What Are These Chronic, Progressive, Bruise-Like Lesions on a Child?

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A 6-year-old boy with obesity presented to our clinic with a 7-month history of worsening "bruising" scattered across his entire body. His mother had initially noted a small purplish-brown lesion on his upper left thigh, which slowly progressed in size. Over the course of several months, new lesions appeared and spread to his face, torso, back, and various parts of the extremities.

Several visits to the patient's primary doctor and urgent care had not led to a diagnosis. He was referred to a dermatologist but presented to the emergency department (ED) prior to his dermatology appointment, because the lesions had become painful.

The lesions were initially dime-sized, flat, and purplish-brown in color and progressively increased in size and became more firm, elevated, and darker purple in color. The patient reported that the lesions are occasionally pruritic and painful to touch.

There is no history of trauma, easy bleeding or bruising, weight loss, night sweats, lymphadenopathy, travel, or unusual environmental exposures.

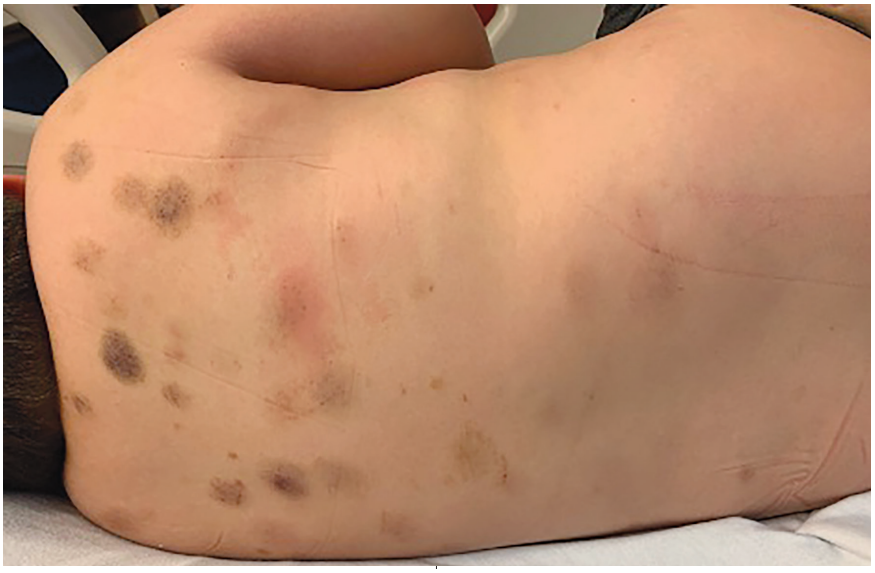

Figure 1. Physical examination findings were significant for lesions spread diffusely over the patient's upper back.

In the ED, the patient was noted to be afebrile with normal vital signs. Physical examination findings were significant for diffusely scattered, purpuric-appearing patches and plaques, some with a peau d'orange texture (Figures 1-3).

The results of laboratory workup showed a normal complete blood cell count, normal chemistry and coagulation panels, a normal C-reactive protein level, and a normal erythrocyte sedimentation rate. A radiography scan was conducted because the patient reported chest pain, results of which showed a possible widened mediastinum. The patient was admitted to the hospital for further workup. A computed tomography scan revealed an anterior mediastinal mass on the thymus.

What is your diagnosis?

A. Vasculitis
B. Fibroma
C. Blastic plasmacytoid dendritic cell neoplasm
D. Melanoma

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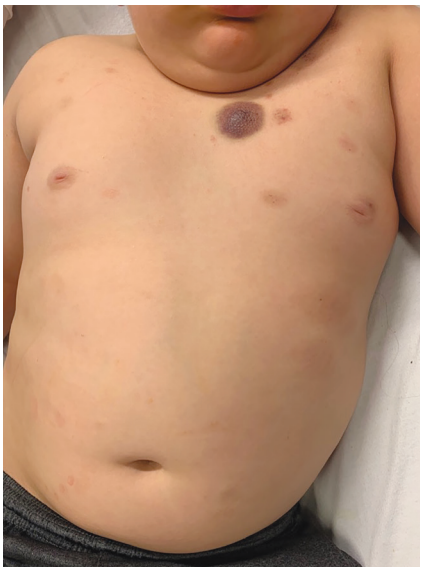

Figure 2. Physical examination findings were significant for lesions over the patient's anterior chest.

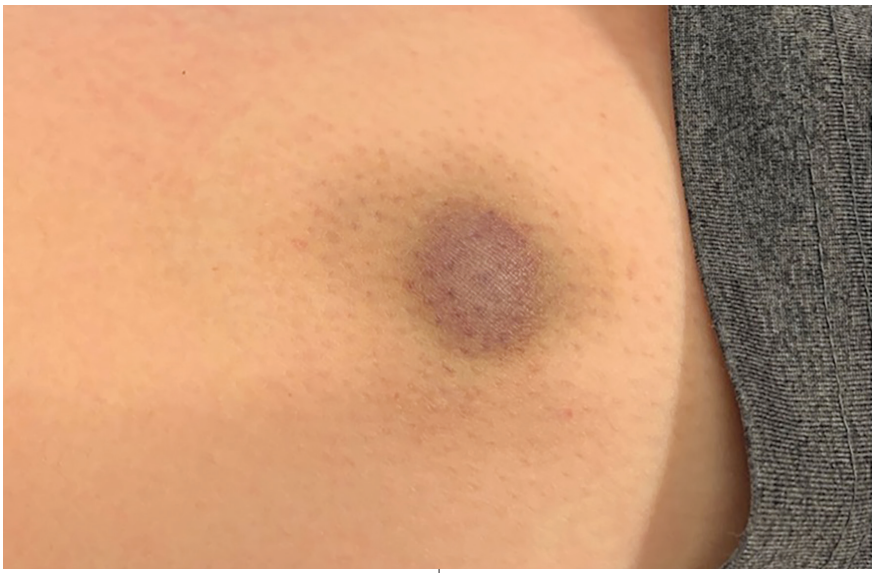

Figure 3. Physical examination findings were significant for a solitary lesion on the patient's anterior thigh.

Correct answer: B. Blastic plasmacytoid dendritic cell neoplasm

Dermatology was consulted and conducted a punch biopsy of one of the lesions, results of which confirmed the diagnosis of blastic plasmacytoid dendritic cell neoplasm (BPDCN). In our patient's case, the differential diagnosis revolved around the appearance and characteristics of the cutaneous lesions, because there was a lack of other distinct symptoms or clinical findings. The differential diagnosis primarily included vasculitis, benign lesions such as fibromas, or cutaneous oncologic processes.

Discussion

BPDCN is a rare oncologic process arising from type 2 dendritic cells. BPDCN comprises less than 1% of cutaneous hematologic malignancies, with a male predominance of about 2.5:1. It is also more common among individuals aged older than 60 years, although there appears to be a bimodal age distribution with a second incidence peak in individuals aged younger than 20 years.[1-3]

Cutaneous lesions are the most common clinical finding presenting in approximately 80% of cases, but only 30% of cases have cutaneous-isolated disease.[3-6] The characteristic lesions—often plaques or nodules that are brown or purple in color with a bruise-like appearance—matched those on our patient.[4,5] More than half of patients have involvement of blood, bone marrow, or lymph nodes with peripheral blood involvement presenting with the following frequency: thrombocytopenia, 78%; anemia, 65%; and neutropenia, 34%.[4,6] Central nervous system (CNS) involvement is common at the time of diagnosis, affecting up to 33% of patients.[2,6,7]

Diagnosis of BPDCN starts with a skin biopsy demonstrating infiltrative, intermediate-size blasts with poor differentiation that spare the epidermis. However, definitive diagnosis requires immunophenotyping that demonstrates cells expressing CD4 and CD56, as well as one or more plasmacytoid dendritic cell specific antigens.[3,8,9,10]

Although there is a lack of consensus on the optimal approach to treating BPDCN in pediatric patients, many review articles have touted the benefits of high-risk acute lymphoblastic leukemia (ALL)-type therapies with CNS prophylaxis compared with other chemotherapy regimens.[2,7,11,12] Regular intrathecal prophylaxis has been recommended to maintain remission, primarily because the CNS may serve as a persistent blast cell sanctuary and a common site of relapse.[11] Hematopoietic stem cell transplantation (HSCT) is typically reserved for children who relapse, primarily because studies have not demonstrated an increase in survival rates for pediatric populations undergoing HSCT during their first remission, and the toxicity of allogeneic HSCT in the first remission outweighs the potential benefits for longer-term outcomes.[6,11] Most recently in adult populations with BPDCN, novel targeted therapies have shown promise with manageable toxicities and durable responses to therapy.[2,7,13] Tagraxofusp-erzs is the only US Food and Drug Administration–approved targeted therapy for both adults and children aged older than 2 years.[7,14] However, this medication may not always be an option.[7,14]

Data demonstrates a difference in prognosis between pediatric and adult patients. The overall prognosis for adult BPDCN is poor, with a reported average survival median of less than 2 years.[7,15] In comparison, pediatric patients fare better than their adult counterparts on multiple prognostic measures. Children are more likely to achieve complete remission, have lower rates of relapse, and have higher survival rates at follow-up.[11] In a 2010 review article, pediatric patients on chemotherapy, without HSCT, had an overall survival of 74%, with a median follow-up of 30 months.[6] Older age is the primary negative predictive prognostic factor for BPDCN; clinical presentation, aside from cutaneous lesions, does not have prognostic significance in pediatric populations.[11] It is unclear whether the presence of cutaneous lesions at diagnosis affects the prognosis in children. Some studies have shown that pediatric patients presenting without cutaneous lesions can be expected to fare better, but this may be due to a higher proportion of patients with noncutaneous symptoms receiving ALL treatment.[6,11]

Patient Outcome

After biopsy results returned, the patient was admitted to the oncology service and underwent further workup, including peripheral smear and cytometry, bone marrow aspirate, and lumbar puncture, results of which showed no signs of malignancy. The patient was started on a regimen of induction high-risk ALL, including vincristine, doxorubicin, pegasparaginase, and dexamethasone with intrathecal methotrexate and cytarabine.

At the end of induction, the patient had significant fading or resolution of all skin lesions without evidence of disease metastasis on repeat imaging. He underwent consolidation phase treatment with 6-mercaptopurine and cytarabine with intrathecal triple therapy, including vincristine, methotrexate, and 6-mercaptopurine. Now, he is on a maintenance therapy regimen of vincristine, high-dose methotrexate, and 6-mercaptopurine without significant complications or signs of disease relapse.

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