Solitary Metastasis of the Patella in the Differential Diagnosis of Anterior Knee Pain

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INTRODUCTION

The patella is a sesamoid bone and, because of poor vascular supply, it is considered that metastases are not usual (1). Only about 30 cases of patellar metastasis originating from different primary tumours, mostly lung and breast have been reported in the literature (2–15). In only eight cases was patellar metastasis the only sign of distant tumour (16–20).

Here, we present a unique case of patellar metastasis of lung adenosquamous carcinoma, with the anterior knee pain as the first and only sign of the disease.

CASE REPORT

An 86-year old man developed left anterior knee pain, aggravated by movement which progressively increased over the following three months. He attributed the onset of symptoms to a minor trauma and denied any knee problems before that. He had been suffering from unstable angina pectoris and taking prescribed medicine for many years. He was also operated on and a coronary bypass was performed in 1998. In 2005, he fell and sustained a femoral neck fracture on the left side; total hip replacement was performed in emergency.

On physical examination, the patient was afebrile and generally in good health. The knee was euthermic and not swollen, with full range of motion; on palpation, the patello-femoral joint was moderately painful. Pain obviously exacerbated as flexion increased. Radiographic examination of the knee revealed mild osteoarthritis with cystic lesion in the patella (Figs. 1a, b). All routine blood tests including erythrocyte sedimentation rate, C-reactive protein, acid and alkaline phosphatase were normal.

Bone scintigraphy showed increased uptake of radio-isotope only in the left patella, and computed tomography of the knee revealed extended osteolytic lesion in the patella (Figs. 2, 3). Arthroscopy was indicated and performed; synovial effusion and general degenerative changes were found, along with degenerative bilateral menisceal lesions. In the central portion of the patella, one square centimetre of soft and blue coloured cartilage was found in contrast to the rest of patellar cartilage which was unchanged. Excision biopsy

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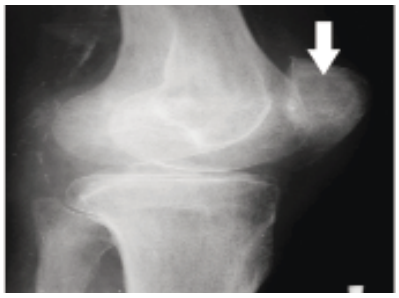
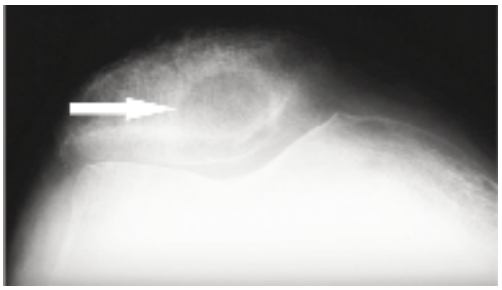


(a)



(b)

Fig.1: Lateral radiograph (a) and axial view (b) of the patella depicting radiolucent defect with mild sclerotic reaction but wide transition zone (arrows).

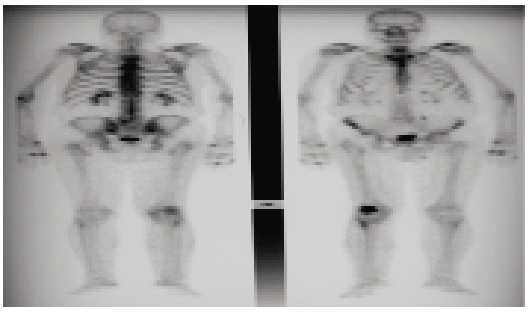


Fig. 2: Bone scintigraphy revealed increased activity in the left patella.

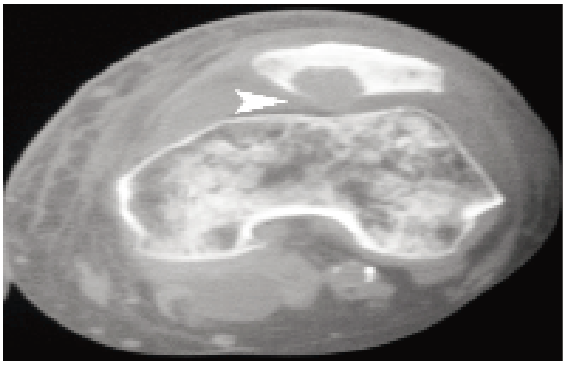


Fig. 3: Computed tomography showed osteolytic lesion in the posterior part of the left patella with cortical destruction and intra-artiicular extension (arrowhead).

was performed with the removal of some chocolate-coloured gelatinous content of the cyst. The wall of the cyst was curettaged and was of good bone quality. The first impression was that the origin of the cystic patellar lesions was degenerative; unfortunately, histological examination of the specimen confirmed the presence of metastasis mostly of adenocarcinoma type. The neoplasm was composed of glands lined by epithelial cells with cytological and architectural atypia. Some cystic structures were lined with papillary formation while some were lined with well-differentiated squamous epithelium with abundant keratinization (Fig. 4a, b). Immunohistochemically, the ceroplastic cells co-expressed keratin and vimentin. Focally, there was also positivity for Carcinoembryonic antigen (CEA) and epithelial membrane antigen (EMA). TTF-1 confirmed the nuclear positivity in most cells of adenocarcinoma (Fig. 4c) which was suggestive of the primary lung process. However, the squamous cells were TTF-1 negative while CK 5/6 positive which confirmed the true adenosquamous type of lung carcinoma (Fig. 4d).

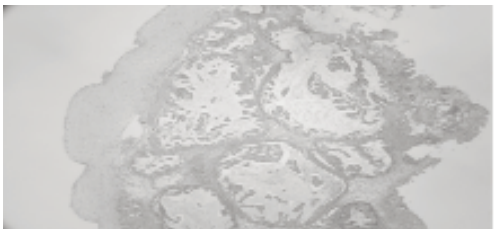


Fig. 4a

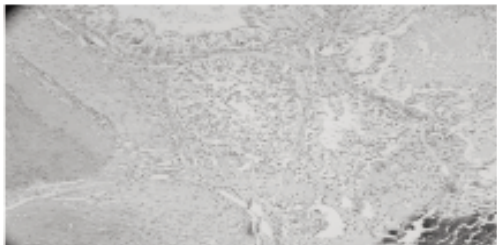


Fig. 4b

Fig. 4c

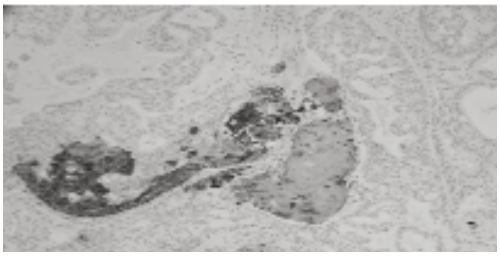


Fig. 4d

Fig. 4: Patellar metastatis of adenosquamus carcinoma. a) Atypical glandular structures lined by papillary formation; b) foci of squamous carcinoma with abundant keratinization; c) nuclear immunoreactvity for TTF-1 positive in adenocarcinoma and d) cytoplasmic immunostaining for CK5/6 in TTF-1 negative squamous cells.

The patient was a non-smoker and had no respiratory symptoms. Pulmonary status, conventional radiographs of the lung and bronchoscopy were normal; but Multi-slice computed tomography (MSCT) revealed a small, round tumour less than 1.5 cm in diameter situated in the right inferior lobe (Fig. 5). The treatment was composed of patellectomy and radiotherapy. During the one-year follow-up the patient was generally well, local status of the left knee was significantly improved; presently he feels no pain and is ambulatory.

Fig. 5: **C**omputed tomography determined small peripheral primary tumour of the lung. Note ill-defined soft-tissue nodule within the postero-basal segment of the right inferior lobe (arrowhead) scintigraphy revealed increased activity in the left patella.

DISCUSSION

Lung cancer frequently metastasizes to bone; however patellar metastases are extremely rare. In contrast to other similar cases of patellar metastasis, the anterior knee pain was a single symptom of lung tumour in the index case. Anterior knee pain is a very common presenting symptom in orthopaedic practice. The most common causes are patellofemoral syndrome, patellar tendinopathy, fat pad impingement and instability of patellofemoral joint. Tumour is possible, but not a highly suspected cause of anterior knee pain (21). Usually, the clinical presentation of patellar metastasis in these cases is similar to septic arthritis, including a very painful, hyperthermic and swollen knee with positive inflammatory blood tests. Some authors described knee symptoms as dramatic (4, 22). In contrast to other

similar cases, our patient's anterior knee pain was the only symptom of lung tumour. Medical history, clinical examination and laboratory tests revealed no additional signs of distant pathology. However, only the histological report of the specimen was strongly indicative of the pulmonary origin of the tumour. Multi-slice computed tomography was indicated and a small peripheral primary tumour of the lung was found.

The review of literature revealed nine cases of patellar metastases from lung carcinoma. Four cases were associated with squamous cell carcinoma (4, 8, 17, 23), four cases with adenocarcinoma (3, 6, 10, 22) while in one case, the histological type of lung cancer was not stated (14). It is common for adenocarcinoma of the lung to give rise to remote metastases before the onset of pulmonary symptoms, which can be attributed to their peripheral pulmonary growth. On the contrary, metastases from lung squamous or epidermoid carcinoma are not common, since this tumour is mostly centrally located and it usually presents itself with pulmonary symptoms. Except for its clinical presentation, this presented case is also instructive for several other reasons. First, it reveals that the isolated skeletal metastasis of the patella is created from lung adenosquamous carcinoma before the diagnosis of primary tumour. Only two other cases with patella as the only site of distant metastasis of lung adenocarcinoma were described (10, 22). However, in both cases, the metastasis of the patella appeared one year after the diagnosis of advanced lung carcinoma and, in the other case, there was surgical operation on the lung adenocarcinoma. Additionally, in the case with the presentation of metastasis to the patella before the diagnosis of lung adenocarcinoma was indeed reported, there was metastasis to shoulder and cervical lymph node (6). Review of literature resulted in no reports of primary tumour less than 1.5 cm in diameter giving skeletal (patellar) metastasis.

Finally, the pathologic feature of tumour differentiation deserves some comment. As previously mentioned, all described patellar metastasis originated either from lung squamous carcinomas or poorly differentiated adenocarcinoma**,** whereas in the present case it originated from a moderately differentiated adenocarcinoma associated with well differentiated squamous carcinoma, described in the literature for the first time. In tumour classification, the adenosquamous carcinoma is a well-recognized histological entity, This tumour is rare; the incidence, as identified by light microscopy, is between 0.4 to 4.0%. Usually, it is located in the lung periphery and is frequently associated with early metastases, which was present in this case. Since it has been well established that adenosquamous carcinoma can be associated with HPV infection (24), polymerase chain reaction (PCR) was done to detect HPV DNA but the results were negative. Nevertheless, this case remains the first described solitary patellar metastasis as the first manifestation of lung adenosquamous carcinoma, although we assume that the clinical relevance of the presented case is even more important. In the differential diagnosis of a very common orthopaedic symptom, such as anterior knee pain, one should be aware of the extremely rare possibility that it could be caused by metastasis of distant tumour.

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