OLGU SUNUMU / CASE REPORT
TIBBİ ONKOLOJİ / MEDICAL ONCOLOGY

ATLJM 2024; 4 (10): 118-123
https://doi.org/10.54270/atljm.2024.56

PECOMA OF THE TALUS, A RARE CASE AND THE LITERATURE REVIEW

TURGUT KAÇAN[1], CAHİT KOÇAK[2], BERKE CENKTUĞ KORUCU[3]

ABSTRACT

Perivascular epithelioid cell neoplasms (PEComas) are mesenchymal tumors which evolve out of the perivascular epithelioid cells (PECs).Soft tissue, visceral organs, and skin are the most encountered body regions. Primary bone PEComas,especially PEComas of talus, are remarkably rare; to the best of our knowledge, only sixteen primary bone PEComa cases have been reported since 2002. We report a 51-year-old male presented with PEComa of the talus and review the literature.
Keywords: PEComa, PEComa of bone, PEcoma of talus, foot tumor, soft tissue tumor

TALUSTA PECOMA, NADİR BİR OLGU VE LİTERATÜR DERLEMESİ

ÖZET

Perivasküler epiteloid hücreli neoplazmlar (PEComalar), perivasküler epiteloid hücrelerden (PEC'ler) gelişen mezenkimal tümörlerdir. Yumuşak doku, iç organlar ve deri en çok karşılaşılan vücut bölgeleridir. Primer kemik PEComaları, özellikle talusun PEComaları oldukça nadirdir; Bilgimize göre 2002'den bu yana yalnızca 16 primer kemik PEComa vakası rapor edilmiştir. Biz de, talusta PEComa ile başvuran 51 yaşında bir erkek hasta ve literatür derlemesini rapor ediyoruz.
Anahtar Kelimeler: PEComa, kemik PEComası, talus PEComası, ayak tümörü, yumuşak doku tümörü

[1]İSTANBUL ATLAS ÜNİVERSİTESİ, TIP FAKÜLTESİ, İÇ HASTALIKLARI ANABİLİM DALI, İSTANBUL, TÜRKİYE
[2]DORUK ÖZEL NİLÜFER HASTANESİ, ORTOPEDİ VE TRAVMATOLOJİ, BURSA, TÜRKİYE
[3]JERSEY MEDICAL CENTER, INTERNAL MEDICINE, NEW JRESEY, USA

Sorumlu Yazar: TURGUT KAÇAN
İSTANBUL ATLAS ÜNİVERSİTESİ, İÇ HASTALIKLARI ANABİLİM DALI, İSTANBUL, TÜRKİYE

Telefon: +905063367455
E-mail: kacanturgut@gmail.com

KAÇAN T, KOÇAK C, KORUCU BC. PECOMA OF THE TALUS, A RARE CASE AND THE LITERATURE REVIEW. ATLJM. 2024;4(10): 118-123.

Gönderim Tarihi: 28 KASIM 2023
Kabul Tarihi: 08 ŞUBAT 2024

INTRODUCTION

Perivascular epithelioid cell neoplasms (PEComas) are mesenchymal tumors, evolve out of the perivascular epithelioid cells (PECs) that including angiomyolipomas (AML), pulmonary clear cell sugar tumor (CCST) and lymphangioleiomyomatosis (LAM), and several rare clear-cell tumors of visceral, intraabdominal, soft tissue, and bone tumors (1) . In 1943, Apitz first described the PECs; and Masson stated them as "abnormal myoblasts" in renal AML (2) . Bonetti et al. (1992)(3) term the perivascular epithelioid cell characterized by epithelioid lesions with clear/acidophil cytoplasm and perivascular spread (3). PEComashave an epithelioid appearance with clear cytoplasm, a round centrally placed nucleus, and inconspicuous nucleolus. Immunohistochemically, PEComas are expressing melanocytic markers, including Melan A, S100 protein, MiTF, and HMB-45 (4) . Even though PECs' non-malign counter-part has not identified; the size of the tumor (>5 cm), mitotic activity >1/50 in high-power fields, cell necrosis, nuclear pleomorphism, and infiltrative growth pattern are assumed to poor prognosis in PEComa (5). PEComas may raise in any age group and shows the female predominance (5, 6). PEComas have been affirmed as ubiquitous tumors due to come across in various organs or tissue. Although PEComa is a rare tumor; soft tissue, visceral organs, and skin are the most encountered body regions (5, 7). Primary bone PEComas are remarkably rare; best of our knowledge, only sixteen defined primary bone PEComa cases have been reported since 2002 . As mentioned before, besides female predominance in PEComa, in this study, we report a 51-year-old male presented with PEComa of the talus.

CASE REPORT

A 51-year-old male patient with unremarkable medical history was presented with swelling and redness of his left ankle in January 2019. Anteroposterior and lateral ankle plain radiography shows an impaction in the talus. (Figure 1a) After a culture sample has taken, the patient treated with antibiotics for a month. No regression in patient complaints has observed; further diagnostic tests examined. MRI revealed talus involvement and invasion of surrounding soft tissue. (Figure 2) Spacer operation performed and executed biopsy has shown infiltration, mild cellularity, and pleomorphism in clear, eosinophilic, granulated epithelioid cells suggest PEComa. The immunohistochemical report revealed; FE-3 (+), Desmin (-), HMB 45 (+) Myo- D1 (-), Melan-A (-), PanCK (-), Mitf (-), EMA (-), Sox-10 (-), S-100 (-), SMA (-), Pax-8 (-), Ki67 proliferation index %15-20. Another biopsy examination has shown necrosis and increased mitotic metabolism in clear cells. Related to findings, malignant PEComa has considered. PET-CT has examined.

PET-CT showed heterogeneous high metabolic activity in the area of the left ankle proximal to and around the operation area, including the tibia and fibula. In the left femoral area, hypermetabolic lymph nodes were detected with 3-4 malignancies, the largest of which was 50x35 mm. In the mediastinum and lung site, nodular formations that could not be measured due to their small size were observed. Superficial USG evaluated the lymph nodes in the femoral area; 58x35 mm sized asymmetric conglomerate lymph nodes were seen. Possible urinary tract and other infection sites examined; no infection observed clinically cause to conglomerate lymph nodes. Nodal biopsy has suggested, but the patient refuses the operation. The patient has evaluated by Oncology and Orthopedics mutually; chemotherapy has recommended.

DISCUSSION

Perivascular epithelioid cell tumors (PEComas) are mesenchymal tumors, clinically encountered rarely; furthermore, primary bone originated PEComas are extremely rare. To the best of our knowledge, Insabato et al. (2002) (8) , since stating primary bone PEComas in 2002, sixteen cases have been reported in the literature (Table 1) (8-17). The age of the patients varied from 24 to 93. Eight patients are male, and eight are female. Frequently, lower extremities have been affected by tumor. Tibia is the most tumor involving site, (4 of 16 cases located in tibia) and fibula is following. (3 of 16 cases located in fibula) Pathological evaluation of PEComa reveals characteristic findings such as epithelioid appearance with clear cytoplasm, a round centrally placed nucleus, and inconspicuous nucleolus. PEComa has an inclination to metastasis. 8 of 16 cases has been reported for metastasis likely all have an extra-bone involvement.

In this report, we present case number 16, unique primary bone PEComa of talus with the invasion of surrounding soft tissue; referred to the clinic with swelling and redness of his left ankle. After differential diagnosis of osteomyelitis and avascular necrosis, further investigations have revealed the PEComa. The biopsy is consistent with the characteristic features of PEComa. Chemotherapy has administered.

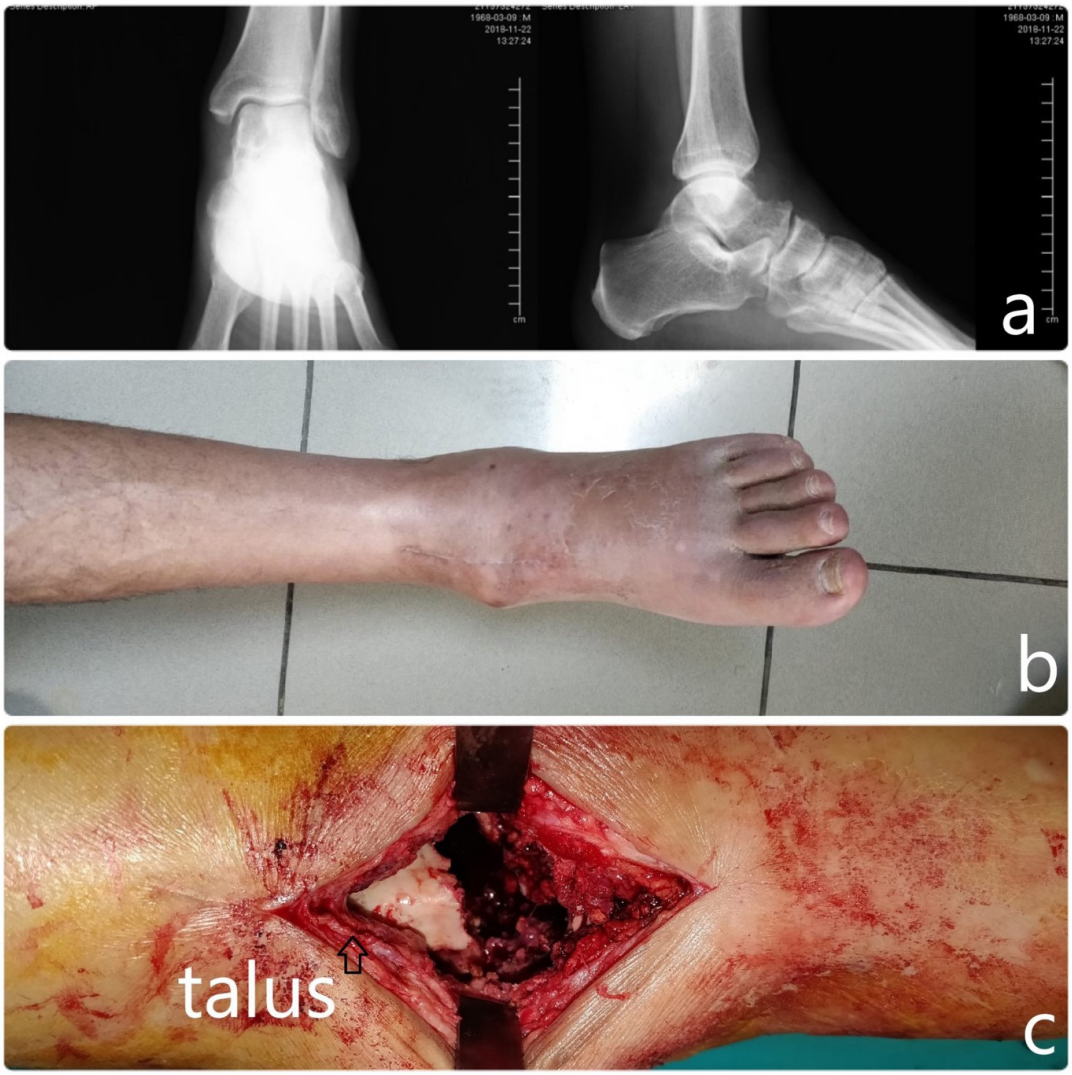

Figure 1. *Anteroposterior and lateral ankle radiography (a), Ankle clinical photo (b), intraoperative ankle anteroposterior photo (c)*

PEComas are mesenchymal tumors, evolve out of the perivascular epithelioid cells (PECs) that including angiomyolipoma (AML) of the kidney, pulmonary clear cell sugar tumor (CCST) and lymphangioleiomyomatosis (LAM) of the lung, and several rare clear-cell tumors of visceral, intraabdominal, soft tissue, and bone tumors (1). In 1943, PECs first described by Apitz; and Masson stated them as "abnormal myoblasts" in renal AML (2). Bonetti et al. (1992)(2) term the perivascular epithelioid cell characterized by epithelioid lesions with clear/acidophil cytoplasm and perivascular spread (2).

PEComas have prominent features; morphologically, it has an epithelioid appearance with clear cytoplasm, a round centrally placed nucleus, and inconspicuous nucleolus. Immunohistochemically, PEComas are expressing melanocytic markers, including Melan A, S100 protein, MiTF, and HMB-45, furthermore smooth muscle markers, including smooth muscle actin, myosin, desmin, and calponin (4, 9). Genetically, PEComas are mostly encountered with Tuberous Sclerosis (TSC), a disease associated with inactivating mutations of TSC1 or TSC2 genes, which lead to activation of mTOR; moreover, the mTOR pathway is activated in non-TSC PEComas also, suggests the presence of further genetic disorders for mTOR activation (5, 10). TFE3 gene fusions also reported in some subset of PEComas (4).

Table 1. Primary bone PEComas

Author	Year	Sex/ Age	Site	Extra bone involvement	Histology	Immunohisto-chemistry	Treatment
Insabato et al.[10]	2002	M/30	Proximal Tibia	No	Epitheloid cells	HMB45 (+)	Resection en bloc
Lian et al.[11]	2008	F/52	Proximal Fibula	No	Epitheloid cells	HMB45 (+) CD10 (+)	Resection en bloc
Righi et al.[12]	2008	F/92	Proximal Fibula	No	Epitheloid cells	HMB45 (+) CD10 (+)	Resection en bloc
Torii et al.[16]	2008	M/28	6th Rib	No	Epitheloid cells	HMB45 (+) Actin (+)	Resection en bloc
Yamashita et al.[1]	2010	M/35	T7	Yes	Epitheloid cells, Fusiform	HMB45 (+) Actin (+) Melan-A (+)	CT/RT
Yamashita et al.[1]	2010	F/39	Proximal Tibia	Yes	Epitheloid cells, Fusiform	HMB45 (+) Actin (+) Melan-A (+)	Resection / RT
Yamashita et al.[1]	2010	F/48	Distal Tibia	Yes	Fusiform cells	HMB45 (+) Actin (+) Melan-A (+)	Radical resection
Desy et al[14]	2012	F/93	Distal Fibula	Yes	Epitheloid cells, Bursiform	HMB45 (+)	Resection en bloc
Desy et al[14]	2012	M/24	Acetabulum	Yes	Epitheloid cells, Fusiform	Vimentin (+) Mart-1/Melen-A (+) Desmin (+)	Resection en bloc
Kazzas et al. [15]	2012	M/26	L5	Yes	Epitheloid cells	HMB45 (+) S100 (+) -? TEF-3 (+)	Marginal resection
Untrauer[17]	2014	F/77	Mandible	No	Epitheloid cells	Melan-A (+) NSE (+) CD56 (+) Vimentin (+)	Resection
Lao et al. [13]	2015	M/47	Distal Femur	Yes	Epitheloid cells	HMB45 (+) PNL2 (+) TFE-3 (+) Vimentin (+) Actin (+) CD10 (+) CD17 (+)	Curettage /RT/CT
Técualt et al.[7]	2016	M/24	Proximal Tibia	Yes	Epitheloid cells	HMB45 (-) Benign Actin (-) Melan-A (-) Others (-)	Resection en bloc/CT
Karpathiou et al.[8]	2017	F/24	Iliopubic bone	Yes	Epitheloid cells	HMB45 (+) Melan-A (+) S100 (-) Actin (-)	Resection/CT/RT
Gebhart et al. [9]	2017	F/50	Distal Talus	No	Epitheloid cells	HMB45 (+) Melan-A (-) S100 (-) Actin (-)	Resection en bloc
Kacan et al.	2019	M/51	Talus	Yes	Epitheloid cells	HMB45 (+) FE-3 (+) Melan-A (-) S100 (-)	CT/Resection

CT: Chemotherapy, RT: Radiotherapy

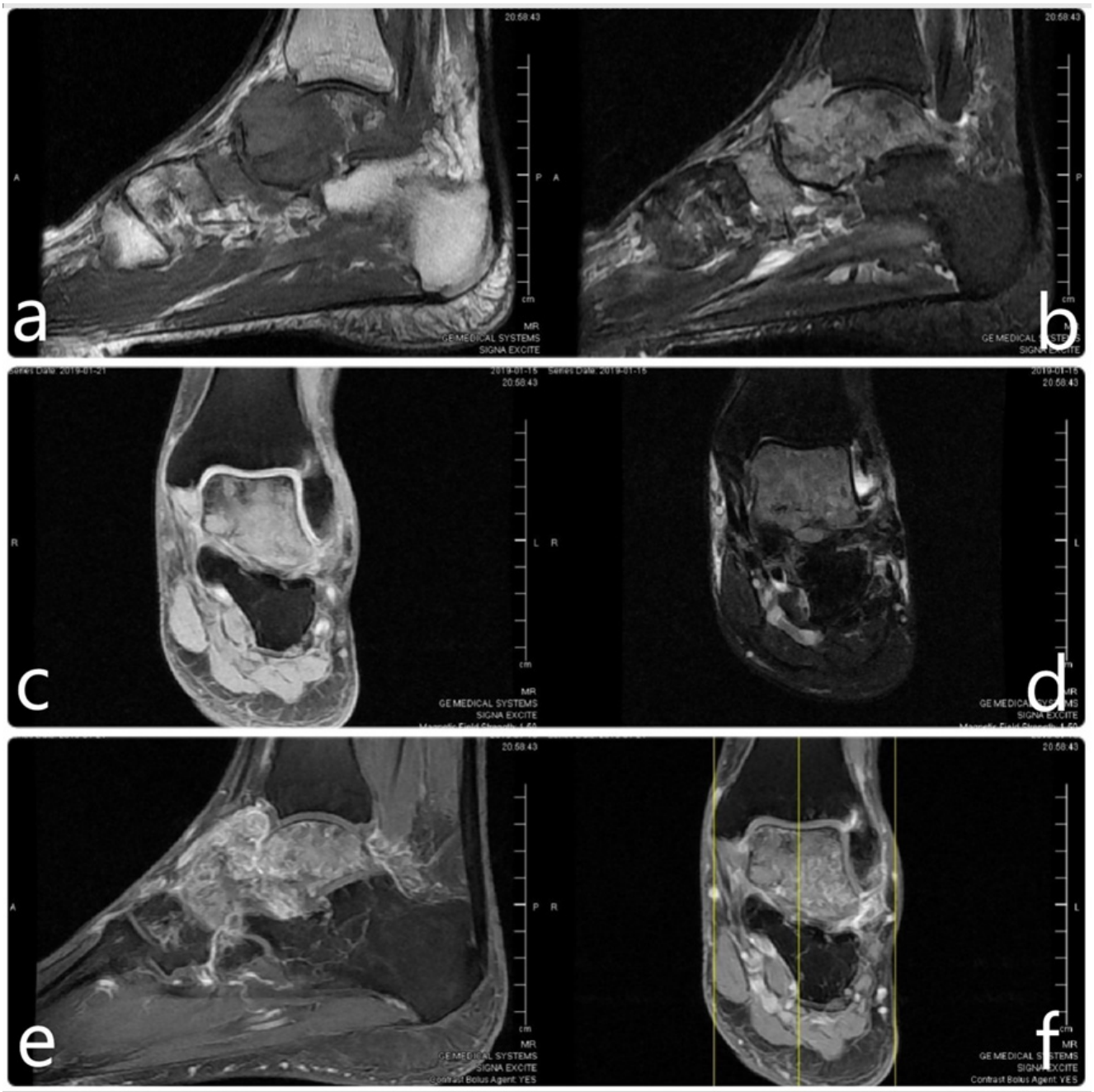

Figure 2. *Ankle MR images, sections show talus involvement and invasion of surrounding soft tissue; sagittal T1 (a), sagittal T2-STIR (b), coronal T1 (c), coronal T2 (d), contrast-sagittal T1 (e), contrast-coronal T2 (f)*

PEComa is accepted as malignant tumor, may have poor prognosis like high-grade sarcomas due to metastasis tendency. Physiological counterpart has not been identified before but several hypotheses have been stated about PEComas' origin (4). Some of studies suppose, PECs are sort of myeloblasts and differentiate from smooth muscle cells. Neural crest originated PEComa is the another of well accepted hypothesis; and also, pericytic origin of PEComa is considering in consequence of PEComa appears around muscle all of blood vessels (1).Folpe et al. (2010) (5) has proposed classification of PEComa as "benign", "uncertain malignant potential" and "malignant". Size of tumor (>5cm), necrosis, infiltrating growth pattern, high nuclear grade, high cellularity, and mitotic activity are described as a malignant criterion. Existence two of these criteria supports "malignant" PEComa. In case of 9 years, malignant PEComa is expected to have metastases to out of bone sites (5).

Primary bone PEComas have typically present with pain and swelling of the affected bone area. Differential diagnosis of tumor, soft tissue infection, osteomyelitis and avascular necrosis of talus has considered due to presentation of our patient. Radiological imaging has revealed talus involvement and invasion of surrounding soft tissue. Pathological evaluation of executed biopsy revealed infiltration, mild cellularity, and pleomorphism in clear, eosinophilic, granulated epithelioid cells. In differential diagnosis, hemangioma, PEComa, AML, CCST have considered. The immunohistochemical stain has resulted as PEComa with FE-3 (+), Desmin (-), HMB 45 (+) Myo- D1 (-), Melan-A (-), PanCK (-), Mitf (-), EMA (-), Sox-10 (-), S-100 (-), SMA (-), Pax-8 (-), Ki67 proliferation index %15-20. Another biopsy examination has shown necrosis and increased mitotic metabolism in clear cells.

Radiologically, PEComas have defined as peripheral parenchymal nodules which is rounded, well-countered and no presence of cavitation or calcification appearance which appear as osteolytic lesions. Related to aggressiveness of tumor, may present with cortical destruction and soft tissue invasion. MRI is recommended for evaluation of bone and soft tissue and CT scan of other body cites helps to asses metastasis. Even 18F-FDG-PET findings have not mentioned particularly in the literature, several cases report low 18F-FDG-PET uptake in PEComas (18).

In our case, anteroposterior and lateral ankle plain radiography shows an impaction in the talus. MRI indicated lobulated heterointense solid areas in left ankle. 18F-FDG-PET revealed that tumor suspected area in left talus has high uptake. (SUVmax 4.8) Bone scintigraphy showed hyperemia in left lower extremities and increased metabolic activity in left ankle bones. These findings are in agreement with imaging characteristics of PEComa.

In conclusion, primary bone PEComas are extremely rare mesenchymal tumors that including perivascular epithelioid cells with histological and immunohistochemical characteristics. PEComas frequently present with pain and swelling in affected bone area and must be distinguished from other tumors and infections.

Declarations

An informed consent form was obtained.

REFERENCES

1. Yamashita K, Fletcher CD. PEComa presenting in bone: clinicopathologic analysis of 6 cases and literature review. The American journal of surgical pathology. 2010;34(11):1622-9. Epub 2010/10/27.
2. Masson P. Origin of fibromyolipomas. Human tumors Histology, Diagnosis and Technique: Wayne State University Press Detroit; 1970. p. 735-6.
3. Bonetti F, Pea M, Martignoni G, et al. The American journal of surgical pathology. 1992;16(3):307.
4. Martignoni G, Pea M, Reghellin D, et al. PEComas: the past, the present and the future. Virchows Archiv. 2008;452(2):119-32.
5. Folpe AL, Kwiatkowski DJ. Perivascular epithelioid cell neoplasms: pathology and pathogenesis. Human pathology. 2010;41(1):1-15.
6. Bleeker JS, Quevedo JF, Folpe AL. "Malignant" perivascular epithelioid cell neoplasm: risk stratification and treatment strategies. Sarcoma. 2012;2012.
7. Gebhart M, Coltofeanu A. PEComa of the talus: a unique case of a soft tissue tumor within bone. Acta Chirurgica Belgica. 2019;119(2):118-22.
8. Insabato L, De Rosa G, Terracciano L, et al. Primary monotypic epithelioid angiomyolipoma of bone. Histopathology. 2002;40(3):286-90.
9. Técualt-Gómez R, Atencio-Chan A, Amaya-Zepeda R, et al. Neoplasia de células epiteloides perivasculares (PEComa) tibial. Reporte de un caso y revisión de la literatura. Revista Española de Cirugía Ortopédica y Traumatología. 2019;63(3):239-45.
10. Karpathiou G, Barral FG, Habougit C, et al. The eight year evolution of an osseous PEComa. Pathology international. 2017;67(3):181.
11. Lian D, Chuah K, Cheng M, Yap W. Malignant perivascular epithelioid cell tumour of the fibula: a report and a short review of bone perivascular epithelioid cell tumour. Journal of clinical pathology. 2008;61(10):1127-9.
12. Righi A, Dimosthenous K, Rosai J. PEComa: another member of the MiT tumor family? International Journal of Surgical Pathology. 2008;16(1):16-20.
13. Torii I, Kondo N, Takuwa T, et al. Perivascular epithelioid cell tumor of the rib. Virchows Archiv. 2008;452(6):697-702.
14. Desy NM, Bernstein M, Nahal A, et al. Primary perivascular epithelioid cell neoplasm (PEComa) of bone: report of two cases and review of the literature. Skeletal radiology. 2012;41(11):1469-74.
15. Untrauer JB, Giannini PJ, Talmon GA, et al. Malignant PEComa involving the mandible: report of a unique case. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2014;117(1):e3-e8.
16. Kazzaz D, Khalifa M, Alorjan M, et al. Malignant PEComa of the lumbar vertebra: a rare bone tumour. Skeletal radiology. 2012;41(11):1465-8.
17. Lao IW, Yu L, Wang J. Malignant perivascular epithelioid cell tumor (PEComa) of the femur: A case report and literature review. Diagnostic Pathology. 2015;10(1):54.
18. Sun L, Sun X, Li Y, Xing L. The role of 18F-FDG PET/CT imaging in patient with malignant PEComa treated with mTOR inhibitor. OncoTargets and therapy. 2015;8:1967.