Ege Journal of Medicine / *Ege Tıp Dergisi* 2015;54(3):145-147

Diagnosis and differential diagnosis of para-articular chondroma of popliteal fossa: A very rare location

Popliteal fossa yerleşimli para-artiküler kondromun tanı ve ayırıcı tanısı: Çok nadir bir lokalizasyon

Berne Dirim METE[1] Merve GÜRSOY[1] Donald RESNICK[2]

[1]İzmir Atatürk Training and Research Hospital, Clinic of Radiology, İzmir, Turkey
[2]Veterans Affairs Medical Center, University of California, Department of Radiology, San Diego, USA

Abstract

Para-articular chondroma is a benign chondroid tumor which is frequently seen in the infrapatellar fat pad of the knee. We report a para-articular chondroma case located in the popliteal fossa which is very uncommon. Eighty-two-year-old male was presented to the department of orthopedics with a history of chronic pain and swelling at the popliteal fossa of his right knee. The patient was investigated using the following techniques; plain radiograph and MRI which gave an impression of a benign para-articular chondroma arising from the popliteal fossa. Radiographically, a well-delinated mass with spherical calcifications in the popliteal fossa was detected on the X-ray of the knee. On MRI, isointense signal intensity with adjacent muscles on T1-weighted TSE sequence and heterogeneous high signal intensities suggestive of chondroid matrix and oedema on fat-supressed T2-weighted sequence were detected. On postcontrast images peripheral enhancement in the chondroid lobules which was typical for chondroma was seen. After surgical resection, histopathological examination revealed para-articular chondroma.

Keywords: Chondroma, soft tissue neoplasms, magnetic resonance imaging, knee.

Öz

Para-artiküler kondromlar dizin infrapatellar yağ yastığında sıklıkla görülen benign kondroid tümörlerdir. Biz burada, popliteal fossa yerleşimli, nadir görülen bir para-artiküler kondrom olgusunu sunmak istedik. Seksen iki yaşında erkek hasta, sağ dizin popliteal bölgesinde kronik ağrı ve şişlik yakınmalarıyla ortopedi servisine başvurmuştu. Düz röntgenogram ve MRG tetkikleri gerçekleştirildi. Röntgenogramda, popliteal fossada, sferik şekilli kalsifikasyonlar içeren, iyi sınırlı kitle saptandı. MRG'de T1 ağırlıklı TSE sekansta; komşu kaslarla eş sinyalde, T2 ağırlıklı yağ baskılı sekansta; kondroid matriks ve ödemi temsil eden heterojen yüksek sinyalli kitle saptandı. Kontrast sonrası alınan kesitlerde, kondrom için tipik olan kondroid lobüllerde periferal kontrastlanma görüldü. Cerrahi olarak çıkarılan kitlenin histopatolojik tanısı para-artiküler kondrom ile uyumlu idi.

Anahtar Sözcükler: *Kondrom, yumuşak doku tümörleri, manyetik rezonans görüntüleme, diz.*

Introduction

There are several different types of soft tissue and cartilaginous lesions that occur around the knee. Para-articular chondroma (PAC) is one of those lesions, which have a benign nature. Hands and feet are the most common site for PACs (1). The popliteal fossa location is very rare.

Corresponding Author: Merve GÜRSOY
İzmir Atatürk Training and Research Hospital, Clinic of Radiology, İzmir, Turkey
Received: 15.04.2014 Accepted: 29.05.2014

Osteochondroma is a more common benign tumour that does not have any attachment to the adjacent bones in contrast to PAC. Synovial osteochondromatosis and synovial chondrosarcoma are one of the patologic entities that can mimic PACs (2). It is important to differentiate PACs from more aggressive malign tumours to avoid unnecessary radical surgery. In this article, we report a case of para-articular chondroma of the popliteal fossa, which is a very rare location for this pathologic entity.

Case Report

Eighty-two-year-old male was presented to the department of orthopedics with a history of chronic pain

and swelling at the popliteal fossa of his right knee. Clinical examination revealed a fixed, rigid mass at this region. There was no hyperemia or visible skin changes secondary to this lesion. There was no history of trauma.

X-ray of the lateral view of the knee showed a well-delineated mass (arrows), which contained spherical and arch shaped ossifications/calcifications in the region of popliteal fossa without any attachment to the bone structures (Figure-1a).

Figure-1. a. Lateral plain X-ray of the knee. A well-delineated mass (arrows) which contains spherical and arch shaped ossifications/calcifications in the popliteal fossa is seen. **b.** Fat-supressed T2-weighted image of the knee. High signal intensities represent chondroid matrix and edema in the tumour. Hollow arrows indicate calcified parts of the lesion which have very low signal intensities. **c.** T1-weighted TSE image of the knee. The lesion has isointense signal intensity with adjacent muscles. Hollow arrows indicate calcified parts of the lesion which have very low signal intensities. **d.** Post-contrast fat-supressed T1-weighted image of the knee. Peripheral enhancement in the tumour is seen (arrows).

A knee MRI was performed. The exam included coronal turbo spin echo (TSE) T1, coronal fat-suppressed T2, axial fat-suppressed T1 with and without Gadolinium injection. On fat-suppressed T2-weighted sequence (Figure-1b), high signal intensities (arrow) suggestive of chondroid matrix and edema were detected. On T1-weighted TSE sequence (Figure-1c), a well-delimited mass lesion, which had isointense signal intensity, was detected. On both sequences (Figure-1b,c), very low signal intensities (hollow arrow) were related to calcified parts of the lesion. After Gadolinium injection (Figure-1d), peripheral enhancement in the chondroid lobules (arrows), which is typical for chondroma, was seen. The other structures of the knee were intact in MRI. Diagnosis of para-articular chondroma, which was confirmed by surgical resection and histological examination, was made. At the follow-up period, the patient's symptoms completely resolved and no recurrence was seen.

Discussion

Para-articular chondroma (PAC), a rare subtype of chondroma, also known as intraarticular chondroma or soft tissue chondroma is uncommon (3). PAC is a benign chondroid tumour which is a result of extra skeletal chondromatous proliferation (3). They are most often located in the extremities with the great majority of all the cases occurring in the hands, feet and knee (1,4). Knee is a common site for PAC, particularly the infrapatellar fat pad region followed by medial site of the knee joint and suprapatellar region. The PAC located in the popliteal fossa as in our case is extremely rare. They tend to be quite big in size (2-10 cm). The PACs occurring around major joints, such as the knee, can become quite larger than the tumours around the hands and feet. They usually occur between the fourth and the sixth decades of life (1). The pathogenesis of this lesion is related to an osteochondral metaplasia.

Histologically, the tumour consists of hyaline and fibrous cartilage, with varying degrees of mature trabecular bone, ossification or calcification (3). They may contain focal areas of fibrosis, hemorrhage, and necrosis or granuloma formation (5). Soft tissue chondromas are composed of predominantly mature hyaline cartilage or immature chondroblasts. The chondroblastic type has a greater tendency to local recurrence (6).

Table-1. Differential Diagnosis of PAC and Their Characteristics That Help to Differentiate Them From PAC*.

Lesions	Characteristics That Help To Differentiate İt From PAC
Synovial osteochondromatosis	Multiple, usually smaller lesions
Synovial chondrosarcoma	More aggressive soft tissue mass, punctuate or dystrophic calcifications
Synovial sarcoma	Infiltrative large soft tissue mass, "triple sign", usually small punctuate calcifications
Soft tissue osteosarcoma	More aggressive mass, ossification rather than calcification
Liposarcoma	Typical fat signal on MRI, calcification is rare
Schwannomas, Neurofibromas	"Fascicular sign", "target sign", located longitudinally in the nerve distribution
Hemangioma	Typical MR signal features, linear and punctuate calcifications
Myositis ossificans	linear calcifications which is denser at the periphery of the lesion

*PAC: Para-articular chondroma

On the plain radiograph our patient had a typically soft tissue mass with spherical and arch shaped calcifications but in some patients the calcifications may be punctuate or mixed (1). The high signal on non-fat-saturated T1-weighted images represents fatty marrow or ossification and the high signal on T2-weighted images represents chondroid matrix, which are characteristic for the lesion. Peripheral enhancement in chondroid lobules after Gadolinium injection is typical for PAC (7).

Radiographic differentials (Table-1) may include synovial osteochondromatosis, synovial chondrosarcoma and synovial sarcoma. Synovial osteochondromatosis is a result of benign proliferation of the synovium and presents as multiple intra-articular osteocartilaginous loose bodies within a joint (8). Presenting as a solitary mass is important to differentiate PAC from synovial chondromatosis. More aggressive malign tumours such as synovial chondrosarcoma and synovial sarcoma should be kept in mind as a differential diagnosis of PAC. They may present as a focal mass and have punctuate or dystrophic calcifications (8). Synovial sarcomas are also larger and ill-defined than PACs (5). On T2-weighted MR images synovial sarcomas have heterogeneous high signal intensity which has been described as the “triple sign”. Triple sign is the result of the mixture of solid cellular elements (intermediate signal intensity), hemorrhage or necrosis (high signal intensity), and calcified or fibrotic collagenized regions (low signal intensity) (9). Soft tissue osteosarcoma is another differential diagnosis which is a rare malignant mesenchymal tumour. It usually occurs in the soft tissue of extremities and retroperitoneum (10). They usually contain ossification rather than calcification. Liposarcoma is another malignant soft tissue tumour that is seen around the knee. Liposarcomas rarely calcify. MRI signal of liposarcoma is also characteristic for this lesion. Schwannomas and neurofibromas also can be located in the periphery but not intraarticular and they usually do not have calcification. On T2-weighted MR images they have predominantly high signal intensity with low signal intensity in the central region of the tumour which is called “target sign”. Fascicular sign; multiple small ring-like structures with peripheral high signal intensity can be seen in these tumours on T2-weighted images. Schwannomas and neurofibromas are also associated with the nerve and located longitudinally in the nerve distribution. Soft tissue hemangiomas are well-defined, lobulated benign lesions that can occur anywhere in the body. The calcification of this tumour is linear which is located along the vascular structures. Feeding vessels can also be shown on MRI. Myositis ossificans can appear as a calcified mass in the extremities. It has linear calcifications which is denser at the periphery of the lesion.

A well-defined, slowly growing lesion in the infrapatellar fat pad location with mixed osseous and cartilage findings on MRI may be useful in suggesting this diagnosis. Surgical excision is the treatment of choice, without any recurrence or malign transformation. Although it is difficult to make a definitive diagnosis before the surgery, the recognition of this rare, benign, chondroid lesion must be based on imaging studies; otherwise it can be mistaken for a more aggressive, malign lesion. MRI is the method of choice in the evaluation of this rare condition.

References

1. Zlatkin MB, Lander PH, Begin LR, Hadjipavlou A. Soft-tissue chondromas. Am J Roentgenol 1985;144(6):1263-7.
2. Marcial-Seoane RA, Marcial-Seoane MA, Ramos E, Marcial-Rojas RA. Extraskeletal chondromas. Bol Asoc Med PR 1990;82(9):394-402.
3. Murphey MD, Choi JJ, Kransdorf MJ, Flemming DJ, Gannon FH. Imaging of osteochondroma: Variants and complications with radiologic-pathologic correlation. Radiographics 2000;20(5):1407-34.
4. Bansal M, Goldman AB, DiCarlo EF, McCormack R. Soft tissue chondromas: Diagnosis and differential diagnosis. Skeletal Radiol 1993;22(5):309-15.
5. Enzinger FM, Weiss SW. Soft tissue tumours, 2th ed. St. Louis: Mosby; 1988.
6. Lichtenstein L, Goldman RL. Cartilage tumours in soft tissues, particularly in the hand and foot. Cancer 1964;17(9):1203-8.
7. Helpert C, Davies AM, Evans N, Grimer RJ. Differential diagnosis of tumours and tumour-like lesions of the infrapatellar (Hoffa’s) fat pad: Pictorial review with an emphasis on MR imaging. European Radiology 2004;14(12):2337-46.
8. Gentles C, Perin J, Berrey H, Griffiths HJ. Radiologic case study. Soft-tissue chondroma. Orthopedics 2007;30(3):241-3.
9. Jones BC, Sundaram M, Kransdorf MJ. Synovial sarcoma: MR imaging findings in 34 patients. Am J Roentgenol 1993;161(4):827-30.
10. Mc Auley G, Jagannathan J, O'Regan K, et al. Extraskeletal osteosarcoma: Spectrum of imaging findings. Am J Roentgenol 2012;198(1):31-7.