

## A Neonate with Indurate Dermal Papules and Nodules and Pneumonia: a Case Report

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**Abstract-** We presents an infant with several indurated plaques and nodules scattered on her body. She was brought to the hospital because of fever, runny nose and cough from one month ago. During the examination and investigation the plaques and nodules grabbed the attention of the clinicians and the skin biopsy and other lab works revealed the diagnosis of congenital leukemia.

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### Case Report

A 52 day-old female infant of Afghani origin was brought to the clinic with the complaint of fever, runny nose and cough from one month ago. She also had occasional vomiting after coughs from two days ago. Her mother didn't report cyanosis during or between coughs.

She was admitted to the infectious diseases ward because of accelerating coughs and respiratory distress.

On examination the doctors noticed 12 indurate blue papule and nodules scattered on her face (Figure 1), head, fore arm, chest, hands, feet and legs, ranging from 0.5 to 3 centimeters in diameter. These exanthemas have been present since she was 20 days old.



Figure 1. Cutaneous manifestation of the case

She had mild respiratory distress, few fine crackles on

auscultation, especially on the base of the both lung fields, and purulent bilateral conjunctivitis. The exam of her abdomen was normal.

Her vital signs were: temperature=38°C, respiratory rate=50 bpm, pulse rate=120 bpm.

Her anthropometric measures were: weight= 4.8 kg, height= 57 cm and head circumference= 37 cm.

Her past medical history was not remarkable apart from what has been noted above.

She was the third child of her family, born by caesarian section without any complication. Her birth weight was 2900 g, birth height was 49 centimeter and her birth head circumference was 34 centimeters, which are within normal ranges.

Her mother had mild hypertension during pregnancy, and her first pregnancy was terminated in stillbirth at 7th month of gestation without any known reason.

Her parents are remote relatives.

Before being admitted to our hospital, she had received some courses of oral antibiotics such as azithromycin and diphenhydramine without proper result.

She was treated with intravenous ampicillin and cefotaxime, sulfacetamide ophthalmic drop and antipyretics. A proper care of nutrition and hydration was also administered and because respiratory distress packed cell was transfused.

A chest x ray performed (Figure 2) and reported as:

Bilateral parahilar opacities, suggestive of gastro

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esophageal reflux or aspiration. Bilateral hyperaeration, small thymus were noted. Heart and vascular pattern were normal.



Figure 2. Chest x-ray

Because of her Afghanistan origin and the probability of tuberculosis, chest x rays and tuberculin tests for the parents and a TB culture of gastric lavage of the patient were performed, which were negative or TB.

The indurate papules and nodules were a major concern, so a dermatologic consultation was requested. The pediatric dermatologist suggested that a skin biopsy should be performed and diagnosis of TORCH, leukemia, rhabdomyosarcoma, metastasis and neuroblastoma should be considered.

The lab works results were as follows:

ESR=62 mm/h (reference range: 0-10), CRP=+++

PT=13 seconds, INR=1, PTT=30 seconds,

White blood cells=5590/ $\mu$ l (reference range: 4000-10000/ $\mu$ l), neutrophils=13% (800/ $\mu$ l) (reference range: 2000-7000/ $\mu$ l), lymphocyte=80% (4930/ $\mu$ l) (reference range: 800-4000/ $\mu$ l), monocytes=6.6% (410/ $\mu$ l) (reference range: 120-800/ $\mu$ l), eosinophils=0, basophils=0.3%, red blood cells=2690/ $\mu$ l (reference range: 3500-5500), hemoglobin=7.2 g/dl (reference range: 11-16 g/dl), hematocrit=22.6% (reference range: 37-50%), MCV=88.5, MCH=28.2, RDW=15.1%, platelets count=521000, MPV=9.1.

The coagulation time, liver function test, blood urea nitrogen and creatinine were normal. There were no electrolyte abnormalities.

Blood sugar=115 mg/dl, Blood urea nitrogen=5, creatinine=0.5, calcium=8.6, sodium=137, potassium=4.8

Uric acid=3.3 mg/dl (reference range: 3-7), AST=29 U/L, ALT=9 U/L, alkaline phosphatase=474 U/L (reference range: up to 1000), LDH=766 IU/L (reference range: 1100), albumin= 3.6 g/dl (reference range: 3.5-5.5)

Eye discharge smear: gram positive cocci and few white blood cells. The urine analysis, urine culture and stool exam were normal and blood culture negative.

Urine analysis: pH=8, specific gravity=1.002, white blood cells=0-1, red blood cells=0-1

TORCH study of the child was negative. Skin biopsy showed; small round cell tumor (Figure 3 and 4), and a bone marrow aspiration and biopsy (Figure 5) confirmed the diagnosis of AML (acute myelocytic leukemia). There were many blast elements and the immunophenotyping showed a large mononuclear population (about 20-22% of total cells) dim expression of CD45, which was positive for CD33, CD34, CD65, and HLA-DR and negative for CD14, CD117, suggestive of M4 AML.

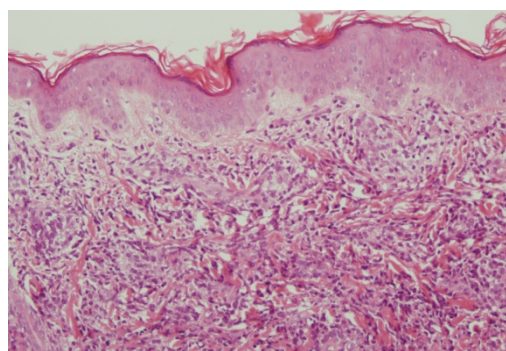


Figure 3. Skin biopsy

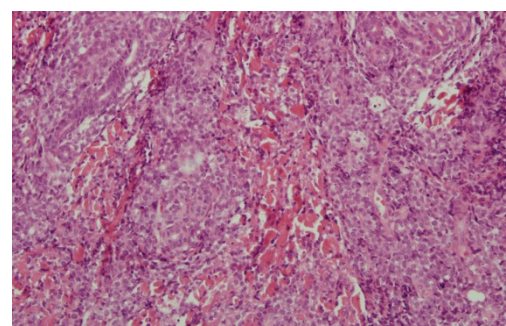


Figure 4. Skin biopsy

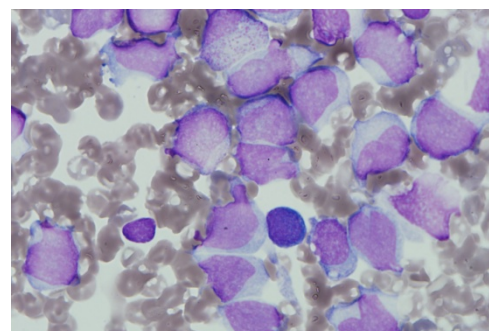


Figure 5. Bone marrow aspiration and biopsy

## Discussion

Congenital leukemia (CL) is a rare disease (8). CL includes 0.8% of leukemia in children (4). Leukemia cutis (LC) typically manifests by multiple infiltrative papules, nodules and plaques but it can also manifest as a solitary nodule in neonates (6). CL is a rare malignancy and most

of the reported afflicted by were acute non-lymphoblastic leukemia (8). CL characterizes by the presence of leukemia at birth or the first month of life and LC is the infiltration of the skin with immature malignant hematopoietic cells (9). The diagnostic criteria for CL are as follows: 1-the presence of the disease at birth of the first 4 weeks of birth, 2- proliferation of immature myeloid, lymphoid or erythroid cells, 3- infiltration of those cells into extra hematopoietic tissues and absence of the diseases that cause leukemoid reactions (9, 13-15). The clinical manifestations of CL are; hepatosplenomegaly, anemia, leukocytosis and skin and brain involvement (9). The most prevalent variables of CL are myelomonocytic (M4) and monocytic (M5) (10). CL often manifests with pallor, lethargy, hepatosplenomegaly, leukemia cutis, anemia and leukocytosis (10). LC happens in 10% of adults with AML and 1% of adults with ALL (10). CL is a poor prognosis disease and the survival rate in 2 years is just 20% (10). CL has associations with maternal exposure to radiation, maternal food with bioflavonoids, maternal use of tobacco and illicit drugs, Down's syndrome, Neurofibromatosis, Bloom's syndrome and Fanconi's anemia (10). 25-30% of neonates with CL have LC, which typically presents as indurate hard blue, red or blueberry muffin nodule (11). About 2% of childhood leukemia happens before one year of age (12). LC can be the first presentation of CL (16). This dermal presentation usually exists at birth and disappears 3-6 weeks after birth (17). The differential diagnoses of blueberry muffin are: neuroblastoma, congenital rhabdomyosarcoma, langerhans cell histiocytosis, hereditary spherocytosis, rhesus hemolytic anemia, ABO blood group incompatibility, neonatal lupus and twin-twin transfusion syndrome (18). Blueberry muffin skin lesion can be caused by congenital infections (rubella, coxsackievirus, CMV and toxoplasmosis), hemolytic diseases, transient myeloproliferative disorders and other infiltrative cutaneous processes such as metastatic neuroblastoma, malignant histiocytosis and langerhans cell histiocytosis (10). The prognosis of CL is poor (3). Congenital leukemia sometimes improves spontaneously (1). Leukemia cutis with 11q23 rearrangement should be aggressively treated (5,7). CL has an unusual and unpredictable nature (1). Chemotherapy should be postponed until evidence of 11q23 translocation or progressive illness being found (1). It doesn't appear that a conservative treatment approach affect the survival of the patient (1). Because of the possibility of relapse, long term follow up should be performed (1). In a case report congenital leukemia was the cause of still birth at 30th

week of gestational age and the diagnosis of CL were made by microscopic examination of the placenta and finding the immature myeloid precursors in the fetal vessels of the umbilical cord and chorionic villi (2). CL should be differentiated from transient leukemoid reaction (LR) which is mostly seen in Down's syndrome (3). There are some reports of myeloid leukemia, which involves skin without involvement of blood and bone marrow (3). CL should be differentiated from leukemic reaction and transient myeloproliferative disorders (4). A transient myeloproliferative disorder is a rare neonatal condition, which has connections to the disorders of chromosome 21 and is identified by blastosis in peripheral blood and bone marrow and improves in 1-3 months (4).

We decided to observe the patient with conservative treatment and perform long-term follow-up but because of poor cooperation of the patient's family the follow-up of the patient was unsuccessful. Typically the blueberry muffin lesions present at birth and resolve in 3-6 weeks of life but in the presented case the blueberry muffin lesions appeared at 3rd week of life and disappeared at 10th week of age. Blueberry muffin lesion in neonatal period could be the presentation of congenital leukemia and skin biopsy and proper follow up should be performed.

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