Indian Journal of Pathology and Oncology 2024;11(1):56–58

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Indian Journal of Pathology and Oncology

Journal homepage: www.ijpo.co.in

Case Report

Beyond the ordinary: A rare glimpse of PEComa TFE3 rearranged in soft tissue

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ARTICLE INFO

Article history:
Received 08-01-2024
Accepted 28-03-2024
Available online 17-04-2024

Keywords:
TFE3
IHC
PEComa
Soft tissue

ABSTRACT

The term "Perivascular epithelioid cells" was described as early as 1992. WHO has defined PEComas as mesenchymal tumors composed of histologically and immunohistochemically distinctive perivascular epithelioid cells. These tumors have a varied morphology including sheets and nested pattern comprising of epithelioid to spindle tumor cells with increased vasculature often in a sinusoidal pattern. PEComas show immunoreactivity for melanocytic and smooth muscle markers, however small number cases show lack of muscle marker expression along with strong TFE3 nuclear positivity. Here we describe a PEComa of soft tissue of leg, TFE3 rearranged.

1. Introduction

PEComas of bone and soft tissues are extremely rare. Common sites of PEComa are the uterus, kidney, liver, lung, abdominopelvic soft tissues, gastrointestinal organs, retroperitoneum, and skin.[1] A small subset of PEComas show TFE3 gene rearrangement.[2] An uncommon mesenchymal tumor called a perivascular epithelioid cell tumor (PEComa) is made up of perivascular epithelioid cells that have unique histologic, immunohistochemical, and genetic characteristics.[3]

PEComa represents a family of closely related entities showing both melanocytic and myoid differentiation, including angiomyolipoma, lymphangioleiomyomatosis, clear-cell 'sugar' tumor of the lung, and neoplasms arising in a wide variety of locations including skin, soft tissue and visceral organs called PEComa not otherwise specified (PEComa-NOS).[4] Only occasional strong instances of primary bone and soft tissue origin have been documented in English literature.[5–7]

2. Case Report

A 24-year-old male presented with complaints of pain and swelling over right proximal tibia on the anterolateral aspect for 4 months. There was no history any fever, recent illness, nausea, vomiting, rash, or joint pain. No history past injuries or accident.

On clinical examination, the swelling was approximately 6 cm in greatest dimension. The swelling was non-mobile, tender and in deep plane. No skin changes were seen.

On imaging, USG Doppler shows heterogeneously hypoechoic lesion with increased external vascularity and MRI revealed a mass lesion ~ 34 x 36 x 86 mm in the intramuscular plane involving tibial anterior muscle, extensor digitorum longus muscle and peroneous longus muscle. No evidence cortical bone or periosteal invasion was noted. Post contrast images revealed enhancement and increased vascularity suggestive of ? neoplastic ? A-V malformation.

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https://doi.org/10.18231/j.ijpo.2024.012

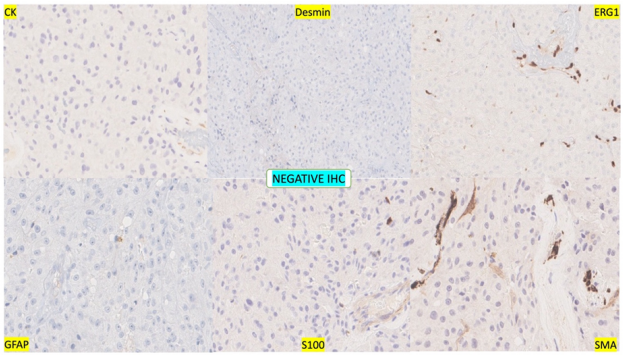

Figure 3:

Histologically, the tumor was cellular, composed of solid sheets and nests (Figure 1 a) separated by thin and delicate arborizing vasculature. (Figure 1 b) Individual tumor cells are large polygonal with abundant granular eosinophilic to clear cytoplasm, vesicular nucleus, and prominent central nucleoli. (Figure 1 c & 1d) Immunohistochemistry (IHC) profile showed diffuse and strong positivity for TFE3, Cathepsin K and HMB-45 (Figure 2) while negative for Pan-CK, SMA, Desmin, S100, MDM2, GFAP and ERG1. (Figure 3) Based on tumor morphology and immunoprofile, a diagnosis of TFE3 rearranged PEComa was rendered.

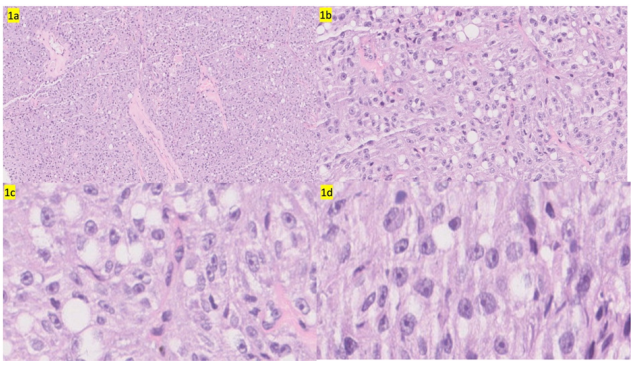

Figure 1:

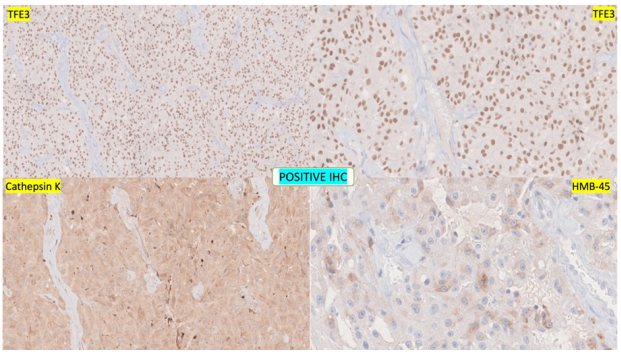

Figure 2:

3. Discussion

There are two distinct subtypes of PEComas. Conventional PEComas are associated with loss of heterozygosity (LOH) mutations in TSC2 or TSC1 gene. Other group is PEComas with TFE3(Xp11) gene locus rearrangements.[8] These tumors show strong positivity for immunohistochemical marker TFE3.[9] A characteristic feature of all PEComas is their immunopositivity for both melanocytic and smooth markers.[10] Morphologically, TFE3 rearranged PEComas have a prominent alveolar pattern with epithelioid cells, and absent expression of smooth muscle markers.[8] In the present case, morphology showed epithelioid cells with strong TFE3 expression and negativity for SMA and Desmin. The TFE3 gene fusion was discovered in PEComas from multiple anatomical locations using molecular analysis. TFE3 is a transcription factor that belongs to the MiTF family.[2]

Histologically, most bone PEComas were composed of epithelioid perivascular cells that exhibited characteristic nesting or organoid arrangement. Two cases were composed of both epithelioid and spindle cells.[4]

Alveolar soft part sarcoma (ASPS) is another differential diagnosis of this case. ASPS, a sarcoma characterized by organoid pattern and sinusoidal type vasculature, may cause confusion with PEComa. In particular, both tumors can express TFE3. It is easier to distinguish between these two entities since melanocytic differentiation is absent in ASPS.[7,11]

In this case, clinico-radiologically? sarcoma? fibromatosis was suspected. On histopathology, we considered the differentials of ASPS, epithelioid smooth muscle tumor and melanoma which were negated on IHC.

Clinically and histopathologically, PEComa is a challenging diagnosis due to nonspecificity of symptoms and ambiguous morphology. Limited data is available about management but, surgical excision is primary treatment.

4. Conclusion

We've discussed the clinicopathological and immunohistochemical characteristics of a case of PEComa arising in an adult male. PEComa can appear as a primary bone or soft tissue lesion, albeit this is extremely uncommon. Obtaining the accurate diagnosis requires a link between the clinical and pathological findings.

5. Source of Funding

This study did not receive any funding in any form.

6. Conflict of Interest

None.

References

1. WHO Classification of Tumours Editorial Board. Soft Tissue and Bone tumors. vol. Vol 3. Lyon (France): IARC; 2020.
2. Utpatel K, Calvisi DF, Köhler G, Köhler G, Kühnel T, Niesel A, et al. Complexity of PEComas : Diagnostic approach, molecular background, clinical management. *Pathologe*. 2020;41(1):9–19.
3. Fletcher CDM, Bridge JA, Hogendoorn P, Martens F. World Health Organization Classification Tumors of Soft Tissue and Bone. 4th ed. Geneva, Switzerland: WHO; 2013.
4. Folpe AL, Mentzel T, Lehr HA, Fisher C, Balzer BL, Weiss SW, et al. Perivascular epithelioid cell neoplasms of soft tissue and gynecologic origin: a clinicopathologicstudy of 26 cases and review of the literature. *Am J Surg Pathol*. 2005;29(12):1558–75.
5. Insabato L, Rosa GD, Terracciano LM, Fazioli F, Santo FD, Rosai J. Primary monotypic epithelioid angiomyolipoma of bone. *Histopathology*. 2002;40(3):286–90.
6. Lian DW, Chuah KL, Cheng MH, Yap WM. Malignant perivascular epithelioid cell tumour of the fibula: a report and a short review of bone perivascular epithelioid cell tumour. *J Clin Pathol*. 2008;61(10):127–9.
7. Righi A, Dimosthenous K, Rosai J. PEComa: another member of the MiT tumor family? *Int J Surg Pathol*. 2008;16(1):16–20.
8. Hornick JL, Fletcher CDM. Sclerosing PEComa: clinicopathologic analysis of a distinctive variant with a predilection for the retroperitoneum. *Am J Surg Pathol*. 2008;32(4):493–501.
9. Doyle LA, Hornick JL, Fletcher CDM. PEComa of the gastrointestinal tract: clinicopathologic study of 35 cases with evaluation of prognostic parameters. *Am J Surg Pathol*. 2013;37(12):1769–82.
10. Zamboni G, Pea M, Martignoni G, Zancanaro C, Faccioli G, Gilioli E, et al. Clear cell "sugar" tumor of the pancreas. A novel member of the family of lesions characterized by the presence of perivascular epithelioid cells. *Am J Surg Pathol*. 1996;20(6):722–30.
11. Kenerson H, Folpe AL, Takayama TK, Yeung RS. Activation of the mTOR pathway in sporadic angiomyolipomas and other perivascular epithelioid cell neoplasms. *Hum Pathol*. 2007;38(9):1361–71.

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Cite this article: Kapoor R, Sharma A, Pasricha S, Kamboj M, Mehta A. Beyond the ordinary: A rare glimpse of PEComa TFE3 rearranged in soft tissue. *Indian J Pathol Oncol* 2024;11(1):56-58.