



Solitary Bone Metastasis of Renal Cell Carcinoma Treated with Limb-Sparing Surgery followed by Radiotherapy

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Renal cell carcinoma is characterized by the lack of early presenting symptoms, which results in a high proportion of patients with either locally advanced or metastatic disease at the time of diagnosis [1,2]. RCC metastasizes via lymphatic or venous routes. The lung parenchyma, bone, liver and brain are the most common sites of metastases. Bone metastases of RCC are associated with poor prognosis. Only a small group of patients with solitary bone lesion may be treated with wide local resection. Relatively slow progression of the disease justifies surgical intervention in such patients in order to prevent future morbidity from pain and fracture associated with growing metastases. We present a patient with a single bone metastasis of RCC, who achieved prolonged disease-free survival after radical resection with limb salvage followed by radiotherapy.

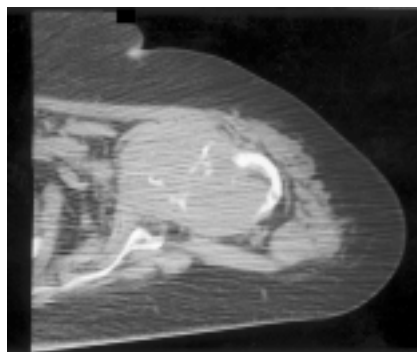
Patient Description

A 67 year old woman was admitted to our institute 2 weeks after her immigration from Russia. Left radical nephrectomy because of RCC had been performed 2 years prior to her immigration. One year after surgery she began to suffer from left shoulder pain. Routine examination and X-ray film showed no pathologic findings and the patient was treated with physiotherapy and analgetics. During the subsequent 8 months the pain exacerbated and finally a

solitary lytic bone lesion was diagnosed on the radiograph. The patient was treated with hypofractionated radiotherapy with five daily fractions of 4 Gy, receiving a total dose of 20 Gy.

On admission, the patient complained of left shoulder pain. Physical examination showed left shoulder edema and movement restriction of the left arm. Plain X-ray film and computerized tomography revealed a large osteolytic lesion of the left proximal humerus [Figure]. Bone scan with ⁹⁹Tc showed a focus of non-homogenic isotope retention in the left shoulder. CT of the chest, abdomen and pelvis showed no evidence of local recurrence or metastatic spread.

The patient was referred to the National Unit of Orthopedic Oncology, where total excision of the upper two-thirds of the left humerus including the glenohumeral joint was performed, with replacement by a modular endoprosthesis. A 6 cm mass was located in the head and upper third of the left humerus. Histopathology confirmed the diagnosis of metastatic RCC.



CT scan of left shoulder showing a huge osteolytic lesion of the left proximal humerus.

The patient received postoperative radiotherapy to the left shoulder and arm with 1.8 Gy daily fractions 5 days a week, reaching a total dose of 50.4 Gy. Arm function of the left shoulder and upper limb was fully spared. The patient died of myocardial infarction 40 months after surgery. Autopsy was not performed. However, one month prior to her sudden death she was clinically disease-free.

Comment

Up to one-third of patients with RCC have metastases at presentation [1]. Of the remaining two-thirds, approximately 50% will have metastatic disease during the further course of the disease after radical nephrectomy [1]. Despite extensive evaluation of many different treatment modalities, metastatic RCC remains highly resistant to systemic therapy, and the median survival of these patients is approximately 8 months [2]. About 10–20% of patients exhibit complete or partial response to interferon and/or interleukin-2 with or without chemotherapy, but most do not respond and there are few long-term survivals [2]. Preclinical research and clinical evaluation of new agents and treatment programs to identify improved antitumor activity against metastases remain the highest priority in this refractory disease.

The phenomenon of a solitary metastasis in RCC has been the subject of several studies and case reports. The frequency of solitary metastases is 2–3% and 5 year survival rates of 30–50% may be achieved after surgical resection [1]. Patients who develop single metastasis after removal of

RCC = renal cell carcinoma

the primary tumor have a better chance of cure and long-term survival compared to those who have metastatic lesion synchronous with primary tumor [3].

A number of controversies exist concerning the optimal treatment modality of solitary bone metastasis of RCC. In the past, the only potentially curative treatment modality in such patients was amputation [1]. Because of the high radioresistance of RCC, radiotherapy of single bone metastasis leads to a good symptomatic improvement in 50–70% patients but does not improve survival [4]. With the development of the concept of limb-sparing surgery in other instances (such as sarcoma surgery), it became possible to

use limb-sparing operations with subsequent radiotherapy in such cases [1,5]. Only highly selected patients with strictly proven single bone metastasis and good performance state are candidates for such a procedure [1].

In our patient, long-term survival and freedom from disease with good functional outcome was achieved. The patient's death was not related to the malignancy.

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