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Subcutaneous fat necrosis of the newborn complicated by Severe Hypercalcemia: A case report

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Abstract

Background: Subcutaneous fat necrosis of the newborn (SCFN) is an uncommon panniculitis of neonates. It occurs in the first few days to 2 to 3 weeks of life following complicated delivery. It is associated with hypercalcemia in approximately 36 to 56 percent of affected neonates.

Therefore, the main goal of management is detection and treatment of hypercalcemia.

Case Presentation: A case of a 6 weeks old Ethiopian female infant with complicated delivery history who presented to the dermatology clinic following an incidental finding of asymptomatic skin bumps, later developing vomiting and loss of appetite. SCFN with severe Hypercalcemia was diagnosed and patient was managed with IV normal saline rehydration and maintenance with subsequent recovery. She was discharged on follow up.

Conclusion: High index of suspicion is required when evaluating pediatric age group patients with SCFN to look out for life threatening metabolic complications. SCFN should also be considered as a differential in infants who present with unexplained hypercalcemia and patient should be evaluated for any dermatologic lesions.

Key Word

Subcutaneous fat necrosis, panniculitis.

Introduction

Subcutaneous fat necrosis of the new born is a rare acute and transient panniculitis of new born. (1) Commonly develops in the first week of life in term infants. Lesions consist of multiple symmetrically distributed indurated, smooth, non-pitting mobile subcutaneous erythematous or violaceous nodules or plaques that appear in the first few weeks of life. Lesions are located on the back, shoulders, arms, buttocks, thighs, or face, but rarely on the anterior trunk or the anterolateral shins. (2) It has a favorable prognosis but affected infants require monitoring for associated hypercalcemia or other complications.

Case Presentation

The patient was a full-term (39+4) infant girl born from a 24 year old mother via emergency cesarean section for the indication of prolonged 2nd stage of labor secondary to cephalopelvic disproportion. The mother's antenatal follow up was uncomplicated. Labor stayed for 24 hours and rupture of membrane was 17 hours. Upon delivery the neonate was 3700gm with initial APGAR score of 6 and 8. In the delivery room oral and nasal suction has been performed and she was immediately referred and admitted to NICU with the diagnosis of respiratory distress secondary to meconium aspiration syndrome and stage I hypoxic ischemic encephalopathy. She was put on intranasal oxygen, maintenance fluid. She also took Ampicillin and ceftriaxone. She was discharged improved after 8 days of stay in NICU.

At 6 weeks of life the patient presented to dermatologic OPD with a complaint of skin bump on the back and shoulder of 1 month duration. The lesions were small which first occurred at the shoulder and progressively increased in size and number. It was asymptomatic which the mother noticed incidentally. Following that over the previous two days the child had vomiting and poor feeding ability. Up on examination infant was lethargic and dehydrated with erythematous subcutaneous nodules on the back and bilateral arms.

Figure 1: erythematous subcutaneous nodules on the back (A) and upper extensor surface arms (B)



As demonstrated on Figure 1, the skin findings included erythematous subcutaneous nodules on the back and upper extensor surface of bilateral arms.

Complete blood count revealed normal white blood cell and platelet count. Lipid parameters were also in normal range. However, the patient's serum total calcium level was 3.5 mmol/l and ionized calcium was 1.5 mmol/l which was severely elevated.

The patient was admitted to pediatric unit for SCFN with severe hypercalcemia and pediatric consultation made. She was put on cardiac monitor and followed closely. Volume expansion was done via weight adjusted IV intravenous Normal saline. She was subsequently put on maintenance dose and serial serum calcium was determined which showed subsequent improvement. The patient was discharged with follow up planned and appointed to come with weekly serum calcium determination until lesions clinically resolved.

Table 1- weekly serial calcium level with reference values (Originally made by the authors)

Age of patient	6 th week	7 th week	8 th week	9 th week	Ref
Total calcium	3.5	3.02	2.78	2.89	2.09 – 2.6 mmol/l
Ionized calcium	1.5	1.58	1.63	1.51	1.0 – 1.25 mmol/l

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70 As demonstrated on Table 1, the child's total serum calcium level significantly improved over
71 the consecutive weeks while the ionized calcium level had a rise and fall pattern.

72 **Discussion**

73 Subcutaneous fat necrosis of the newborn (SCFN) is an uncommon panniculitis of neonates
74 which is also known as Adiponecrosis subcutanea. It is characterized by inflammation and
75 necrosis of subcutaneous fat tissue. (3) The precise incidence is unknown and classically
76 develops within the first week of life in full term infants (>37 weeks gestational age) following
77 complicated delivery. (4) It has no gender predilection and has nearly equal male-to-female ratio
78 (1.14:1). SCFN is a self limited condition but affected infants need monitoring for
79 hypercalcemia, dyslipidaemia and thrombopenia. (2)

80 The exact etiology of SCFN is unknown but hypothermia and hypoxia are presumed to be
81 involved. Possible explanations have included a biochemical defect in the composition or
82 metabolism of neonatal fat, leading to crystallization, fat necrosis, and subsequent inflammation
83 after cold stress. (5)

84 Classically SCFN is characterized clinically by red, red-brown, or violaceous indurated plaques
85 and subcutaneous nodules that commonly occur on the cheeks, shoulders, buttocks, thighs, and
86 calves. (6) Lesions may appear isolated or multiple. Subcutaneous nodules may evolve into
87 calcifications. (3)

88 There are different predisposing factors for this condition. Neonates who have experienced
89 hypoxia or other perinatal stress are specifically prone to develop this condition. In addition to
90 that, it is also noted that the pregnancy was complicated by factors such as maternal diabetes,
91 hypertension or hypothyroidism, preeclampsia, and placental abruption. (2)

92 Histopathologically it is characterized by a lobular panniculitis with a dense inflammatory
93 infiltrate consisting mostly of histiocytes, including multinucleated giant cells, with admixed
94 lymphocytes and occasionally a few eosinophils, along with needle-shaped clefts and fat
95 necrosis. (6)

96 Management of this condition is conservative because nodules resolve spontaneously. The main
97 goal is detection and treatment of hypercalcaemia. Blood calcium levels should be monitored for
98 up to six months after the onset of skin lesions. (2) Some lesions may benefit from aspiration to
99 prevent rupture, infections, necrosis, and scarring. In severe cases where nodules persist and
100 calcify incision and curettage of calcification is indicated.

101 **Conclusion**

102 In summary, Our report emphasizes on the typical presentation of SCFN and the most common
103 complication of SCFN. Severe Hypercalcemia is a life threatening condition that clinicians
104 should look out for when caring for a neonate with SCFN. SCFN should also be considered as a
105 differential in infants who present with unexplained hypercalcemia and patient should be
106 evaluated for any dermatologic lesions.

107 Neonates predisposed to hypoxia are at increased risk for SCFN and in infants of this condition
108 weekly calcium determination is necessary for up to 6 months and until clinical resolution of
109 skin lesion.

110 **List of abbreviation**

111 SCFN- Subcutaneous fat necrosis of the new born

112 APGAR- A – Appearance, P – Pulse, G- Grimace, A – Activity, R – Respiration (breathing
113 effort)

114 Mmol/l- Milimole per liter

115 NICU- Neonatal Intensive care unit

116 OPD- Out patient department

117 **Declarations**

118 **Ethics Approval and consent to participate**

119 Ethical approval was not required for this case report, in accordance with our institutional
120 policy.

121 **Consent for publication**

122 Written informed consent was obtained from the patient's mother for publication of this
123 case report and any accompanying images. A copy of the written consent is available for
124 review by the editor in chief of this journal.

125 **Availability of Data and Materials**

126 The datasets and materials used for this case report are available upon reasonable request.
127 Researchers interested in obtaining access to the data and materials used in this study may
128 contact the corresponding author for further information.

129 **Competing interests**

130 The authors declare that they have no competing interests that could potentially influence
131 the objectivity or integrity of this case report. No financial, personal or professional

conflicts of interest could be perceived as impacting the interpretation or presentation of the finding.

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Authors contribution

Dr Ruth Girum Tamir: Data acquisition and interpretation, Drafting and critical revision of the manuscript for important intellectual content.

Dr Nafkot Girum: Conception, design, data acquisition and interpretation, and drafting of the manuscript

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