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**CASE REPORT**

# Parosteal Osteoclastic Osteosarcoma in the Left Tarsal Joint of A Cat

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## Summary

A parosteal (juxtacortical) osteosarcoma case was diagnosed on the lateral aspect of the left tarsal joint of an 11-year-old male Siamese-crossbred cat. A radiolucent line of demarcation between the tumor and the underlying cortical bone was present. The immobile mass was of soft to firm consistency with cystic areas on the cut surface. Histologically, the tumor tissue consisted generally of large, ovoid or fusiform cells with vesicular nuclei and partially of epithelioid like mesenchymal elements and abundant osteoclastic giant cells. Cellular pleomorphism and mitotic activity were found. The tumor cells were observed to have produced partially hyalinized collagen like osteoid matrix and constituted few crude osteochondroid areas. Partial aneurismal cysts like vascular structures in association with numerous giant cells resembling osteoclasts were present in the tumoral mass with marked necrosis. Based on the radiological and histomorphological features, the tumor with numerous osteoclasts and aneurysmal cystic changes was classified as parosteal osteoclastic osteosarcoma.

***Keywords:*** *Parosteal osteoclastic osteosarcoma, Tarsal joint, Cat*

# Bir Kedinin Sol Tarsal Ekleminde Parosteal Osteoklastik Osteosarkoma Olgusu

## Özet

Onbir yaşlı, Siyam melezi erkek kedinin sol tarsal eklemi lateral yüzünde parosteal (jukstakortikal) ostesarkom olgusu tespit edildi. Radyografide tümör ile alttaki kortikal kemik dokusunun radyolusent bir demarkasyon hattı ile ayrıldığı dikkati çekti. Tümoral kitlenin hareketsiz, yumuşaktan serte farklılaşan kıvamda olduğu ve kesit yüzünde kistik alanlar içerdiği izlendi. Mikroskobik olarak, tümöral dokunun çoğunlukla veziküler çekirdeğe sahip, iri, oval ya da iğsi şekilli hücrelerden; kısmen de epiteloid benzeri mezenşimal elemanlar ile çok sayıdaki osteoklastik dev hücreden oluştuğu gözlendi. Hücresel pleomorfizm ve mitotik figür tespit edildi. Tümöral hücrelerin, kısmen hiyalinize kollojen benzeri osteoid matriks ile nadiren osteokondroid alanlar meydana getirdiği izlendi. Belirgin nekrozunda olduğu tümoral kitle içinde yer yer anevrizmal kist benzeri damarsal yapılar ve bunlarla ilişkili osteoklastları andıran çok sayıda dev hücre gözlendi. Çok sayıda osteoklastik hücre ve anevrizmal kistik değişiklikler içeren tümör radyolojik ve histomorfolojik bulgulara göre parosteal osteoklastik osteosarkom olarak adlandırıldı.

***Anahtar sözcükler:*** *Parosteal osteoklastik osteosarkoma, Tarsal eklem, Kedi*

## INTRODUCTION

Primary bone tumors are commonly encountered in cats and dogs. The proportions of benign and malignant neoplasms of bones are approximately equal in cats [1]. Osteosarcomas may be of central or medullary and peripheral (periosteal and parosteal=juxtacortical) origin. Sarcomas arising within bones are more common and consistently more malignant than sarcomas of periosteal origin [2].

Parosteal osteosarcomas are included in the peripheral (surface) malignant tumors of bones with their well-differentiated osteosarcomatous features with aspects of

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malignancy. Besides, invasion of the underlying cortex is a commonplace and a contrasting feature in distinguishing periosteal osteosarcoma of other peripheral malignant tumor of the bones from parosteal osteosarcoma [3]. In domestic animals peripheral osteosarcomas are rarely observed or diagnosed as osteosarcoma of the bone tissue only due to their histological appearance without detailed radiology [2].

Since the insufficient radiological appearence of these osteosarcomas are similar to those of malignant tumours especially arising from the localized bone tissue, and soft tissue or synovial bursa at the joints of the extremites and the origin of osteosarcomas with parosteal localization is questionable, the relevant case has been found to be worthy of presentation. A case of parosteal (juxtacortical) osteoclastic osteosarcoma was evaluated in the light of radiological and pathological findings.

## CASE HISTORY

A tumoral mass (50 x 30 x 15 mm) was detected on the lateral aspect of the left tarsal joint region of an 11-year-old male Siamese-crossbred cat developed within the last three months of the first presentation. There was no history of trauma and the lesion had a period of painless growth.

On radiography of the left tarsal bones, and tibia and fibula there was a solid, active periosteal reaction extended to the whole lateral surface of the *articulatio tarsi* region. The underlying cortex appeared intact with no evidence of bone lysis. A radiolucent line of demarcation between the tumor and the underlying cortical bones of ossi tarsi, calcaneus, and distal tibia and fibula was present *(Fig. 1A, B)*. Also radiographs showed a well-circumscribed, osteoproductive lesion. There were no local lymphadenopathy and distant metastases.

The immobile juxtacortical mass encircling the whole tarsal joint was removed with wide surgical excision. Further treatment consisting of adjuvant chemotherapy was declined by the owner. Euthanasia was performed in a private clinic at the owner's request. Necropsy was not performed. Grossly, the mass was grayish white in color and supple in consistency containing both soft and firm areas with few cysts, the largest of which appeared to be 1 cm in diameter, on the cut surface.

Histologic examination revealed a non-encapsulated irregular mass, reaching up to the dermal lamina with ill-defined boundaries adjacent to, yet not infiltrating the dermis *(Fig. 2A)*. The neoplastic mass generally consisted of large, ovoid or fusiform cells with vesicular nuclei and partially of epithelioid like mesenchymal elements *(Fig. 2B)*. Cellular pleomorphism and mitotic activity were found. The entity showed foci of osteoblastic and chondroblastic differentiation and formed few crude osteochondroid areas *(Fig. 2C)*. Also the tumor cells were observed to have produced partially hyalinized collagen like osteoid matrix, which was surrounded and destructed by numerous osteoclastic giant cells *(Fig. 2D)*. Also the cystic structures detected on gross examination were compatible with secondary aneurysmal cystic changes surrounded by bundles of neoplastic cells with numerous osteoclasts within.

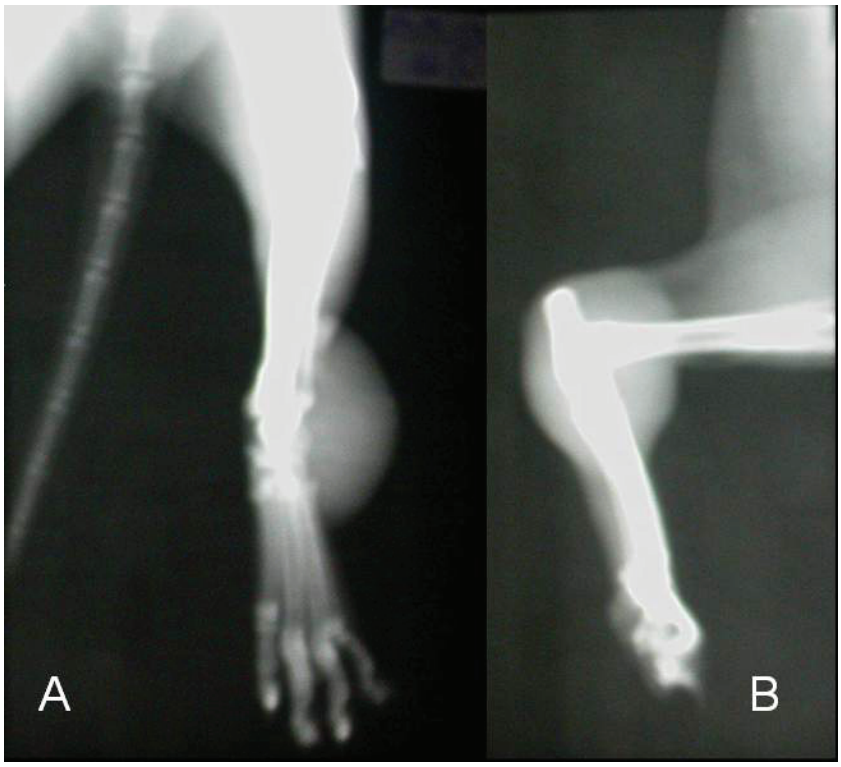


**Fig 1.** Parosteal osteoclastic osteosarcoma; cat. Anterioposterior **(A)** and lateral **(B)** survey radiograph of the left tarsal joint. Non destructive tumoral tissue mass showing zonal development around left tarsal joint

**Şekil 1.** Parosteal osteoklastik osteosarkoma; kedi. Sol tarsal eklemin anteroposterior **(A)** ve lateral **(B)** radyografisi. Sol tarsal eklemin çevresinde bölgesel büyüme gösteren yıkımlayıcı olmayan tümoral doku

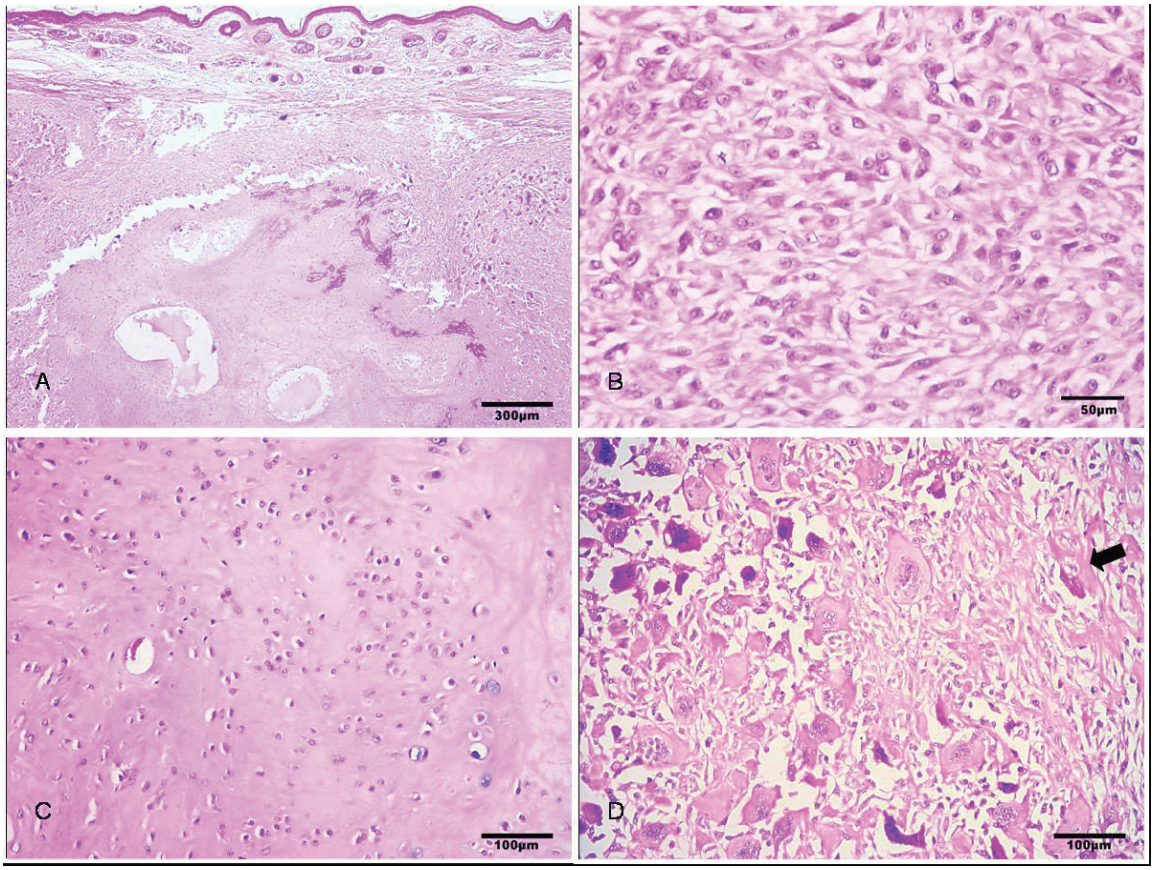


**Fig 2.** Parosteal osteoclastic osteosarcoma; cat. **(A)** Overall view. Tumoral mass with ill defined borders reaching up to the dermis. Areas rich in matrix and osteoclasts, and aneurysmal cystic changes. Bar 300 µm. **(B)** Tumoral mass consisting of large, ovoid or fusiform mesenchymal cells with vesicular nuclei. Bar 50 µm. **(C)** Osteoblastic and chondroblastic differentiation and areas rich in scanty osteochondroid matrix. Bar 100 µm. **(D)** Numerous giant cells resembling osteoclasts. Osteoclast (arrow) in close contact with hyalinized collagen like matrix (osteoid). Bar 100 µm. (Sections were stained with hematoxylin-eosin)

**Şekil 2.** Parosteal osteoklastik osteosarkoma; kedi. **(A)** Detay görünüm. Dermise dek uzanan belirsiz sınırlı tümoral doku. Matriks ve osteoklastlardan zengin alanlar ile anevrizmal kistik değişiklikler. Bar 300 µm. **(B)** Veziküler çekirdekli, iri, oval ve iğsi şekilli mezenşimal hücrelerden oluşan tümoral kitle. Bar 50 µm. **(C)** Osteoblastik ve kondroblastik diferansiyasyon ve sınırlı osteokondroid matriks içeren alan. Bar 100 µm. **(D)** Osteoklastları andıran çok sayıda dev hücre. Hiyalinize kollojen benzeri matriks (osteoid) ile doğrudan temas halindeki osteoklast (ok). Bar 100 µm. (Kesitler Hematoksilen-Eozin boyası ile boyanmıştır)

## DISCUSSION

Peripheral osteosarcomas are malignant neoplasms particularly seen in cats and dogs. The number of cases reported in cats is too small to determine age, sex, clinic characteristic, or site incidence. Futhermore, previously reported data are insufficient to conclude that the prognosis for cats, and dogs or humans with peripheral osteosarcoma differs from that of central osteosarcoma [2].

Previous reports contain a 14-year-old domestic short hair cat [4], 3 male and 1 female cats with a mean age of 7.8, ranging from 4-10 years [5,6]. Also Jacobson (1971) reported 31 bone tumors of dogs and cats, of which 11 cases were in cats with a mean age of 7 years. In this case the patient was an 11-year-old, Siamese- crossbred male cat.

Clinically, the lesion was present slightly more than one year after diagnosis in cats and for more than two years in dogs. Pulmonary metastatic masses ranged from plain cartilagenous tissue to chondrosarcomatous changes in dogs and cats [4,8]. A case of canine high-grade surface osteosarcoma was histologically confirmed to have secondary pulmonary osteosarcomatous lesions despite the lack of radiographical evidence [9]. In this case no distant metastasis was observed radiologically in clinical examination.

In peripheral osteosarcomas, no specific tumor site was indicated for the cat. Tumoral lesions were previously reported to have occurred in various sites such as the foreleg, hind leg, ribs, pelvis, the frontal bone and the right ramus of the mandible [6-8]. On the other hand, radiography revealed the presence of a prominent radiolucent line separating a portion of the tumor from the underlying cortex, which was considered to be of diagnostic importance in the surface osteosarcomas regardless of the site of localization. Cortical destruction with invasion of the marrow cavity was known to be a late event [2,8]. In the present case the immobile juxtacortical mass was detected

on the lateral surface of the tarsal joint. Also clinically, there was no evidence of cortical destruction or medullar involvement in our case.

Histologically, parosteal (juxtacortical) osteosarcomas can sometimes display more vicious features than benign tumors or poor features than malign tumors and they commonly resemble central osteosarcomas with their histomorphological features and usually show osteoblastic differentiation [4,7]. Also parosteal osteosarcomas is composed typically of well differentiated but malignant fibrous, osseous, and cartilaginous tissue elements [2]. In the present case the histologic type was osteoclastic osteosarcoma in wide areas, although parosteal osteosarcomas are usually known to show osteoblastic type histological features. Besides, central osteosarcoma may contain numerous giant cells, which aggregate in some areas of the tumor. However, within the giant cell tumors little or no matrix is produced. Moreover aneurysmal bone cysts, and accompanying giant cell tumors, despite their infrequency, occur in animals and appear as focal or widespread masses [2,3]. In the present case the tumor was histomorphologically a parosteal osteosarcoma with numerous osteoclastic cells and secondary aneurysmal bone cysts in wide areas, showing cellular pleomorphism and mitotic activity.

In conclusion, since the diagnosis is based in great part upon the characteristic radiographic appearance of the lesion with appropriate clinical findings and histomorphological features, the present neoplastic entity with numerous osteoclasts and secondary aneurysmal cystic changes was confirmed undoubtedly as parosteal (juxtacortical) osteoclastic osteosarcoma.

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