Renal Cell Carcinoma Bony Metastasis Treatment

Dear Editor,

Patellar metastases are extremely rare, ironically, primary tumours of the patella are more common than metastatic disease.[1] A Medline search from 1960 to the present yielded only 23 reported cases of patellar metastases.[2] There were only 2 patients who had renal cell carcinoma (RCC) as the primary malignancy. We report a case of RCC with metastases to the patella and sternum, highlighting our choice of surgical treatment.

Case Report

The patient was a 49-year-old man who complained of left knee pain of 7 month's duration. The knee pain had become progressively worse and disturbed his sleep. He presented to the Emergency Department after a fall that severely aggravated the knee pain. He was a heavy drinker and smoker. On examination, the patient's left knee was tender, bruised and swollen but with no breach of the skin. The patella was laterally subluxed and movement was limited by pain. No other significant physical findings were noted.

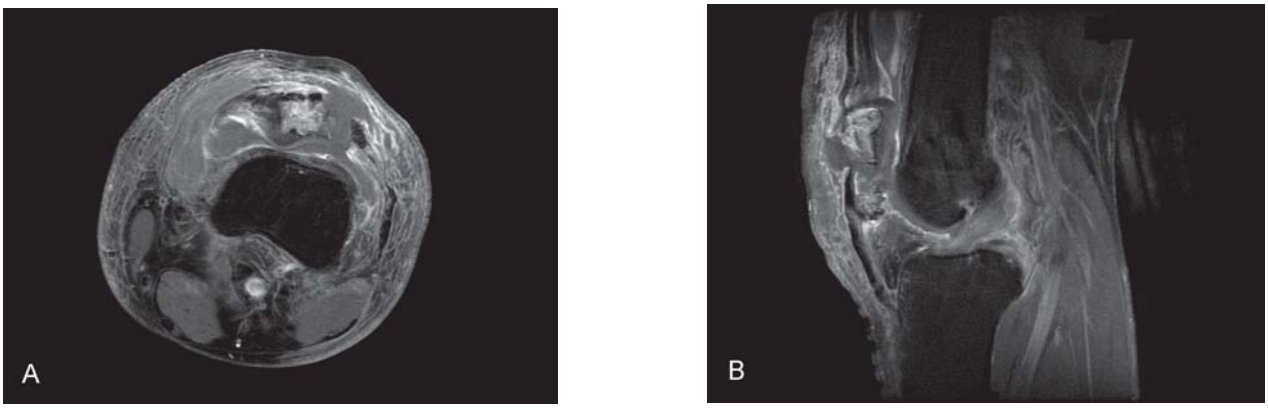
A radiograph of the left knee showed a comminuted fracture of the left patella with an aggressive osteolytic lesion eroding into the subchondrial bone. Computed tomography (CT) of the thorax showed an expanded sternum with no clear erosion. As the upper abdominal sections revealed a heterogeneous 6.0 x 4.8 cm lesion in the upper pole of the right kidney, CT of the abdomen and pelvis was performed. This revealed a heterogeneous mass (5.0 x 5.3 x 5.8 cm) arising from the upper half of the right kidney extending into the pararenal fat.

An isotope bone scan showed increased uptake of Tc-99m in the mid sternum and left patella. Magnetic resonance imaging (MRI) of the left knee showed bony destruction of the patella with only a small area of normal tissue superolaterally. The tumour had broken through the cortex into the knee joint (Figs. 1a and 1b).

We performed an intralesional patellar preserving resection of the tumour in the left knee under tourniquet applied at 250 mmHg. A multi-loculated tumour was noted at surgery, with anterior extrusion involving part of the patella extensor expansion. The tumour mass was first curetted, and the wall subsequently burred at high speed (Midas Rex Legend® Pneumatic, Medtronic, Minneapolis, MN) and coagulated with an argon beam coagulator (Birtcher Medical Systems, Irvine, CA), after which 3 cycles of cryotherapy were performed. The patella was then reconstituted with 18G steel cerclage wire and antibiotic cement to maintain its continuity. A frozen section revealed metastatic clear cell RCC.

The patient was able to partially weight bear using crutches by the 7th postoperative day and had full extensor mechanism function 6 weeks postoperatively. He was able to return to work as a blue collar worker 2-month postoperatively. The patient subsequently underwent an elective laparoscopic radical right nephrectomy and high-dose radiotherapy (40 Gy in 16 fractions) to his left knee and sternum and was put on monthly parenteral zoledronic acid.

One year postoperatively, the patient developed symptoms related to his cerclage wire, which required removal. An opportunistic biopsy was performed, confirming the absence of active metastatic disease. The patient was followed up clinically and with regular blood-investigations, bone scans and CT scans of the chest, abdomen and pelvis. The patient has no evidence of progressive disease systemically at 3 years postoperatively.



Figs. 1a and 1b. Magnetic resonance imaging of the left knee joint showing fragmentation of the patella with tumourous replacement of the normal fatty marrow signal. There is a very large joint effusion with extension of the joint fluid into the surrounding prepatellar soft tissue.

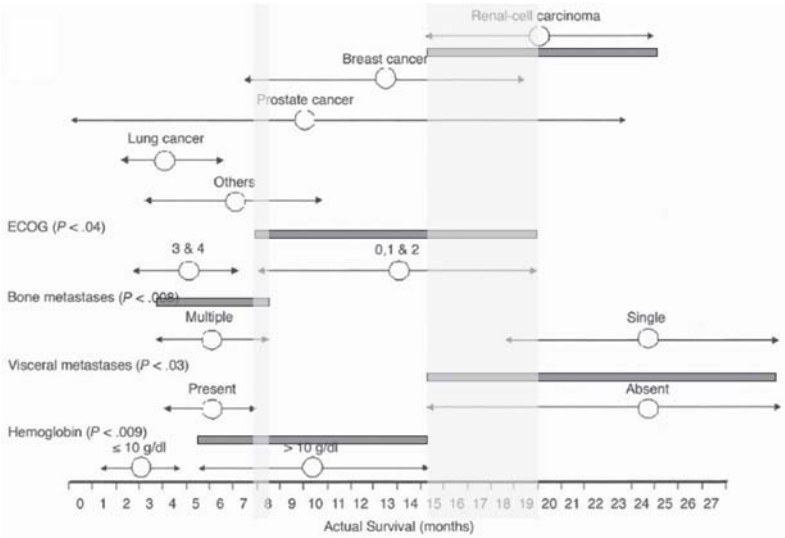


Fig. 2. Sliding scale predicting the survival of patients with pathological fracture. The 2 bands represent the most likely survival of our patient. However, in a patient with discordant factors, the clinician estimate is used as an additional parameter to guide placement on the scale.

Discussion

There has been an increase in the number of tools for predicting the survival of patients with bony metastasis.[3] Recent advances have resulted in patients having improved survival despite metastatic involvement, hence a need to better predict survival.

With improved accuracy of predicting survival, surgeons are able to individualise the surgical treatment of patients with bony metastasis.[4] Surgical procedures should be chosen to minimise the risk of failure and to avoid additional surgery in patients with shortened life expectancy. Treatment for bony metastasis must be able to relieve pain, prevent pathological fracture, improve mobility and function and secondarily prolong survival.

In the majority of the reported cases, a patellectomy was performed with only a few cases utilising argon beam coagulation and cryotherapy with patella preservation. Our decision to preserve the patella for this patient was based on 2 reasons. Firstly, we aimed to preserve function as far as possible given the patient's low 5-year survival rate of only 10% based on the American Joint Committee on Cancer (AJCC) Staging for stage 4 RCC. This was suggested by a sliding scale evaluation of expected survival previously published by the first author (Fig. 2).[5] As the patella is an integral part of the extensor mechanism, a patellectomy would have led to extensor lag, a decreased range of knee flexion and an inability to bear weight on the left lower limb. This would have required the patient to use an ambulatory aid and knee brace, severely impairing the quality of his remaining life. Secondly, RCC metastasis is unique in that disease control appears similar to that for primary bone disease,[6] with no survival advantage by doing wide resection as opposed to intralesional curettage and local stabilisation. Although the implant failure rate can be as high as 15% after intralesional surgery, the patella is a non-weight bearing bone which does not need a strong construct. Cryosurgery satisfies these aims by allowing anatomical preservation.[7] With improved oncological management of patients, more consideration should be given to the functional outcome of treatment and less mutilating and defunctioning surgery.

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