A Perplexing Diagnosis of Exclusion: A Rare Case of Histiocytic Sarcoma of the Central Nervous Sysem

Lucas Macha[1 2], MD, Catalina Amador[2], MD
1.Department of Pathology and Laboratory Medicine, Jackson Memorial Hospital; 2. Department of Pathology and Laboratory Medicine, University of Miami/Miller School of Medicine

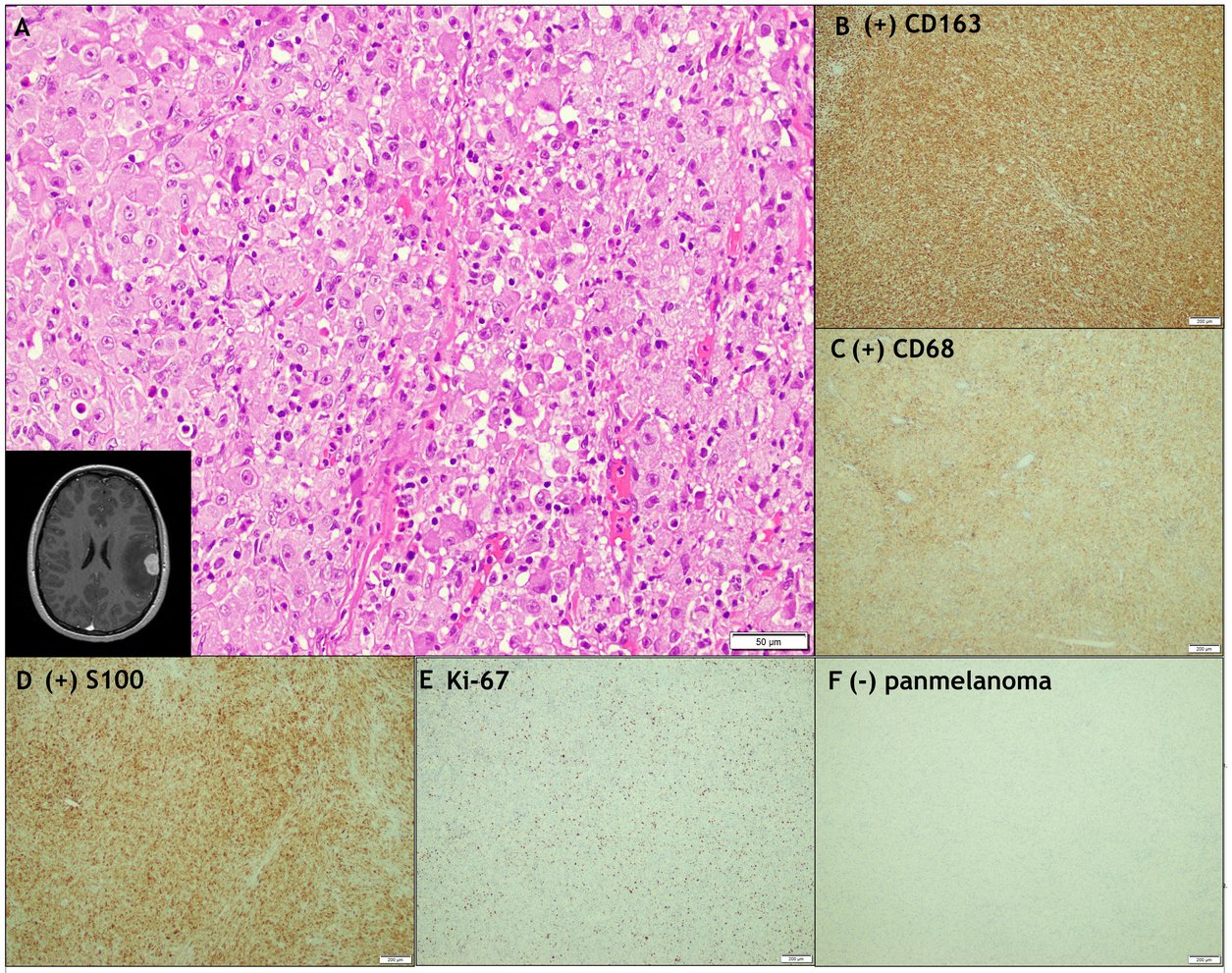
Introduction

- Histiocytic sarcoma (HS) is a rare hematologic malignancy showing immunophenotypical and morphological features of macrophages.
- Can occur over a broad age range with a slight male predominance; it primarily affects the gastrointestinal (GI) tract, skin, soft tissue, and hematopoietic system.

Case Description

- 16-year-old female with no prior medical history presented with intermittent headaches and facial numbness.
- Imaging demonstrated a 2.1 x 1.4 cm left anterior parietal dural-based mass with vasogenic effect; resected via craniotomy.
- Differential diagnosis was broad, including metastasis of unknown origin, meningioma, melanoma, or a primary cranial or hematological malignancy.
- Immunohistochemistry performed on the resected tissue was positive for histiocytic markers (CD163, CD68, PU.1), as well as CD4, vimentin, S100 (focal), and lysozyme; negative stains included several melanocytic markers, epithelial markers, and an array of other markers like CD20, PAX-5, synaptophysin, ALK, and BRAF.
- Mutational studies later revealed an in-frame USP10::BRAF fusion via RNA sequencing.
- Patient was scheduled for six weeks of focal proton radiation therapy at an institution on the west coast.

Case Images



A: H&E, 20x, malignant tumor consisting of pleomorphic cells with deeply eosinophilic cytoplasm; inset shows patient's cranial magnetic resonance imaging (MRI) prior to resection. **B:** Positive CD163 immunostain. **C:** Positive CD68 immunostain. **D:** Positive (patchy) S100 immunostain. **E:** Ki-67 nuclear proliferation index. **F:** Negative panmelanoma stain.

Discussion

- Here we describe a rare of extranodal histiocytic sarcoma.
- The differential diagnosis of histiocytic sarcoma (HS) is broad and requires careful exclusion of various malignancies, including acute monocytic leukemia, lymphoma, melanoma, and undifferentiated pleomorphic sarcoma; therefore, a comprehensive immunohistochemical panel is essential for accurate diagnosis.
- Mutations in the MAPK pathway (e.g. KRAS, NRAS, BRAF, MAP2K1) are frequently identified in HS; targeted therapies directed against these mutations have demonstrated promising results.
- In limited case studies, patients with unifocal disease treated with surgery and adjuvant radiotherapy had the best outcomes.

References

Hornick JL, Jaffe ES, Fletcher CD. Extranodal histiocytic sarcoma: clinicopathologic analysis of 14 cases of a rare epithelioid malignancy. Am J Surg Pathol. 2004 Sep;28(9):1133-44. doi: 10.1097/01.pas.0000131541.95394.23. PMID: 15316312.
Susan Joy Philip D, Sherief A, Narayanan G, Nair SG, Av J. Histiocytic Sarcoma: Clinical Features and Outcomes of Patients Treated at a Tertiary Cancer Care Center. Cureus. 2022 Jun 10;14(6):e25814. doi: 10.7759/cureus.25814. PMID: 35822135; PMCID: PMC9271260.
Kommalapati A, Tella SH, Go RS, Goyal G. Predictors of survival, treatment patterns, and outcomes in histiocytic sarcoma. Leuk Lymphoma. 2019 Feb;60(2):553-555. doi: 10.1080/10428194.2018.1492128. Epub 2018 Jul 22. PMID: 30032691.