



## Tumours and tumour-like lesions of the patella : A report of eight cases

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**We report eight cases of tumours and tumour-like lesions of the patella. Six lesions were primary and two were metastatic, both originating from adenocarcinoma of the rectum. Patients with anterior knee pain related with a tumourous condition usually have significant delay in diagnosis. The importance of considering a neoplastic condition for the common complaint of anterior knee pain, and recognising the patellar tumour with plain radiographs is stressed. In our series, all patients had positive findings on plain lateral radiographs of the patella and we recommend a simple lateral roentgenogram for the initial diagnostic work up for a suspected patellar tumour. Further imaging modalities should be used for accurate staging and histological diagnosis of the lesion.**

**Keywords :** bone tumours ; patella.

### INTRODUCTION

The patella is an uncommon site for primary or metastatic tumours of bone. Primary tumours of the patella account for less than 0.06% of bone tumours. Metastatic lesions are even rarer (4). Anterior knee pain and swelling about the knee are common presenting symptoms, most often related with chondromalacia and degenerative arthritis. However, a tumourous condition should be suspected in cases with resistant night pain, and appropriate lateral knee radiographs should be obtained. When identified, proper pre-operative evaluation is of critical importance because of the subcutaneous

location of the patella and the proximity to the knee joint (5). Much of the literature regarding this entity consists of case reports and small case series. A literature search disclosed 24 histologically documented cases of metastases to the patella including one from a large bowel adenocarcinoma but none from adenocarcinoma of the rectum (1). We report 8 cases of patellar tumours and tumour-like lesions with their clinical and radiological features, including two cases with metastasis from adenocarcinoma of the rectum.

### PATIENTS AND METHODS

All cases of bone tumours and tumour-like lesions of the patella diagnosed and treated in the Department of Orthopaedics and Traumatology at Ankara University (Ibn'i Sina Hospital) between 1986 and 2004 were reviewed. Eight cases were identified.

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Table I. — Details of the eight patients with patellar tumours and tumour-like lesions

Case Number	Diagnosis	Age (years)	Gender	Symptoms	Duration of symptoms (months)	Treatment	Follow-up (months)	Status
1	Simple bone cyst	29	F	Pain, swelling	6	Curettage, autograft	9	
2	Haemangioma	12	M	Swelling	24	Curettage	8	
3	Intraosseous cyst	62	M	Pain	36	Conservative	12	
4	Enostosis	53	F	Pain	36	Conservative	20	
5	Lipoma	55	M	Pain	12	Conservative	120	
6	Giant cell tumour	35	M	Pain	4	Patellectomy	18	exitus
7	Rectum Ca metastasis	43	M	Pain	6	Palliative	6	exitus
8	Rectum Ca metastasis	67	M	Pain	12	Palliative	4	exitus

The clinical and surgical records, radiological findings and histopathology available for these eight patients were reviewed. Plain radiographs in all cases, CT scan in 5 cases and MRI in 4 cases were assessed. Follow-up information ranging from 4 months to 120 months was obtained (table I).

## RESULTS

There were 6 men and 2 women with an average age of 44.1 years (range : 12 to 67). The presenting symptom was anterior knee pain in all cases, with swelling in two of them. The average duration of symptoms was 17 months (range : 4 to 36). None of the cases had a pathological fracture at initial presentation ; one patient with a giant cell tumour presented a fracture of his patella during the night before scheduled surgical treatment. The data are summarised in table I.

There were 6 patients with primary and 2 with metastatic lesions identified. Five patients had benign tumours or tumour-like lesions : lipoma, haemangioma, enostosis, ganglion cyst and simple bone cyst were seen in one case each.

The patient with a simple bone cyst underwent curettage and autologous bone grafting and the patient with haemangioma underwent curettage alone. Neither of these had any sign of recurrence at 9 and 8 months follow-up respectively. The patients with lipoma and enostosis were treated conservatively with NSAIDs. The patient with an intraosseous ganglion cyst had anterior knee pain at initial presentation, and physical examination

showed patellar maltracking. Magnetic resonance imaging revealed patellar chondromalacia and a meniscal tear. He underwent partial arthroscopic meniscectomy and lateral retinacular release in order to treat the underlying condition, but the patella was left untouched. His symptoms markedly improved after surgery. The size of the lesion remained unchanged at 12 months follow-up.

Three patients had malignant tumours ; two were metastases from colorectal adenocarcinoma ; the third patient had a primary giant cell tumour of the patella. The two patients with metastasis from adenocarcinoma of the rectum (Patients 7 and 8) were referred to our department with the complaint of anterior knee pain. One (Patient 7) had a history of colorectal surgery (low anterior resection) with the diagnosis of rectum cancer five years previously and received both chemotherapy and radiotherapy. The other patient (Patient 8) was considered to be inoperable and received palliative chemotherapy alone. Plain radiographs demonstrated an osteolytic lesion in both cases. Computed tomography of the knee showed marked destruction of the patella. Technetium bone scan showed increased uptake in the left patella and revealed multiple skeletal metastases. Magnetic resonance imaging (MRI) scans (Patient 7) revealed a 3.5 × 3 cm lesion with low intensity on T1 weighed images and high intensity on T2 weighed images which were consistent with a metastatic lesion. Open biopsy of the patellar lesion was performed and microscopic examination confirmed the initial diagnosis of patellar metastasis of adenocarcinoma of the rectum. Open biopsy



**Fig. 1.** — Radiograph showing a patellar metastasis from rectal adenocarcinoma.

was not performed in the other case (Patient 8) because of the advanced stage of the primary disease and the poor general condition of the patient, and the diagnosis of a bone metastasis was based on the radiologic features. Both cases were treated palliatively with narcotic analgesics and radiotherapy for their patellar lesions and died from metastatic disease within 6 months after admission (figs 1 & 2).

The patient with a GCT of the patella was admitted to our hospital with anterior knee pain of three months duration. The knee was swollen, warm and tender on physical examination. Radiographs showed a suspicious osteolytic lesion. CT scan showed a large radiolucent area in the patella, cortical irregularity and effusion in the knee joint. MRI revealed an osteolytic lesion with heterogenous intensity which had eroded the cortex. An open biopsy was planned in order to make a definitive histological diagnosis, but the patient presented a pathologic fracture of the patella during the night before the scheduled surgery. Intraoperative microscopic examination revealed a giant cell tumour, and patellectomy was performed. There was a local recurrence 4 months later, as a result of gross



**Fig. 2.** — MRI showing a hypointense lesion in a patient with patellar metastasis from rectal adenocarcinoma.

contamination following the pathologic fracture. Excision of the recurrent lesion was performed because the patient denied wide resection and prosthetic reconstruction. Multiple metastatic lesions were identified on CT scan of the thorax two months later. Histological evaluation of the specimens did not show any malignant features, but the clinical course was malignant. This patient received adjuvant chemotherapy. Progression of the metastatic lesions was however observed, with lung metastasis, and the patient was lost to follow-up 18 months after the index operation (figs 3 & 4).

## DISCUSSION

Primary and metastatic tumours of the patella are rare. In their review of more than eight thousand primary bone tumours Dahlin *et al* (4) reported six cases with patellar localisation. Mercuri *et al* (11) reviewed 210 patellar tumours reported, adding to their 15 personal cases and they estimated that the patella is involved in 1-4 out of 1,000 cases of bone tumours. Metastatic tumours of the patella are less frequent still than primary lesions. There were no cases of metastasis in a series of 42 tumours



**Fig. 3.** — Radiograph of the knee in the patient with a giant cell tumour of the patella.

involving the patella (9). There are 24 histologically documented patellar metastases reported in English literature (1). The patella was involved in 8 of 3126 primary and metastatic bone tumours, with an incidence of 0.25% which is consistent with the estimate of 1 to 4 cases out of 1,000 cases of bone tumour (11). In our series there were two cases of metastasis from adenocarcinoma of the rectum out of eight primary tumours and tumour-like lesions of the patella.

The main presenting symptom was unilateral anterior knee pain in all cases. This pain was very similar in nature to pain originating from degenerative osteoarthritis or chondromalacia. There is usually a significant delay in diagnosis because of the non-specific complaints and of the rarity of patellar tumours. The average time between onset of symptoms and definitive diagnosis was 17 months (range : 4 to 36). Subtle radiological changes can easily be overlooked at the initial evaluation. In these patients a definitive diagnosis could be made only after unsuccessful conservative treatment, which prompted further diagnostic work up. Especially night pain should lead to a suspicion of a patellar tumour and plain lateral roentgenograms



**Fig. 4.** — View of patellar giant cell tumour

should be obtained. Although initial radiographs usually do not indicate the specific type of the lesion, they will demonstrate the presence of a tumour in most cases. We were able to demonstrate the lesion with plain roentgenograms in all of our cases, including the enostosis with its characteristic appearance.

Mercuri *et al* (11) suggested evaluation of the lesion with CT and MRI because radiographs usually do not indicate the histological type of the lesions as their radiological appearances are similar. CT scan and MRI provide additional information for staging of the lesion and planning of the treatment. CT scan was obtained in 5 and MRI in 4 of our cases. They provide anatomic details about the extension of the lesion and staging.

The majority of patellar tumours are likely to be benign (11), which is consistent with our findings. The most common diagnosis was GCT in a review of 15 patellar tumours, although Kransdorf *et al* (9) reported 42 patellar tumours among which the most common was chondroblastoma (38%) followed by GCT (19%). There are five benign lesions out of eight lesions in the present series, with only one case of giant cell tumour (1/8, or 12.5% of the cases).

The preoperative diagnosis was confirmed with histology in four cases. In the remaining four cases the diagnosis was made based on characteristic radiological features of lipoma, enostosis, intraosseous ganglion cyst and metastasis of rectum adenocarcinoma. These patients were followed with symptomatic treatment and were not operated. Benign lesions were followed up at regular intervals and their dimension and radiological appearance remained unchanged.

Ferguson *et al* (5) recommended open biopsy before definitive treatment and planning the treatment according to the results of local staging and histological diagnosis. Different surgical modalities have been used including patellectomy, curettage followed by bone-grafting or methylmethacrylate cement filling, and curative resection followed by prosthetic reconstruction. Open biopsy was performed in one patient with patellar metastasis. Open biopsy was also planned for the patient with GCT, but he presented a pathologic fracture due to a simple fall during the night before surgery, and patellectomy was performed instead of open biopsy. The lesion recurred after 4 months because of the dissemination into the synovium and capsule at the time of fracture. Although extraarticular resection of the knee was offered to the patient, he refused this treatment, and excision of the recurrent lesion was performed. He was lost to follow-up with lung metastasis 18 months after the initial treatment. This case highlights the importance of prompt treatment and avoidance of intraarticular dissemination in malignant lesions of the patella because of its subcutaneous location and close proximity to the joint.

Metastatic lesions of the patella are less frequent than primary tumours (1,9,11). The rarity of patellar metastases has been attributed to the relatively distal localisation of the patella, and to the fairly poor blood supply of the sesamoid bones. The most common primary tumour is lung carcinoma, which accounts for 33% of 24 reported cases. This may be related with direct arterial dissemination of lung cancer, which accounts for distant metastases such as in phalanges (1). A variety of primary malignancies have been reported such as breast, oesophageal carcinoma, renal cell carcinoma, malignant

melanoma, laryngeal carcinoma and lymphoma. Metastatic lesions are usually seen in patients with known malignancies but they may also be seen as the first presentation of an occult malignancy (8,12). Our patients had known malignancies and consulted because of intractable anterior knee pain and restriction of knee motion. To the best of our knowledge, there have been two reported cases of large bowel adenocarcinoma, and the two patients in our series appear to be the first cases of metastasis from adenocarcinoma of the rectum to the patella (1,6). Management of metastatic lesions is different from that of primary tumours of the patella because of the short life expectancy of the patients. The objective of treatment is to resolve pain, provide pain-free ambulation and to treat the lesion in a short period of time in order to decrease the morbidity. Treatment modalities include palliative treatment with analgesics and radiotherapy or palliative surgery such as curettage and methylmethacrylate cement filling of the defect (3).

Patients with anterior knee pain are commonly seen in daily orthopaedic practice and very rarely are these symptoms related with a tumour. These patients usually have had symptoms for a long time. A plain lateral roentgenogram should first be obtained. It provided the diagnosis of a patellar tumour in all our cases. Further diagnostic workup including CT, MRI and biopsy should be considered before the definitive treatment.

## CONCLUSION

Anterior knee pain persisting during night rest should lead to suspicion of a patellar tumour, despite its rarity. A good-quality lateral radiograph of the patella should first be obtained; it will usually reveal a lesion, which should be further investigated. In all of our cases the lesion could be demonstrated with a plain lateral radiograph of the patella, which appears as a cheap and reliable diagnostic tool for initial evaluation of patients with anterior knee pain. CT scan and MRI can then be used in order to assess the extension of the tumour and to make an accurate preoperative planning. When the diagnosis is clear and the lesion is definitely benign, close follow-up is sufficient in cases such as

enostosis, intraosseous ganglion cyst or lipoma. If there is any suspicion of malignancy, histological diagnosis should be obtained before definitive treatment. Surgical management of the lesion should be made based on proper staging and histological diagnosis.

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