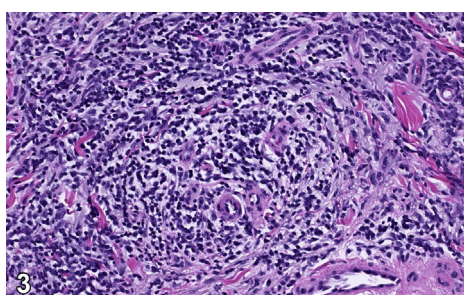
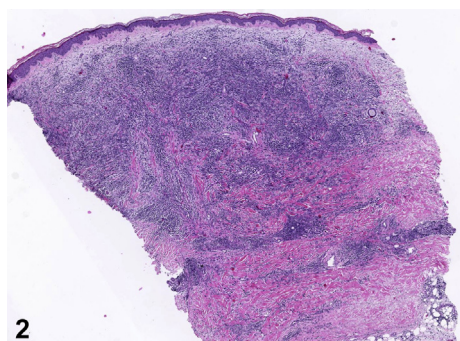


Plum-colored plaques on the scalp and extremities



Aamir N. Hussain, MD, MAPP, Emily L. Guo, MD, and Michael A. Cardis, MD
Washington, DC

Key words: aleukemic leukemia cutis; dermatopathology; leukemia; myeloid sarcoma; myelofibrosis.



An 80-year-old woman with essential thrombocythemia (ET), complicated by myelofibrosis, on anagrelide and pegylated interferon was admitted for expedited work-up of worsening leukocytosis and cutaneous lesions of a duration of 6 weeks. She reported unintentional weight loss and fatigue. Physical examination revealed plum-colored nodules over the bilateral lower extremities and right ventral forearm (Fig 1) with a similarly-colored thin plaque on the scalp. Bone marrow biopsy showed osteosclerosis and myelofibrosis with approximately 6% myeloblasts, but no acute leukemia. Peripheral flow cytometry similarly showed no acute leukemia. A punch biopsy of a representative lesion was obtained from the right lower extremity (Figs 2 and 3).

From the Medstar Washington Hospital Center/Georgetown University Hospital.

Funding sources: None.

IRB approval status: Not applicable.

Correspondence to: Aamir Hussain, MD, MAPP, Dermatology Resident Physician, Medstar Washington Hospital Center, Chevy Chase, MD. E-mail: anh36@georgetown.edu.

JAAD Case Reports 2021;9:21-3.
2352-5126

© 2021 by the American Academy of Dermatology, Inc. Published by Elsevier, Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.jidcr.2020.12.037>

Question 1: What is the most likely diagnosis?

- A. Myeloid sarcoma
- B. Cutaneous lymphoid hyperplasia
- C. Erythema elevatum diutinum
- D. Sweet syndrome
- E. Tumid lupus erythematosus

Answers:

A. Myeloid sarcoma — Correct. Myeloid sarcoma, also known as myeloid leukemia cutis, chloroma, granulocytic sarcoma, or extramedullary myeloid tumor, occurs due to malignant immature myeloid cells or myeloblasts invading an extramedullary anatomic site.¹ The skin is the most commonly affected site, and lesions usually appear as well-defined red, green, or violaceous plaques or nodules appearing on the scalp, trunk, or extremities.¹ Classically, myeloid sarcoma is a cutaneous manifestation presenting concurrently with systemic leukemia. However, it can also occur preceding blastic transformation in patients with a chronic myeloproliferative disorder or a myelodysplastic syndrome, as in this unusual case of our patient with essential thrombocytosis in which her bone marrow biopsy and peripheral flow cytometry did not indicate acute myeloid leukemia. Previous case reports have described this phenomenon as aleukemic leukemia cutis or aleukemic cutaneous myeloid sarcoma, and diagnosis is usually made through a combination of immunohistochemistry and cytogenetic studies.² Histopathology showed a dense, superficial and deep nodular and diffuse infiltrate with perivascular accentuation and infiltration between collagen bundles. It was composed predominantly of atypical myeloblasts with variably enlarged nuclei, finely dispersed chromatin, conspicuous nucleoli, and amphophilic cytoplasm. The epidermis was spared (Grenz zone), and scattered eosinophils and mitotic figures were present. These findings are consistent with cutaneous involvement by a myeloid neoplasm, i.e. myeloid sarcoma.¹

B. Cutaneous lymphoid hyperplasia — Incorrect. Cutaneous lymphoid hyperplasia, also known as pseudolymphoma or lymphocytoma cutis, is a benign inflammatory response that can mimic hematolymphoid neoplasia. Although histopathology may reveal a dense cellular infiltrate in a periadnexal and/or perivascular distribution, there are typically lymphoid aggregates with mixed inflammatory cells and the formation of germinal centers.

C. Erythema elevatum diutinum — Incorrect. Erythema elevatum diutinum is a form of fibrosing leukocytoclastic vasculitis. While it may present with red-purple plaques on the extremities and histopathology may show a Grenz zone, the infiltrate in erythema elevatum diutinum is predominantly neutrophilic, and leukocytoclastic vasculitis is evident. Chronic lesions characteristically feature onion-skin fibrosing around vessels, as the inflammation subsides.³

D. Sweet syndrome — Incorrect. Sweet syndrome typically presents with an abrupt eruption of numerous edematous pink papules and plaques in a generalized distribution. Histopathology classically shows an extensive dermal infiltrate of neutrophils with accompanying papillary dermal edema and occasionally blister formation.

E. Tumid lupus erythematosus — Incorrect. Tumid lupus erythematosus most commonly presents on sun-exposed surfaces such as the face and trunk. The clinical morphology is often that of pink urticarial papules and plaques and may have an arcuate or annular appearance. Histopathology shows a superficial and deep perivascular and periadnexal lymphocytic infiltrate with a conspicuous increase in dermal mucin.³

Question 2: Which of the following immunostains would be most specific for the diagnosis?

- A. BCL2
- B. CD34
- C. CD117
- D. Myeloperoxidase
- E. Ki-67

Answers:

A. BCL2 — Incorrect. This is a protein that inhibits apoptosis and is often lost in certain B-cell lymphomas. It would not be helpful in the diagnosis of myeloid sarcoma.³

B. CD34 — Incorrect. CD34 is a transmembrane protein expressed by a variety of cells, including hematopoietic stem cells. It may be positive in leukemic infiltrates, but is not highly specific for myeloid sarcoma, and may be positive in other malignancies.³

C. CD117 — Incorrect. CD117, the c-kit proto-oncogene product, is a protein expressed by a variety of cells, including hematopoietic stem cells, mast cells, and melanocytes.⁴ It is not highly specific

for myeloid sarcoma, and may be positive in other malignancies such as gastrointestinal stromal tumors.⁴

D. Myeloperoxidase — Correct. Myeloperoxidase is a lysosomal enzyme specific to cells with a monocytic lineage, including the myeloblasts that are constituent cells in myeloid sarcoma.¹ In our case, myeloperoxidase highlighted > 90% of cells within the infiltrate. CD34 and CD117, markers of immature myeloid cells, were additionally positive to varying albeit lesser degrees.

E. Ki-67 — Incorrect. Ki-67, also known as Mib-1, is a nuclear marker expressed in all active stages of the cell cycle. Ki-67 is usefully for confirming a high proliferative index in malignancies; however, it is non-specific, and certain benign entities may also exhibit rapid growth.³ In our case, the Ki-67 proliferative index exceeded 90% within the lesion.

Question 3: Which of the following is not a cutaneous manifestation of essential thrombocythemia?

- A.** Livedo reticularis
- B.** Erythromelalgia
- C.** Polyarteritis nodosa
- D.** Raynaud phenomenon
- E.** Lower extremity ulcers

Answers:

A. Livedo reticularis — Incorrect. This is a purplish, net-like vascular pattern on the skin commonly occurring due to vascular pathology. In ET, the livedo reticularis pattern may be more limited and asymmetric in comparison with the classic/benign form.⁵

B. Erythromelalgia — Incorrect. This is a rare condition characterized by burning pain and erythema at the distal extremities, exacerbated by heat

and exercise. While rare, it has been documented in ET.⁵

C. Polyarteritis nodosa — Correct. Polyarteritis nodosa is a medium-vessel vasculitis often affecting numerous organs, while classically sparing the lungs. It is commonly associated with hepatitis B infection, and may also be triggered by blood dyscrasias such as hairy cell leukemia. However, ET is not a known trigger of polyarteritis nodosa.

D. Raynaud phenomenon — Incorrect. This condition results from vasoconstriction of peripheral arteries due to cold exposure. It is associated with ET, and can be treated with avoidance of cold, warm clothing, and calcium channel blockers.⁵

E. Lower extremity ulcers — Incorrect. Ulceration may occur from chronic coagulopathy, as in the case of ET. It may also result from chemotherapeutics, such as hydroxycarbamide, which are used to treat myelodysplastic syndromes.⁵

Abbreviation used:

ET: essential thrombocythemia

Conflicts of interest

None disclosed.

REFERENCES

1. Cibull TL, Thomas AB, O'Malley DP, Billings SD. Myeloid leukemia cutis: a histologic and immunohistochemical review. *J Cutan Pathol.* 2008;35(2):180-185.
2. Aboutaleb A, Korman JB, Sohani AR, et al. Aleukemic cutaneous myeloid sarcoma. *J Cutan Pathol.* 2013;40(12):996-1005.
3. Elston Dirk. *Dermatopathology—3rd ed.* 3rd ed. Elsevier; 2013. Accessed October 28, 2020. Available at: <https://www.elsevier.com/books/dermatopathology/elston/978-0-7020-7280-2>
4. Sánchez-Muñoz L, Teodósio C, Morgado JM, Escribano L. Chapter 14 - Immunophenotypic characterization of bone marrow mast cells in mastocytosis and other mast cell disorders. In: Darzynkiewicz Z, Holden E, Orfao A, Telford W, Wlodkovic D, eds. *Methods in Cell Biology.* Vol 103. Recent Advances in Cytometry, Part B. Academic Press; 2011:333-359.
5. Cozzani E, Iurlo A, Merlo G, et al. Essential thrombocythemia: the dermatologic point of view. *Clin Lymphoma Myeloma Leuk.* 2015;15(12):739-747.