Subcutaneous fat necrosis of the newborn: hypercalcaemia with hepatic and atrial myocardial calcification

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CASE REPORT

A female infant was delivered full term by caesarean section because of an accidental fall. The birth weight was 3100 g. Apgar scores were 3, 7, and 8 at one, five, and 10 minutes. The baby was intubated and placed on mechanical ventilation for respiratory failure. The cord arterial pH was 6.85 and the base deficit 18.1 mmol/l. Blood cultures were drawn, and the infant received amoxicillin and gentamicin. A chest radiograph showed cardiac enlargement with clear lung fields. Echocardiography showed pulmonary hypertension with right to left shunting across the patent foramen ovale and ductus arteriosus. After 24 hours, mechanical ventilation could be discontinued, and the respiratory failure after birth was ascribed to persistent pulmonary hypertension following birth asphyxia. Blood cultures remained negative.

On the third day, the infant developed a red, painful, nodular swelling on her back with a diameter of 5 cm, suggestive of a bacterial skin infection. Laboratory investigation included: haemoglobin, 152 g/l; platelets, 56 × 10^9/l; white blood cells, 13 × 10^9/l; normal coagulation. Total calcium level was 2.8 mmol/l (normal range 2.1–2.6 mmol/l), ionised calcium level was 1.35 mmol/l (normal range 1.0–1.4 mmol/l), and 1,25-dihydroxyvitamin D concentration was 160 pmol/l (normal range 40–140 pmol/l). Parathyroid hormone level was < 1.0 pmol/l, and parathyroid-like protein level was < 0.1 pmol/l. Serum calcium levels continued to increase progressively (maximum value 3.5 mmol/l on day 30), despite treatment with hydration (180 ml/kg/day) and frusemide (2 mg/kg/day). The hypercalcaemia became symptomatic, with vomiting, anorexia, and agitation. Because the skin lesions became more painful, first acetaminophen and later morphine (0.02 mg/kg/h) were administered. The hypercalcaemia and skin lesions started to resolve after treatment with prednisone (2 mg/kg/day) and a milk formula low in calcium and vitamin D (Basic CaD; Milupa, Friedrichshof, Germany). Within five days, total and ionised calcium levels normalised (day 35). Corticosteroid treatment was discontinued after one week, and the special milk formula and diuretics after one month.

A repeat echocardiogram depicted an echodense lesion in the atrial septum (fig 1), which was diagnosed as calcification on a computed tomographic scan (fig 2). Calcifications were also seen in the inferior vena cava and liver (fig 3). Follow up by the family doctor showed normal physical and neurological development. A repeat echocardiogram and computed tomographic scan were declined by the parents.

DISCUSSION

SCFN is a rare, often painful condition of unknown pathophysiology. It usually occurs in the first week of life following a complicated delivery and is characterised by very painful, firm, indurated, erythematous nodules and plaques over the buttocks, trunk, arms, and cheeks. Newborns who develop SCFN are usually healthy and full term at delivery, but have had some obstetric trauma, meconium aspiration, asphyxia, hypothermia, or hypoxaemia. Owing to its benign, self limiting course, SCFN is thought to be underdiagnosed.
SCFN is a harmless, self-limiting condition, but appreciable morbidity and mortality can result from the associated hypercalcaemia, the pathogenesis of which is not known. The cause and pathogenesis of SCFN are not known. It has been postulated that cold or stress induced injury to immature fat, resulting in necrosis and the development of a granulomatous infiltrate, may play a role in initiating the process. Various mechanisms for the development of the necrosis have been proposed: (a) an underlying defect in neonatal fat metabolism, resulting in an increase in saturated fatty acids within the subcutaneous tissue, which, exacerbated by neonatal stress, may precipitate this condition; (b) fat necrosis caused by local trauma during delivery; (c) hypothermia causing the neonatal fat, which is composed of saturated fatty acids with a relatively high melting point, to crystallise. The areas of fat necrosis seldom progress to atrophy, scarring, or ulceration.

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IMAGES IN NEONATAL MEDICINE

Stethoscope head to body weight ratios in the extremely preterm infant

It has been our observation that large nursing style stethoscopes are often used on extremely premature infants, whereas paradoxically a smaller neonatal stethoscope is usually used for the term neonate. Stethoscope heads were weighed using precision scales, and a ratio of stethoscope head weight to baby weight was calculated (SHBW ratio). This somewhat crude ratio does not take into account the added effect of the clinician pressing the stethoscope on to the chest. The weight of a large stethoscope head was 41 g and that of a small stethoscope head was 28 g. Figure 1 shows auscultation of a 25 week baby weighing 675 g. The SHBW ratio was 1:15 for the large stethoscope head shown.

Auscultation with a large stethoscope head may place undue force on the chest or abdomen of a tiny baby. Using the same ratio (1:15), a 70 kg male would have a stethoscope head weighing 4.4 kg placed on his chest, an uncomfortable experience for both patient and examiner! Auscultation and the associated pressure applied by the auscultator may well be an unpleasant experience for extremely low birthweight infants. Care should be taken to use the smallest stethoscope possible and to apply minimal pressure when examining low birthweight infants.

REFERENCES

Figure 1 Auscultation of a premature (25 weeks gestation) baby.