Metastatic extraskeletal myxoid chondrosarcoma presenting as a forehead mass

Kendra W. Tan, MD,[a] Aisha S. Jamison, BS,[b] Brian L. Swick, MD,[a] and Nkanyezi N. Ferguson, MD[a]

Key words: extraskeletal myxoid chondrosarcoma; forehead mass; metastasis.

INTRODUCTION

Extraskeletal myxoid chondrosarcoma (EMC) is a rare soft tissue sarcoma commonly involving the lower extremities.[1] The World Health Organization categorizes EMC as a tumor of uncertain differentiation because a definitive derivation from cartilaginous differentiation is not evident.[2,3] Males are affected more frequently, with the highest incidence in the fifth and sixth decades of life.[2] EMC presents clinically as a deep mass commonly found on the proximal lower extremity, with a predilection for the underlying musculature.[2] The tumor follows a protracted course, with a high rate of local recurrence and metastasis.[1,2] The most common site of metastasis is the lungs, necessitating frequent clinical monitoring with imaging of the chest.[1,2] We present a case of a patient with metastatic EMC presenting as a forehead mass.

Abbreviation used:

EMC: extraskeletal myxoid chondrosarcoma

CASE REPORT

A man in his mid-30s was referred to the dermatology clinic for further management of a forehead mass thought to be consistent with a lipoma. The mass was noted 1 year before presentation after a minor forehead trauma. Over the previous 4 months, the mass gradually increased in size and was asymptomatic. His past medical history was pertinent to EMC on the left foot, for which he underwent a left below-the-knee amputation 9 years before his presentation to the clinic, followed by 4 cycles of adjuvant chemotherapy with ifosfamide and doxorubicin. Clinical examination revealed a 10 cm × 8 cm soft compressible mass on the right forehead extending from the hairline to the middle of the forehead (Fig 1).

In the surgical suite, the patient was placed in the supine position and sterilely prepared. Lidocaine 1% with 1:100,000 epinephrine was infiltrated locally. A full-thickness cutaneous linear incision was carefully made over the center of the mass. The frontalis muscle was cautiously incised, and an underlying gray circumscribed mass was identified (Fig 2). No abnormal pulsation or bruits were noted on palpation of the mass. The mass was dissected laterally without compromising the wall. At the base of the lesion, the underlying bone was palpated, and a circumferential step-off was noted. The procedure was aborted, and the cutaneous incision was closed. The patient was immediately sent for further imaging studies.

Magnetic resonance imaging showed a mass arising from the right frontal diploic space with intracranial extension and possible superior sagittal sinus invasion (Fig 3, *A*). A computed tomography scan was then obtained, showing a lytic right frontal bone lesion with hypodense soft tissue extension into the scalp soft tissues (Fig 3, *B*). The patient was referred to the

From the Department of Dermatology, University of Iowa Hospitals and Clinics, Iowa City, Iowa[a]; and Wright State University Boonshoft School of Medicine, Dayton, Ohio.[b]

Funding sources: None.

IRB approval status: Not applicable.

Correspondence to: Kendra W. Tan, MD, Department of Dermatology, University of Iowa Hospitals and Clinics, 200 Hawkins Drive, Iowa City, IA 52242. E-mail: Kendra-Tan@uiowa.edu.

JAAD Case Reports 2022;28:40-3.

2352-5126

https://doi.org/10.1016/j.jdcr.2022.08.012

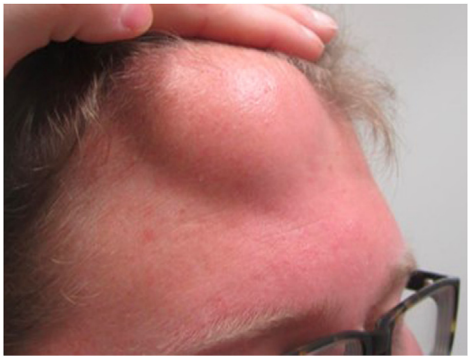

Fig 1. Soft compressible mass on the forehead extending from the hairline to the middle forehead.

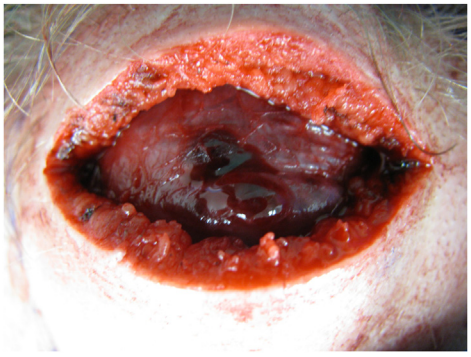

Fig 2. A full-thickness cutaneous linear incision with the frontalis muscle cautiously incised, revealing a gray circumscribed mass.

neurosurgery department and underwent a right frontal craniotomy and resection of the mass.

The mass was highly adherent to the underlying dura, and although it was carefully dissected away using microdissection, a minimum amount of tumor was left without complete resection. The resected tissue was sent for pathologic review.

Histopathologic examination of the resected mass revealed infiltrating atypical cells in small clusters on a background of the myxoid stroma. The atypical plasmacytoid cells had eosinophilic cytoplasm, regular nuclear contours, and finely granular chromatin and inconspicuous nucleoli and formed small clusters (Fig 4, *A* and *B*). Occasional multinucleate forms, spindled cells, and mitoses were noted. Immunohistochemical staining showed diffuse positivity for synaptophysin, focal positivity for neuron-specific enolase, and was negative for S100. Staining with MIB-1 revealed a proliferation index of 15% to 20%. A review of the primary tumor on the left foot showed identical morphology, consistent with metastatic EMC. The patient subsequently underwent radiation to the brain and failed systemic treatment with chemotherapy and immunotherapy, with the development of further metastases ultimately resulting in death.

DISCUSSION

EMC is a low-grade soft tissue sarcoma with an estimated prevalence of 1of 1,000,000 people, typically affecting adults in their fifth decade of life, with few cases reportedly occurring during childhood and adolescence.[4] EMC typically arises within the soft tissue of the proximal lower extremities. Less common locations of primary involvement include the head and neck, abdomen, bone, paraspinal soft tissue, and retroperitoneal space.[5] The central nervous system with intracranial involvement arising from the dura, choroid plexus, and pineal region also occurs.[5,6] Symptoms of pain and tenderness may be present, and some patients report a history of preceding trauma.[2]

Gross examination of EMC typically shows a blue-gray gelatinous lobulated to multinodular tumor.[2] Histopathologic examination reveals uniform spindle cells arranged in a reticular pattern with eosinophilic cytoplasm and hyperchromatic nuclei.[1,6] These cells are often surrounded by a characteristic myxoid stroma.[1] Immunohistochemically, EMC typically stains positive for vimentin, with variable expression of synaptophysin, neuron-specific enolase, and S-100.[2,7] These tumors commonly harbor a t(9;22)(q22;q12) translocation, resulting in the gene fusion of *EWSR1-NR4A3*, and less common rearrangements of t(9;17)(q22;11) and t(9;15)(q22;q21), which have not been identified in any other sarcomas.[7] Cytogenetic studies probing for these gene fusions were not performed on our patient.

The treatment of EMC is wide surgical excision with or without adjuvant radiation and chemotherapy.[4] Although EMC has an indolent course, it is associated with a high rate of local and distant recurrence, with an estimated 10-year survival rate of 60.7 %.[4] The most common site of distant metastasis is the lungs; however, other sites include lymph nodes, bony skeleton, soft tissue, and the brain.[8,9]

Our patient underwent surveillance with yearly chest computed tomography and nuclear bone scans after the initial diagnosis of EMC of the foot and was considered disease-free for 9 years before presenting to the dermatology clinic for a forehead mass presumed to be a lipoma. Other differential considerations for a mass on the forehead included dermoid cyst, meningocele/meningocephalocele, osteoma, fibrous dysplasia, osteoid osteoma, ossifying fibroma, giant cell tumor, aneurysmal bone cyst, neuroblastoma, lymphoma, Ewing sarcoma, osteogenic sarcoma, calcified cephalohematoma, and growing skull fracture (leptomeningeal cyst).

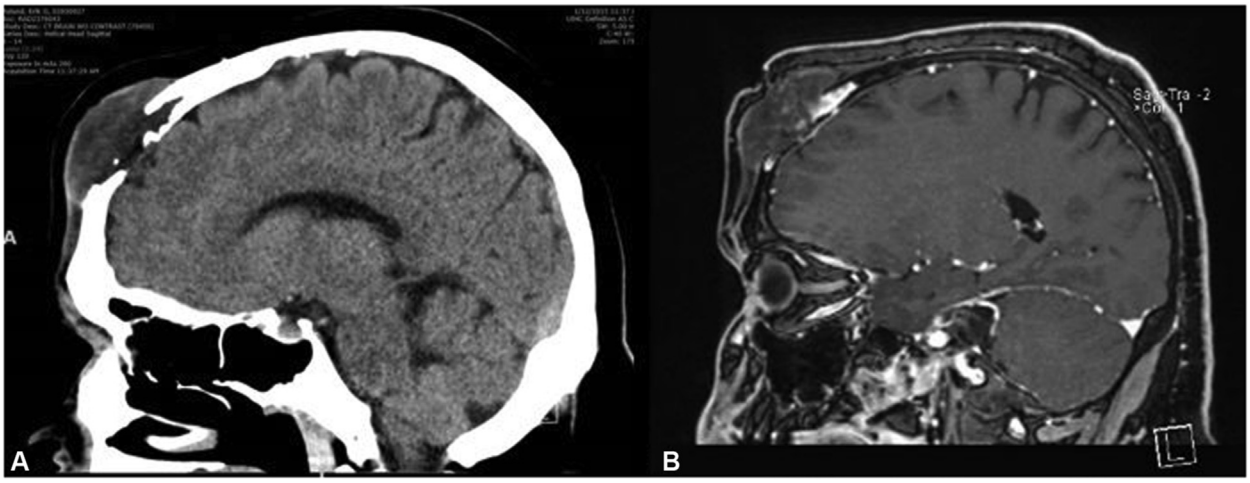

Fig 3. A, Magnetic resonance imaging and (**B**) computed tomography without contrast showing a mass arising from the right frontal diploic space with intracranial extension.

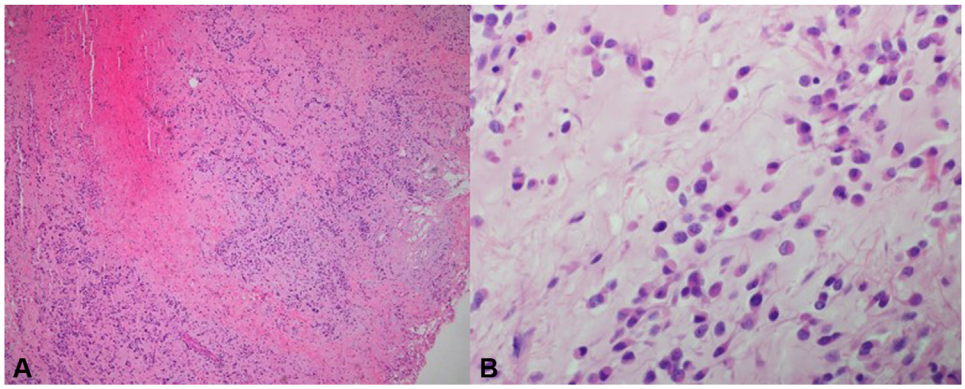

Fig 4. Histopathology demonstrated uniform spindle cells arranged in a reticular pattern with eosinophilic cytoplasm and hyperchromatic nuclei (**A** and **B,** Hematoxylin-eosin stain; original magnification: **A,** ×40; **B,** ×400.)

Although this patient's clinical and histologic findings are consistent with EMC, the anatomical location of his mass is atypical. Additionally, the patient's time from the initial presentation of EMC to distant relapse differs from the literature that reports a median interval of 20 months for distant recurrence.[10] Our case highlights the importance for dermatologists to maintain a broad differential diagnosis for scalp and skull masses, consider preoperative imaging in atypical cases, and be cautious during surgery for lesions that may have communication to the underlying dura or brain.

Conflicts of interest

None disclosed.

REFERENCES

1. Kapoor N, Shinagare AB, Jagannathan JP, et al. Clinical and radiologic features of extraskeletal myxoid chondrosarcoma including initial presentation, local recurrence, and metastases. *Radiol Oncol*. 2014;48(3):235-242. https://doi.org/10.2478/raon-2014-0005
2. Goldblum JR, Folpe AL, Weiss SW. Other malignant soft tissue tumors, including those of uncertain type. In: *Enzinger and Weiss's Soft Tissue Tumors*. 7th ed. Elsevier; 2020.
3. WHO Classification of Tumours Editorial Board. *Soft Tissue and Bone Tumours*. World Health Organization; 2020.
4. Brown JM, Rakoczy K, Pretell-Mazzini J. Extraskeletal myxoid chondrosarcoma: clinical features and overall survival. *Cancer Treat Res Commun*. 2022;31:100530. https://doi.org/10.1016/j.ctarc.2022.100530
5. Park JH, Kim MJ, Kim CJ, Kim JH. Intracranial extraskeletal myxoid chondrosarcoma: case report and literature review. *J Korean Neurosurg Soc*. 2012;52(3):246-249. https://doi.org/10.3340/jkns.2012.52.3.246
6. Stacchiotti S, Baldi GG, Morosi C, Gronchi A, Maestro R. Extraskeletal myxoid chondrosarcoma: state of the art and current research on biology and clinical management. *Cancers (Basel)*. 2020;12(9):2703. https://doi.org/10.3390/cancers12092703
7. Okamoto S, Hisaoka M, Ishida T, et al. Extraskeletal myxoid chondrosarcoma: a clinicopathologic, immunohistochemical,

and molecular analysis of 18 cases. *Hum Pathol*. 2001;32(10): 1116-1124. https://doi.org/10.1053/hupa.2001.28226

8. Fice MP, Lee L, Kottamasu P, et al. Extraskeletal myxoid chondrosarcoma: a case series and review of the literature. *Rare Tumors*. 2022;14:20363613221079754. https://doi.org/10.1177/20363613221079754
9. Claxton MR, Reynolds G, Wenger DE, Rose PS, Houdek MT. Extraskeletal myxoid chondrosarcoma: a high incidence of metastatic disease to lymph nodes. *J Surg Oncol*. 2020;122(8): 1662-1667. https://doi.org/10.1002/jso.26179
10. Paioli A, Stacchiotti S, Campanacci D, et al. Extraskeletal myxoid chondrosarcoma with molecularly confirmed diagnosis: a multicenter retrospective study within the Italian sarcoma group. *Ann Surg Oncol*. 2021;28(2):1142-1150. https://doi.org/10.1245/s10434-020-08737-7