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Patellar Metastasis From a Squamous Carcinoma of the Lung

A Case Report

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Bone is a common site of metastasis from lung cancer. Metastasis to the patella, however, is rare. A 76-year-old man presented with knee pain caused by an isolated patellar metastasis from squamous cell carcinoma of the lung. Treatment was delayed secondary to delay in diagnosis. In cases of bone pain that are unexplained or out of proportion to a traumatic event, more extensive diagnostic studies should be done.

The patella rarely is affected by tumor. Dahlin and Unni,⁴ in a review of 8543 primary bone tumors, observed only six (0.06%). Metastatic lesions involving the patella are even less frequent. Kransdorf et al¹³ found no cases of metastasis in a series of 42 tumors involving the patella. A review of the English literature

reveals 23 cases of histologically proven patellar metastases.^{1–3,5–7,9–12,14–23} There are four previous reports of patellar metastases from squamous cell carcinoma of the lung.^{2,6,18,20} In three of four cases, knee pain was the first manifestation of lung cancer.

CASE REPORT

A 76-year-old man was in good health until a fall when he sustained minor trauma to the left knee. The patient had pain and swelling that persisted for several weeks. Radiographs of the knee at this time were normal. The left knee pain worsened during the next 2 months to the point where the patient had difficulty walking. A steroid injection in the knee provided no relief. One month later the patient experienced three episodes of hemoptysis. A chest radiograph showed a large left upper lobe mass. Cytologic evaluation of the sputum revealed squamous cell carcinoma. Repeat radiographs of the left knee revealed a lytic lesion thought to be consistent with metastasis (Fig 1) and magnetic resonance imaging (MRI) showed a lesion confined to the patella (Fig 2). The patient received four radiation treatments to the knee and chest.

The patient continued to have excruciating pain and was transferred to the authors' institution 5 months after initial presentation. The patient had sustained a 24 lb weight loss. The left knee was warm, swollen, and tender. The patient was unable

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Fig 1. A lateral radiograph of the left knee 3 months after initial presentation, shows an ill-defined permeative lesion in the posterior aspect of the patella. The cortex appears intact.

to tolerate any movement of the knee because of pain. Radiographs revealed a destructive lytic lesion in the patella (Fig 3). A bone scan showed intense tracer activity isolated to the left patella (Fig 4). A computed tomography (CT) scan of the chest revealed an extensive left upper lobe lesion with mediastinal invasion.

The patient was taken to the operating room and an open biopsy and patellectomy of the lesion were performed through a midline incision. The tumor had extended through the cortex of the patella in

several areas. Histologic analysis revealed infiltration by nests of malignant-appearing epithelial cells characteristic of squamous cell carcinoma. The cells were arranged in irregular islands and keratin pearls could be seen (Fig 5). Postoperatively, the patient wore a knee immobilizer and experienced marked pain relief. The patient was discharged 6 days after surgery with oral pain medications and was able to ambulate with weight-bearing as tolerated. The patient died of progressive lung disease 3 months later.

DISCUSSION

Metastasis to the patella is rare. There are only 23 histologically proven patellar metastases reported in the English literature. This is the fifth reported case of a metastasis to the patella from squamous cell carcinoma of the lung (and eighth overall for all bronchogenic carcinoma).^{2,3,16-18,20} However, it is only the second reported case in which the patellar metastasis is an isolated lesion.

Metastasis to the patella and its accompanying knee pain was the presenting symptom of lung cancer in the current patient. Although the most common manifestation of lung cancer is cough and sputum production (in 75% of patients), bone pain as an initial symptom oc-

Fig 2A-B. (A) Sagittal T1-weighted MR image shows a large ill-defined lesion in the patella with intermediate signal intensity (TR 550, TE 20). (B) An axial two-dimensional gradient echo MR image shows a lesion in the patella with high signal intensity (TR 521, TE 20).

Fig 3. A lateral radiograph of the left knee 5 months after initial presentation, shows an extensively destructive lesion in the patella.

curs in 22% of the patients.⁸ Autopsy studies have shown that 25% of patients with lung cancer have bone metastases at the time of death.⁸ These lesions are found most commonly in well-vascularized areas such as the spine, pelvis, and femur.

The patella is a relatively distal site with a fairly poor blood supply. This fact may account for the rarity of patellar metastases. However, lung cancer has the potential to reach distal sites because of its ability to disseminate directly into the arterial systemic circulation via pulmonary veins. Lung cancer accounts for 50% of the metastases distal to the knee and elbow and can be found in the distal phalanges.⁸ Among the 24 histologically proven cases of patellar metastasis (including the current case), the most common primary sites were the lung (eight cases) and the breast (three cases).^{11,12,22} There are two cases each for esophageal carcinoma,¹⁹ renal cell carcinoma,^{7,14} malignant lymphoma,^{5,21} and melanoma.^{9,19} The remaining metastatic tumors are represented by one case each of squamous cell carcinoma of the cervix,¹⁹ adenocarcinoma of unknown origin,¹⁹ salivary gland carcinoma,¹⁰ extramammary Paget's disease with invasive carcinoma,¹⁰ and large bowel adenocarcinoma.²³ The mean age of the patients at

Fig 4. The 99mTc-MCP bone scan shows a solitary focus of abnormally increased tracer activity in the left patella. The activity in the right elbow represents the injection site.

presentation was 57 years with a range of 37 to 76 years. Two-thirds of the patients were men and 1/3 were women.

All the patients presented with pain and swelling in the affected knee. The presenting

Fig 5. Histologic specimen of the patellar biopsy shows subchondral bone infiltrated by nests of malignant squamous cell and keratin pearl formation, with invasion into the overlying articular cartilage (Stain, hematoxylin and eosin; magnification, $\times 200$).

symptoms were unilateral in 21 of 24 patients. In 15 of the 24 patients, the patients had a known primary tumor. Among the nine patients without known tumor, eight had knee pain as their presenting symptom. Only seven of 24 patients recalled a traumatic injury to the knee before onset of pain. On radiographs, a lytic lesion of the patella was the most common finding, seen in 23 of 24 patients and 13% of these lesions had evidence of pathologic fractures. Computed tomography was done on eight patients and all had lytic lesions, and two had extensive soft tissue involvement. Magnetic resonance imaging was done on four patients who also had a CT scan.

Bone scintigraphy was done in 10 patients; four of these patients had isolated patellar lesions and six had diffuse involvement. Arthrocentesis was done in five patients and all had negative cytologic evaluations. Histologic diagnosis was confirmed by open biopsy in 11 patients and by patellectomy in 12 patients; in one patient the diagnosis was confirmed at autopsy.

Metastatic carcinoma is the most common malignancy involving the musculoskeletal system. In patients with bone pain that is unexplained or is out of proportion to a traumatic event, neoplastic disease must be considered. In the current patient, treatment was delayed several months because of delay in the diagnosis. Because of the short life expectancy of

patients with metastatic lung carcinoma, early definitive treatment of these lesions is recommended.

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