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Case Report

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Unusual Cutaneous Manifestation of Acute Lymphoblasic Leukemia in a Child

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ABSTRACT

Acute lymphocytic leukemia (ALL) is a prevalent cancer in pediatrics. The cutaneous manifestation known as leukemia cutis is an unusual presentation of ALL, and patients with this manifestation have a poor prognosis. In this report, we present a 3-year-old boy who was referred to our clinic with cutaneous manifestations of ALL and responded well to treatment.

A 3-year-old male patient was referred to our clinic for swelling in the left posterior thoracic region. The child's parents reported an observable bulging in the abdominal area. Ultrasonography revealed splenomegaly and a hypoechoic mass measuring 11 mm × 8 mm in the anterior superior cortex of the right kidney. Laboratory studies indicated leukocytosis. Imaging findings suggested potential metastatic liver involvement, with a less probable diagnosis of secondary non-Hodgkin lymphoma (NHL). Bone marrow aspiration (BMA) and biopsy of the thoracic lesion were performed. The BMA confirmed a diagnosis of acute pre-B cell lymphoblastic leukemia (ALL), and the cutaneous biopsy indicated infiltration by leukemic cells. The patient was initiated on a standard treatment regimen, to which he responded well. Leukemia cutis is rare in children and may present as unresponsive swelling. Pediatricians should consider it when standard treatments fail.

Introduction

Acute lymphoblastic leukemia (ALL) is a hematological neoplasm characterized by the uncontrolled proliferation of lymphoblasts, precursors to lymphocytes. While more common in children, the incidence of ALL in adults is increasing. The disease is categorized into two main subtypes: pre-T ALL and pre-B ALL. Early detection is critical, as the disease can progress swiftly, leading to severe complications. Clinical manifestations include fatigue, fever, bone pain, and, in some cases, cutaneous involvement [1, 2].

Leukemia cutis (LC) is the infiltration of neoplastic leukocytes into the epidermis, dermis, or subcutis, leading to cutaneous lesions. It can occur in any type of leukemia, though it is rare in ALL, affecting about 1–3% of cases. Clinical features of LC include nodules,

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plaques, papules, vesicles, ulcers, and swellings [3, 4]. While cutaneous manifestations of ALL are uncommon, they may include ecchymosis, erythema, and petechiae, signaling leukemic cell infiltration or thrombocytopenia [5]. Standard treatment involves chemotherapy, yet treatment resistance is frequent [6]. In this report, we presented a 3-year-old boy with a swelling on the chest and the sudden presentation of abdominal bulging that was diagnosed as pre-B cell ALL and responded to chemotherapy perfectly.

Case Presentation

A 3-year-old boy was referred to our clinic with a swelling in the left posterior part of the thoracic area (Figure 1). His parents said they found the mass by accident. They referred to a pediatrician, and an ultrasound of the lesion was requested. The report described a subcutaneous cystic lesion measuring 21 × 11 mm. The lesion had no capillary flow and consisted of a cystic lesion with a cutaneous and/or soft tissue origin. The pediatrician reassured them about the mass, and the child was treated with antibiotics based on a diagnosis of an infectious collection.

The parents continued the therapy for forty days, but the lesion did not improve. Then, the parents observed abdominal bulging. Another ultrasonogram was done, and the following findings were reported:

- Splenomegaly measuring 169 mm, with several target-shaped masses with a maximum size of 29 × 21 mm
- A hypoechoic mass measuring 11 × 8 mm in the anterior superior cortex of the right kidney

Due to these presentations, a laboratory study and an abdominopelvic computed tomography (CT) scan with and without contrast were requested. The results of the laboratory study are presented in Table 1. Leukocytosis was noted, and other tests were normal.

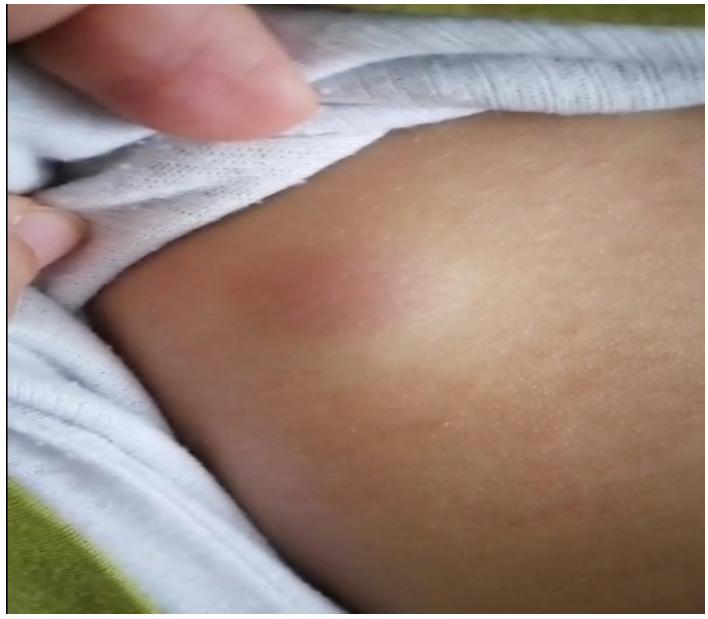

Fig. 1. The swelling in the left posterior part of the thoracic area.

Table 1. Laboratory data of the patient.

Test	Result (first time)	Result (second time time)
WBC	28.2	14.7
RBC	5.36	4.94
Hemoglobin	13.6	12.7
Neutrophil	13%	18
Lymphocyte	80%	80
Urea	30	-
Creatinine	0.6	-
AST	14	-
ALT	20	-
LDH	696	559
ESR	6	4
CRP	Negative	negative

Imaging demonstrated multiple low-attenuation solid masses, up to 30 mm in size, throughout the liver parenchyma. Both kidneys were at the upper limit of size and had innumerable low-attenuation lesions, with a maximum size of 20 mm. The conclusion was metastatic liver involvement versus less likely secondary non-Hodgkin lymphoma (NHL). No other abnormalities were detected.

The patient was referred to our clinic with this report. At the time of the visit, a round, firm, and tender mass was noted in the mentioned area. The patient had abdominal bulging with hepatomegaly. There were no other positive findings in the physical examination. We performed bone marrow aspiration (BMA) and a biopsy from the thoracic lesion based on the medical history and available data. The BMA confirmed a pre-B cell ALL diagnosis (with 45% blasts), and the cutaneous biopsy showed infiltration by leukemic cells.

A cytogenetic test and cerebrospinal fluid (CSF) analysis were requested, and both were normal.

Treatment with the standard regimen was started for the child, and the response was excellent. The cutaneous, renal, and hepatic manifestations resolved, and the child is currently under routine observation.

Discussion

In this report, we presented a 3-year-old boy with a firm, tender cutaneous swelling without other involvement. The child suddenly developed abdominal bulging. Laboratory tests were normal, but the CT scan showed hepatic and renal infiltrations. BMA was performed, and ALL was diagnosed. The boy responded well to standard therapy.

The most prevalent clinical presentation of ALL results from bone marrow failure, including thrombocytopenia, leukopenia, and anemia. Patients may present with symptoms such as fatigue, malaise, petechiae, purpura, bleeding, bone pain, and fever, all of which indicate medullary involvement [7–9]. Skin involvement is a rare manifestation of ALL called leukemia cutis [10]. Leukemia cutis, caused by leukemic cell infiltration, can present as nodules, plaques, ulcers, and papules, with typical locations throughout the body. Although the prognosis for leukemia cutis is often poor, treatment usually involves chemotherapy, with radiotherapy reserved for refractory cases [11, 12]. Our case was remarkable because his manifestations and responses to treatment were not compatible with previous reports. He initially presented with a swelling and then suddenly developed abdominal bulging. Laboratory tests were normal at the first visit, and only leukocytosis was found. The diagnosis was confirmed by CT scan, and BMA confirmed the diagnosis of ALL. He had a good response to treatment, in contrast with previous reports.

The highest prevalence of leukemia cutis is observed in patients diagnosed with adult T-cell leukemia/lymphoma; however, the incidence of this specific leukemia remains relatively rare. In clinical practice, the most frequently encountered subtypes are acute myeloid leukemia (AML) and chronic lymphocytic leukemia (CLL), which account for approximately 13% and 8% of total cases, respectively [13]. Our case involved childhood ALL-induced leukemia cutis, which is a very rare presentation of leukemia cutis in this type of leukemia and at this age.

The treatment of leukemia cutis focuses on addressing the underlying leukemia through aggressive systemic chemotherapy. The specific chemotherapy regimen is determined by the subtype of the cancer. Typically, the remission of hematological abnormalities coincides with the complete or partial resolution of cutaneous lesions. While chemotherapy remains the primary mode of treatment, radiation therapy, specifically in the form of electron beam therapy, may be employed in cases that are refractory or require palliative care [14, 15]. Leukemia cutis is identified as a systemic manifestation of underlying leukemia, often correlated with a poor prognosis [16]. Our case had a good response to treatment, the manifestations of the disease resolved, and he is under close follow-up.

Conclusion

Leukemia cutis is a rare manifestation of leukemia, especially ALL, and it may manifest solely as a swelling in pediatric patients. Despite its infrequent occurrence in this demographic, pediatricians should consider it as a differential diagnosis in cases of swelling, particularly when lesions do not respond to typical treatment modalities such as topical and oral antibiotics. Further evaluation in these instances should include imaging studies and biopsy of the affected lesion. It responds to treatment of the underlying leukemia.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this article.

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Conflict of Interests

The authors have no conflict of interest to declare.

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