A 4-year-old girl presented to the plastic and reconstructive surgery clinic with her parents for evaluation of a fast-growing soft tissue mass located primarily on her left nasal ala. The family reported first noticing a small lesion (the size of a pencil tip) 3 months before their consultation. Initially, the mother brought the patient to the pediatrician, who administered antibiotics with the presumed diagnosis of an infected comedo. The patient underwent a dermatology consult 1 month later, where the lesion was locally injected with Kenalog. However, neither of the attempted pharmacological treatments was successful, and the lesion continued to grow. On physical examination, a 3-cm-diameter hyperemic lesion was noted primarily on the left nasal ala, with partial extension into the left naris (Fig 1). The rest of the child’s physical examination was unremarkable, without any signs of fever, chills, organomegaly, lymphadenopathy, fatigue, pallor, weight loss, night sweats, bruises, or bleeding. The child had adequate energy levels and an appropriate appetite for her age. The child subsequently underwent a computed tomographic scan examination, which displayed a 2.2 × 2.0 × 1.4 cm³ mass within the soft tissue of the left nasal ala, which appeared solid, well circumscribed, and extended slightly into the left nasal vestibule. Radiodensity of the mass was noted to be 31 Hounsfield units, which verified that the mass could not be classified as a simple cyst. The patient was originally scheduled for excision of the mass, but due to the fast growing nature of the lesion, the Plastic and Reconstructive team elected to perform a shave biopsy before any definitive surgical intervention. The biopsy revealed diffuse infiltration of the soft tissue by lymphoid cells that stained positive for CD45, CD79a, CD1, and MUM-1. These infiltrates were found in both the mass and the skin. At this point, the patient was urgently referred to pediatric oncology service for further work-up.

**Summary:** Skin and soft tissue lesion removal contributes significantly to both academic and private plastic surgery practices. When encountering various types of dermatologic diseases, it is crucial for a plastic surgeon to exercise caution and consider further medical evaluation before proceeding with local excision of any abnormal skin growth, especially those that involve the face in the pediatric or adolescent population. In this case report, we discuss the case of a child who presented with a primary cutaneous skin lesion involving the left nasal ala, which was ultimately diagnosed as B-cell acute lymphoblastic leukemia. This case is reported to highlight B-cell acute lymphoblastic leukemia for plastic and reconstructive surgeons so that it can be included in the differential when encountering fast growing cutaneous lesions of the face in children. (Plast Reconstr Surg Glob Open 2020;8:e3021; doi: 10.1097/GOX.0000000000003021; Published online 19 August 2020.)

**CASE REPORT**

A 4-year-old girl presented to the plastic and reconstructive surgery clinic with her parents for evaluation of a fast-growing soft tissue mass located primarily on her left nasal ala. The family reported first noticing a small lesion (the size of a pencil tip) 3 months before their consultation. Initially, the mother brought the patient to the pediatrician, who administered antibiotics with the presumed diagnosis of an infected comedo. The patient underwent a dermatology consult 1 month later, where the lesion was locally injected with Kenalog. However, neither of the attempted pharmacological treatments was successful, and the lesion continued to grow. On physical examination, a 3-cm-diameter hyperemic lesion was noted primarily on the left nasal ala, with partial extension into the left naris (Fig 1). The rest of the child’s physical examination was unremarkable, without any signs of fever, chills, organomegaly, lymphadenopathy, fatigue, pallor, weight loss, night sweats, bruises, or bleeding. The child had adequate energy levels and an appropriate appetite for her age. The child subsequently underwent a computed tomographic scan examination, which displayed a 2.2 × 2.0 × 1.4 cm³ mass within the soft tissue of the left nasal ala, which appeared solid, well circumscribed, and extended slightly into the left nasal vestibule. Radiodensity of the mass was noted to be 31 Hounsfield units, which verified that the mass could not be classified as a simple cyst. The patient was originally scheduled for excision of the mass, but due to the fast growing nature of the lesion, the Plastic and Reconstructive team elected to perform a shave biopsy before any definitive surgical intervention. The biopsy revealed diffuse infiltration of the soft tissue by lymphoid cells that stained positive for CD45, CD79a, CD1, and MUM-1. These infiltrates were found in both the mass and the skin. At this point, the patient was urgently referred to pediatric oncology service for further work-up.
Her complete blood count showed a normal hemoglobin and platelet count but noted an elevated WBC count of 27.5 k/mm³. Bone marrow aspirate and biopsy was then obtained, which showed 85% blasts. These blast cells were positive for TdT, CD19, CD22, CD79a, HLA-DR, and CD38; all were consistent with the B-ALL diagnosis. The patient ultimately began induction chemotherapy based on Children’s Oncology Group protocol AALL1731, which is a 3-drug induction for standard risk ALL. At the end of the induction, a bone marrow examination showed the presence of still 1.3% leukemic blasts. She therefore was enrolled on the standard-risk high arm of the protocol for a subsequent chemotherapy (Fig 1).

DISCUSSION

B-ALL is a malignant condition involving abnormal development of immature lymphoid precursor cells. These aberrant lymphoblasts replicate in the bone marrow, leading to neutropenia, anemia, and thrombocytopenia. Rarely, these lymphoblasts will reproduce outside the marrow in areas such as liver, lymph, or in this case, the skin. Primary cutaneous lesions occurring as a result of B-ALL is a rare manifestation. A recent review of the literature revealed only 37 published cases involving pediatric primary cutaneous manifestations of B-cell lymphoblastic lymphoma (B-LBL). B-LBL and B-ALL represent a spectrum of disease, with ALL being diagnosed when there are >25% blasts in the bone marrow. Immunohistochemically, B-LBL and B-ALL both have neoplastic cells that express TdT and B-cell antigens such as CD 10, CD 19, CD 22, and CD 79a. Primary cutaneous manifestations in the case of ALL are even more rare. In the only large-scale review of such cases, among the 1359 patients (1259 with ALL and 100 with LBL) enrolled in the multicenter European trial EORTC 58881, 24 presented with skin involvement at diagnosis, including 15 patients with ALL and 9 patients with LBL. Among the 24 patients, 21 had at least one skin lesion on the face or scalp. In several cases where ALL was diagnosed, the skin lesions were present for several months before diagnosis.

Surgical excision of the lesion in this case has a questionable role. Although a biopsy was a crucial determinant for the diagnosis of B-ALL, surgical excision is neither curative nor therapeutic for the patient. This stems from the fact that the cutaneous lesion was a manifestation of B-ALL and would thus benefit from an appropriate chemotherapy regimen. The majority of cases with primary cutaneous lesions used chemotherapy as the mainstay of treatment. As the incidence of B-ALL continues to increase in children as shown in an analysis by Surveillance, Epidemiology and End Results (SEER), it would be valuable to include B-ALL in the differential when encountering fast-growing cutaneous lesions in children. The initial differential diagnosis included a simple infection, but its rapid onset was a more ominous sign indicating potential for malignancy. In the
pediatric population, infantile hemangiomas are the most common type of vascular tumor and should be considered. These hemangiomas display a phase of active growth during the early years of life, reaching peak growth around 9 months and then regressing at the age of 4–8. This child is around the age at which these types of hemangiomas can be present before they regress and thus should be considered as a differential. Pyogenic granulomas, congenital hemangiomas, and tufted angiomas should also be included. Although rare, there have been documented pediatric cases of keratoacanthosis, which is a well-known rapidly growing lesion. In this case, a dermatologist had injected steroids into the lesion without determining the nature of the lesion. Prompt recognition of this diagnosis is important to avoid unnecessary disfiguring surgery and to rapidly provide definite therapy. Children with ALL who have been appropriately treated with a multi-drug regimen have a good prognosis and the majority of patients will become long-term survivors (Fig 2).

Upon 8-month follow-up, the patient has been tolerating chemotherapy well and has been randomized to arm D, Blinatumomab arm. The patient’s treatment is being monitored by examining minimal residual disease. This has been achieved by analyzing bone marrow-derived endothelial outgrowth cells, which initially showed 1.3% leukemic blasts. As of day 110 after induction, the patient is negative for minimal residual disease. On physical examination, the child’s lesion is no longer visible on the left naris (Fig. 2). She continues to follow up with hematology and oncology during the duration of her treatment.

Patients with facial lesions are routinely referred to plastic and reconstructive surgeons. This article is reported to encourage surgeons to have a broad differential when dealing with rapidly enlarging lesions involving the face.

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REFERENCES
1. Ward E, DeSanitis C, Robbins A, et al. Childhood and adolescent cancer statistics, 2014. CA Cancer J Clin. 2014;64:83–103.
2. Ganick DJ. Skin changes associated with hematology and oncologic diseases in children. NY State J Med. 1992;92:256–261.
3. Doros GM, Devesa SS, Curtis RE, et al. Acute leukemia incidence and patient survival among children and adults in the United States, 2001-2007. Blood. 2012;119:34–43.
4. Clarke RT, Van den Brul A, Bankhead C, et al. Clinical presentation of childhood leukemia: a systematic review and meta-analysis. Arch Dis Child. 2016;101:894–901.
5. Seerdlow SH, Campo E, Harris NL, et al., eds. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues, revised 4th edition, Lyon: International Agency for Research on Cancer (IARC); 2017.
6. Shah A, Coleman MP. Increasing incidence of childhood leukemia: a controversy re-examined. By J Cancer. 2007;97:1099–1012.
7. Schultz KR, Pullen DJ, Sather HN, et al. Risk- and response-based classification of childhood B precursor acute lymphoblastic leukemia: a combined analysis of prognostic markers from the Pediatric Oncology Group (POG) and Children’s Cancer Group (CCG). Blood. 2007;109:926–935.
8. Shurtleff SA, Buijs A, Behm FG, et al. TEL/AML1 fusion resulting from a cryptic t(12;21) is the most common genetic lesion in pediatric ALL and defines a subgroup of patients with an excellent prognosis. Leukemia. 1995;9:1985–1989.
9. Seerdlow SH, Campo E, Harris NL, et al., eds. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues. Revised 4th ed. Lyon, France: IARC; 2016, Vol 2: 199–214.
10. Song H, Todd P, Chiarle R, et al. Primary cutaneous B-cell lymphoblastic lymphoma arising from a long-standing lesion in a child and review of the literature. Pediatr Dermatol. 2017;34:e182–e186.
11. Knowles DM. Lymphoblastic lymphoma. In Knowles DM, ed. Neoplastic Hematopathology, 1st ed. Baltimore, Md.: Williams & Wilkins, 1992:715–748, 1295–1314.
12. Lee WJ, Moon HR, Won CH, et al. Precursor B- or T lymphoblastic lymphoma presenting with cutaneous involvement: a series of 13 cases including 7 cases of cutaneous T lymphoblastic lymphoma. J Am Acad Dermatol. 2014;70:318–325.
13. Lin P, Jones D, Dorfman DM, et al. Precursor B-cell lymphoblastic lymphoma: a predominantly extranodal tumor with low propensity for leukemic involvement. Am J Surg Pathol. 2000;24:1480–1490.
14. Miliot F, Robert A, Bertrand Y, et al. Cutaneous involvement in children with acute lymphoblastic leukemia or lymphoblastic lymphoma. The Children’s Leukemia Cooperative Group of the European Organization of Research and Treatment of Cancer (EORTC). Pediatr Blood. 1997;1009–1012.
15. Leauté-Labrèze C, Harper JI, Hoeger PH. Infantile haemangio-oma. Lancet. 2017;390:85–94.
16. Price E, Biro L, Chen CK. Solitary keratoacanthoma in a child. Am J Dis Child. 1974;128:110–111.