Case Report

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Subcutaneous Fat Necrosis of the Newborn

Neonatology Section

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ABSTRACT

Subcutaneous fat necrosis of the newborn is a rare type of localized lobular panniculitis resulting in firm, inflamed, skin-coloured to purple nodules in the fat. The back, limbs and buttocks are common sites affected. The disease may manifest as discrete lumps or as a large hardened area. It occurs most commonly in the first post natal week in term infants. Although, usually a self-limited condition, subcutaneous fat necrosis may be complicated by hypercalcaemia and other metabolic abnormalities and therefore, these patients need close monitoring for complications.

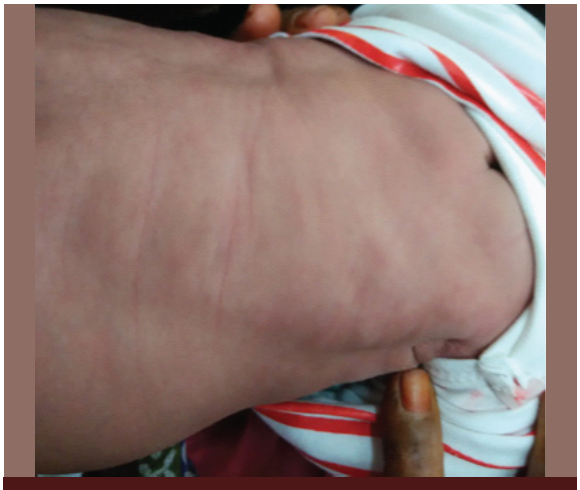
Keywords: Hypercalcaemia, Neonate, Nodules, Panniculitis

CASE REPORT

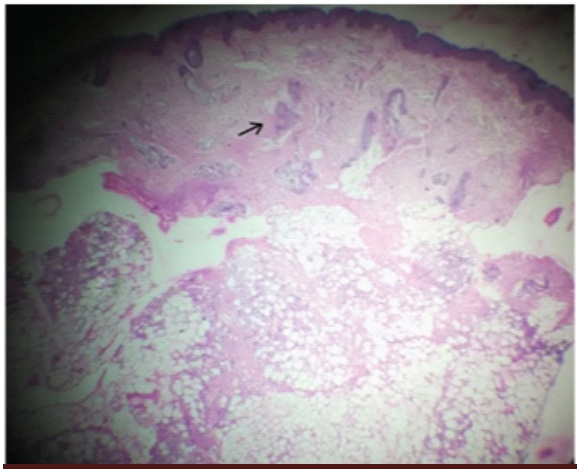
A 3.1 kg full term, singleton male baby was delivered to a primigravida mother, with an uneventful antenatal period by a normal vaginal delivery. Baby had a normal APGAR score. Early postnatal period was otherwise normal and the baby was being exclusively breast fed. On 14th day of life, child presented to Outpatient Department with complaint of excessive crying since three days. After taking consent from parents, physical examination was done which revealed multiple red-purple, firm and painful subcutaneous nodules and plaques, size ranging from 1x1 cm to 4x5 cm with an irregular margin, raised above the surrounding area, located on the back, shoulders, the lateral surfaces of the arms, and on the upper thigh. Skin over the lesions was smooth, mobile with ill-defined erythema [Table/Fig-1]. Other systemic examination was normal. Routine laboratory investigations were normal. The baby had hypercalcemia (11mg/dl). Vitamin D level was 9.6ng/ml (<20 deficient).

Histopathological examination revealed normal epidermis and fat necrosis was seen with an infiltrate of mixed inflammatory cells in the dermis [Table/Fig-2]. Needle shaped clefts/crystals were seen in radial array in the adipocytes and multinucleated giant cells. Sheets of adipocytes were seen admixed [Table/Fig-3].

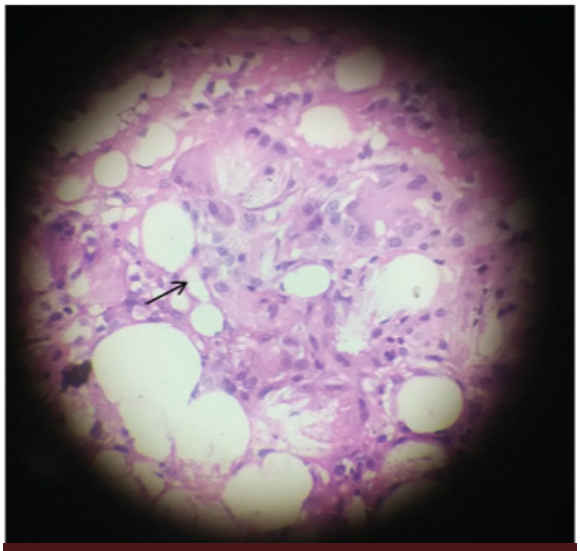
Based on these findings, the patient was diagnosed as subcutaneous fat necrosis of the newborn. No treatment was given as it is a self resolving condition, patient was kept on follow-up and serum calcium levels were done monthly. Spontaneous improvement was observed in the lesions after 1 month following the diagnosis and the lesions completely resolved in 3 months.



[Table/Fig-1]: Multiple red-purple, firm and painful subcutaneous nodules and plaques, size ranging with an irregular margin, located on the back and shoulders.



[Table/Fig-2]: Normal epidermis and fat necrosis seen with an infiltrate of mixed inflammatory cells in the dermis. H&E, 10X.



[Table/Fig-3]: Needle shaped clefts seen in radial array in the adipocytes and multinucleated giant cells. H&E, 40X.

DISCUSSION

Subcutaneous Fat Necrosis (SCFN) of the newborn is a rare, benign, inflammatory condition involving the adipose tissue. It resolves spontaneously within a few weeks. Though, the exact cause of the condition remains unknown, neonatal stress and hypothermia are thought to be linked to the pathogenesis of SCFN. However, in many cases no history of either of these risk factors is forthcoming. Other factors incriminated in the causation of SCFN include but are not limited to maternal diabetes, pre-eclampsia, parathyroid hyperplasia, Rh factor incompatibility, protease inhibitor deficiency, birth asphyxia, meconium aspiration syndrome, forceps delivery, cardiac surgery, exposure to active or passive smoking during pregnancy, hypothermia, deficiency of brown fat, defect in fat composition and metabolism [1] . SCFN has also been known to develop as a complication of therapeutic hypothermia used in neonates with perinatal asphyxia and in neonates undergoing surgical procedures [1-3].

Three possible mechanisms are thought to play a role in the development of SCFN. There is thought to be an underlying defect in fat composition or metabolism in susceptible infants which is exacerbated by neonatal stress. Neonatal stress in turn results in hypothermia which induces fat to undergo crystallization, ultimately leading to necrosis. Trauma during delivery has also been implicated in the induction of necrosis.

The most common presentation in newborns is with erythematous, indurated plaques most commonly on the face, posterior trunk, extremities and buttocks. However, SCFN is usually a self-limited condition. It tends to resolve within a few weeks to months without scarring [4]. The only cause for concern are systemic complications including hypercalcaemia, hypoglycemia, hyper triglceridemia and thrombocytopenia, however these are rare. In addition, most of these complications are self-limiting with prompt response to treatment. The most dreaded complication of SCFN is hypercalcaemia as this can be life threatening and needs immediate recognition and correction.

SCFN causes granulomatous cell infiltration in the damaged immature adipose tissue. There is increased Vitamin D production secondary to the macrophage infiltration which leads to increased intestinal absorption of calcium irrespective of the PTH level [3-5]. Other suspected mechanisms leading to hypercalcaemia include release of calcium from necrotic fat cells, increased osteoclastic activity due to increased PTH and effect of local prostaglandins (PgE2) [4,5]. The severity and duration of skin lesions directly are known to directly correlate with the severity and duration of hypercalcaemia. In our case, the Vitamin D levels were low.

Deep hemangioma, erysipelas, histiocytosis, fibromatosis, rhabdomyosarcomas, sclerema neonatorum, cold panniculitis and calcinosis cutis must be considered in the differential diagnosis of SCFN.

Definitive diagnosis of SCFN requires histopathological assessment, which will reveal lobular or septal panniculitis with infiltration of lymphocytes, monocytes and multinucleated giant cells cells forming the granulomatous structure. Radially arranged needle-shaped clefts are present in lipocytes, but are not essential for the diagnosis [1,4,5]. In our patient, diagnosis of SCFN was confirmed by skin biopsy. In cases, where a biopsy cannot be done, a fine needle aspiration may also show the typical cells. Polarized light microscopy shows the presence of doubly refractile crystals [6].

CONCLUSION

SCFN of the newborn is a rare self-limiting disorder. Though, it is a harmless condition in itself, but awareness about complications associated with SCFN is important. Close monitoring of serum calcium levels must be done in all patients of SCFN. Symptoms like anorexia, failure to thrive, irritability and constipation should raise the suspicion of hypercalcemia, which may be life-threatening in acute settings. The rarity of case reports from India prompted us to report this case

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