CASE REPORT

Incidental forearm fractures in a preterm neonate

J. Kitson*, A. Rosewarne, P. Cox, M. Quinn

Princess Elizabeth Orthopaedic Centre, Royal Devon and Exeter Hospital, Barrack Road, Exeter EX2 5DW, UK

Accepted 8 August 2005

Case report

A male infant weighing 545 g was admitted to the Neonatal Intensive Care Unit at 28 weeks gestation. The pregnancy was the result of in vitro fertilization and was complicated by oligohydramnios. The baby was one of triplets delivered by Caesarian section.

Due to hyaline membrane disease, he was ventilated for a total of 53 days. He survived coagulase negative staphylococcal sepsis, and disseminated intravascular coagulation. There were marked metabolic disturbances including alternating hypocalcaemia, and hypophosphataemia. Liver function was also deranged with elevated levels of bilirubin, alkaline phosphatase and aspartate aminotransferase. Treatment of these conditions and general life support measures, required many weeks of intravenous access with multiple sites of cannulation.

During the first month of treatment, a radiograph of the right forearm was performed to assess adequacy of bone mineralisation. This was reported to show osteopenia and was otherwise unremarkable.

When repeated two months later, healing greenstick fractures of the proximal radius and distal ulna (Fig. 1) were revealed, although there had been no clinical suspicion of such injuries.

Both fractures were in a satisfactory position, with evidence of callus formation, and no specific treatment was necessary.

It is postulated that these injuries were sustained as a result of restraint during episodes of venous cannulation, in which the wrist was held in hyperflexion, and the elbow in hyperextension.

Discussion

Various factors contribute to osteopenia associated with prematurity. Neonates of less than 1000 g birth weight have high requirements of the bone minerals, calcium and phosphate, which feeding regimens frequently fail to meet. Impaired calcium absorption is often present for long periods, and essential metabolic processes dependent upon phosphate will utilise phosphate liberated from bone, accompanied by the loss of calcium, further contributing to osteopenia. Deficiencies in Vitamin D and its metabolites also commonly occur.

Routine radiographs of the radius and ulna to assess bone mineralisation were recommended by Koo et al. James et al. have shown that preterm infants have smaller bones with a lower mineral content than term babies. Both of these factors will predispose to fracture. These authors have also shown that after adjustment for lower birth weight and bone size, the preterm infant still has a lower bone mineral content than term infants.
A case report of an isolated fracture of the distal radius was reported by Jones et al.\textsuperscript{4} This fracture was due to restraining the infant to perform cannulation, and radiographs were performed due to swelling and bruising as clinical signs of injury. Amir et al.\textsuperscript{1} reported the incidence of pathological fractures in very low birth weight premature infants to be 2.1%. Only one of these neonates had rickets and the underlying cause in the others was a combination of metabolic bone disease of prematurity and manual handling. Long bone fractures were associated with clinically obvious swelling and were usually in the metaphyseal region. Dabezies et al.\textsuperscript{2} reported a fracture incidence of 10.5% in 247 infants with a birth weight below 1500 g. Rickets was diagnosed in 39% of this group.

In our case the incidental finding of two fractures suggests that these injuries may occur with a higher frequency than we are aware. In this case, there was no clinical deformity, and no other external sign of injury. A previously normal radiograph excludes birth injury as a cause. The combined injury pattern of distal ulna and proximal radius has not been previously described in the absence of rickets.

Preterm infants are susceptible to injury and are subjected to repeated attempts of venous cannulation, in which hyperflexion of the wrist or hyperextension of the elbow may be required. These findings highlight the importance of taking caution to avoid iatrogenic injury when performing invasive procedures, and that a low threshold for radiographic investigation should be adopted, in patients with bruising or swelling, if fractures are to be detected.

References


Figure 1  AP and lateral views of the right forearm, revealing fractures of the proximal radius and distal ulna.