323@gmail.com).

doi: 10.3928/01477447-20131021-32

Figure: Axial computed tomography scan (A) and resected specimen (B) of spinal metastasis involving the T12 vertebral body.
Renal cell carcinoma accounts for 3% of adult malignancies and 90% of neoplasms arising from the kidney.\(^1\) Approximately one-third of patients diagnosed with renal cell carcinoma have evidence of metastatic disease at the time of diagnosis, and up to 50% of renal cell carcinoma patients eventually have metastatic lesions during follow-up.\(^2\) Metastatic renal cell carcinoma is highly resistant to most systemic therapies. Promising responses were achieved in select patients, but they were rarely stable.\(^2\)

In patients with metastatic renal cell carcinoma, the skeleton is a common metastatic site, second only to the lung, with estimates of frequency ranging from 24% to 51%.\(^3-5\) Bone metastases create serious problems for these patients because they often have poor performance status due to pathologic fractures, spinal cord compression, and intractable pain.

This article presents a patient with multiple metastases from renal cell carcinoma who maintained a good quality of life and a good performance status 15 years after en bloc resection of solitary spinal metastasis.

**Case Report**

A 60-year-old man was referred to the authors’ institution with T1N2M1 renal cell carcinoma in the right kidney and synchronous bone metastases at T12 (Figure 1) and the right humerus. The metastasis at T12 was located in the vertebral body and did not involve the pedicles and laminae. He underwent right nephrectomy and en bloc resection of T12 metastasis at the same time. Using a retroperitoneal approach after a right nephrectomy and dissecting the diaphragm, the anterolateral aspects of the vertebral bodies at T11-L1 were exposed. En bloc corpectomy of T12 and reconstruction using an anterior mesh cage and anterior instrumentation at T11-L1 were performed (Figure 1). The surgical pathology showed renal cell carcinoma, clear cell type, Fuhrman grade 2/4. The surgical margin at T12 vertebral body was negative. He also underwent curetted total excision of metastasis in the right humerus 1 month postoperatively.

Postoperatively, he received immuno-therapy consisting of interferon-\(\alpha\) and interleukin-2. However, he had a tumor recurrence in the right humerus 1 year postoperatively, which did not abate with radiotherapy at the total dose of 50 Gy (2.5 Gy×20 fractions). He underwent an additional 7 tumor excision surgeries in the right humerus due to repeated tumor recurrences over the following 11 years (Figure 2). Meanwhile, he underwent a pulmonary metastasectomy in the right lung 7 years after the right nephrectomy.

Thirteen years after initial surgery, tumor recurrence and surgical site infection occurred in the right humerus. His right upper extremity had been almost paralyzed because of the repeated tumor surgeries. He finally underwent the right forequarter amputation (Figure 3). Fifteen years after initial surgery, he is still alive with no evidence of tumor recurrence or metastases. He has been ambulatory with no tumor recurrence in the spine for 15 years, and he maintains a relatively good quality of life a good and performance status (Figure 4).

**Discussion**

Metastatic renal cell carcinoma presents a particular challenge for the clinician because of its resistance to chemotherapy and radiotherapy as well as its limited response to immunotherapy.\(^2\) Immunotherapy, such as interferon-\(\alpha\) and interleukin-2 treatment, is effective for only 10% to 20% of patients with metastatic renal cell carcinoma, and complete
responders account for only 5% to 10%.6,7 Median survival for patients with metastatic disease is approximately 13 months in the cytokine era.8 Although newer targeted therapies have proven effective in achieving disease stabilization and modest reductions in tumor size, complete response has been rare.9

The role of metastasectomy for the treatment of metastasis from renal cell carcinoma is widely accepted.10-12 The results of the 2 largest studies on metastasectomy indicated that complete resection of multiple renal cell carcinoma metastases may be associated with long-term survival.10,11 Thus far, surgical resection still offers the best results for the treatment of pulmonary metastases from renal cell carcinoma and can prolong survival significantly. Although the overall 5-year survival rate remains approximately 10% for patients who develop metastasis, the rate in patients with pulmonary metastases ranges between 33% and 40% following complete metastasectomy.13,14

Osseous metastases from renal cell carcinoma are difficult to manage. They tend to be large, highly destructive, and hypervascular tumors. They tend to be more resistant to systemic therapies than other metastases. Lin et al15 performed a retrospective review of a total of 368 metastases of renal cell carcinoma to the extremities and pelvis; these patients had all undergone surgery. They concluded that local control is an important issue for patients with the potential for a long period of survival. Jung et al16 reported that wide resection of osseous metastases was an independent predictor of survival in patients with renal cell carcinoma. Several authors reported that spinal metastasis was defined as a significant risk factor in patient survival.17,18 One reason for the poorer prognosis was the difficulty of wide resection of the vertebral lesions.19

Conventionally, curettage or piece-meal excision of spinal metastasis has been commonly practiced. Clear disadvantages of these approaches include a high risk for tumor cell contamination to the surrounding structures and residual tumor activity at the site attributable to the difficulty in demarcating tumor from healthy tissue. These disadvantages contribute to incomplete resection of the tumor and high local recurrence rates of malignant spinal tumors. In recent decades, spinal tumor classification, staging, imaging, surgical techniques, and reconstructive materials have been advanced. Nevertheless, wide en bloc resection of spinal tumors remains a more challenging undertaking in terms of both technical demand and surgical morbidity than in the appendicular skeleton. Several surgeons have described excellent results with en bloc resection of spinal tumors for reducing local recurrence.19,20

The current case raises 3 meaningful points. First, metastasectomy in renal cell carcinoma may be worthwhile in selected patients, not only as a means of local control but also as a strategy for long-term disease control without the burden of long-term drug therapy.21 Second, curetted excision of bone metastasis has a high risk of local recurrence, especially in metastases from renal cell carcinoma, a highly vascular tumor. Massive bleeding in a curetted surgery that violates the tumor vessels makes it difficult to achieve total excision of bone metastasis.22 Third, en bloc resection of spinal tumor provides an adequate tumor margin; this results in a decrease in the rate of local recurrence. Local control in the spine is more important for both of quality of life and performance status than that in extremities. It maintains the quality and duration of life with ambulatory status.

Figure 4: Postoperative anterolateral (A) and lateral (B) radiographs of the thoracolumbar spine 15 years after en bloc corpectomy for T12 metastasis.

CONCLUSION

En bloc resection of solitary spinal metastasis allowed the current patient to be ambulatory and have a relatively good quality of life and a good performance status with no recurrence. This contrasts with curetted excision of bone metastasis in the humerus, which resulted in repeated recurrences and surgeries and loss of the arm.20

REFERENCES

7. Fyfe G, Fisher RI, Rosenberg SA, Sznol M, Parkinson DR, Louie AC. Results of treat-