Bone metastasis from renal cell carcinoma (RCC)

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Section: Musculoskeletal system
Case Type: Clinical Cases

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Patient: 61 years, male

Clinical History:

We describe a case of a patient who presented with pain of the right knee and underwent MR, RX and then scintigraphy and CT; the imaging features suggested a diagnosis of bone metastasis from RCC.

Imaging Findings:

A 61-year-old male presented with pain of the right knee from 2 months. Past history: left nephrectomy 2 years ago for renal cell carcinoma (pT2). The patient was affected by poliomyelitis. MR performed on the patient revealed the presence of a tumour in the distal femur and described it as malignant looking. The patient underwent an extemporary radiography and then a bone scintigraphy and CT of the chest and of the abdomen. Imaging demonstrated a local recurrence at the nephrectomy site, contralateral adrenal gland, pulmonary and mediastinal lymph node metastases.

Discussion:

The overall incidence of metastatic disease following RCC surgery is approximately 40%, the risk being related mostly to high tumour stage and grade. Eighty-five percent of these recurrences occur within 3 years after initial resection but have reported up to several decades later. Risk of relapse is stage-dependent, with a higher rate of metastases in patients with pT3 and pT4 renal tumours compared with lower stages. Also higher tumour grades are more likely to develop metastases and tumour nuclear grading of RCC is a predictor of survival; one study showed 5-year survival rates of 89%, 65% and 45% for grades 1, 2, and 3-4, respectively. Histologic subtype of the primary RCC also predicts the development of metastatic disease. Many studies have shown a trend towards a better prognosis for patients with chromophobe, papillary, and conventional (clear cell) RCCs, respectively. Metastatic lesions from kidney cancer are seen in virtually every organ: lung (50-60%); bone (30-40%); liver (30-40%); and adrenal gland, contralateral kidney, retroperitoneum, and brain (5% each). The prognosis for RCC with metastasis is poor, with fewer than 9% of patients surviving at 5 years. The whole body of literature on follow-up after surgical treatment of RCC is based on observational studies with a lack of randomized trials. Clinical assessment including history recording, physical examination, and laboratory studies, as well as chest x-ray, should be performed twice a year for the first 3 yr and then annually, irrespective of the tumour pathologic stage. Abdominal CT scan may not be recommended for pathologic stages T1 and T2, while most studies support scanning to be performed every 6 mo for the first 2-3 yr and then every 2-3 yr for patients with pT3 tumours. Metastases to bone are 25 times more common than primary skeletal neoplasms. We have not found MR criteria that reliably differentiate between metastatic and primary disease. The differential diagnoses are multiple myeloma, lymphoma, paget disease, hemangioma and malignant fibrous histiocytoma (MFH). Thus, whenever a focal mass is seen on MR, close evaluation for multiple lesions and correlation with patient history is important. Using T1-weighted and STIR sequences, MRI has been shown to be more sensitive and specific than bone scintigraphy. On T1-weighted images, focal or diffuse areas of...
hypointensity are shown; on STIR images, lesions appear hyperintense. Whereas MR is the imaging technique of choice for detecting the presence and determining the local extent of disease, the nuclear medicine bone scan continues to be essential in many clinical situations because of its ability to survey the entire skeleton. Bone metastases classically appear as large expansile lytic lesions on plain radiography. Contrast-enhanced CT shows bone destruction with or without the presence of an enhancing soft-tissue mass.

**Differential Diagnosis List:** bone metastasis from renal cell carcinoma (RCC)

**Final Diagnosis:** bone metastasis from renal cell carcinoma (RCC)

**References:**

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Campanacci M
Description: Anteroposterior and lateral radiography shows a large lytic expansile lesion involving the right distal femur and demonstrates the cortical destruction and the extension into soft tissue. Origin:
Figure 2

Description: Axial T1-weighted shows lobulated, eccentric lesion of low-intermediate SI in the distal femur. Origin:
Description: Coronal T1-weighted shows focal bony destruction with an associated soft tissue mass in the medial femoral condyle. In the coronal STIR the same lesion appears of high signal. Sagittal T2-weighted shows the high signal tumor in the distal femur. Origin:
Description: Contrast-enhanced CT scans show local recurrence at the nephrectomy site and contralateral adrenal gland metastases. Origin:
Description: Contrast-enhanced CT scans show multiple pulmonary metastases and mediastinal lymph node involvement. Origin:
Figure 6

**Description:** Axial nonenhanced CT and coronal MPR shows lytic lesion in the distal femoral epiphysis with cortical destruction and soft tissue extension. **Origin:**