

Subperiosteal hemorrhage due to distal femoral physis fracture in a neonate

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ABSTRACT

Femoral physis fractures as a birth related injury has been rarely reported. As the plain radiograph findings are variable, its diagnosis may be a challenge. In this case report, we presented a male neonate presenting with periosteal elevation at the left distal femur. Radiological evaluation demonstrated posteromedial displacement of the distal femoral epiphysis. Final diagnosis was subperiosteal hemorrhage due to distal femoral physis fracture.

Keywords: Birth injuries; distal femur; neonate, subperiosteal hemorrhage; physis fracture.

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Birth related limb injuries have been rarely reported. This spectrum includes a simple bruise, swelling, for-cers scar or loss of nerve and motor function or rarely a fracture [1]. Injuries related to femur are usually defined at shaft and proximal physis, but distal femoral physis fracture is rarely reported [1-3]. Herein, we reported a male newborn with periosteal elevation at the left distal femur. Magnetic resonance imaging (MRI) demonstrated distal femoral physis fracture.

CASE REPORT

An informed consent was obtained for this case presentation. A 13-day-old male neonate was referred to our health center with the complaint of swelling and immobility in his left thigh. He was born at the 40th gestational week by a vaginal delivery with an APGAR score of 10. He was appropriate for the gestational age and his birth weight was 3400 g. Initial physical examination was unremarkable. The obstetrician reported no complication related to delivery. The mother attended her follow-

ups regularly during the pregnancy and her pregnancy was uneventful.

At the second day of age, his mother noticed soft tissue swelling around the left knee and distal femur. On physical examination there was slight swelling around the left knee and distal femur. Femoral and dorsal pedal pulses were palpable. The range of motion at the knee joint was normal without any evidence of joint instability or dislocation. His white blood cell count was 11090 /uL, hemoglobin level was 14.2 g/dl, platelet count was 629000 /uL and serum C-reactive protein level was less than 1 mg/L. Coagulation parameters including prothrombin time (PT) and activated partial thromboplastin time were also within the normal limits. Plain radiograph of the region was normal. The patient started to receive antibiotic treatment for ten days with a preliminary diagnosis of soft tissue infection. After the antibiotic therapy, his swelling around the left distal femur was still present. Repeated radiograph of the left thigh demonstrated periosteal reaction around the left distal femur (Fig. 1). No fracture line could be identified but a slight



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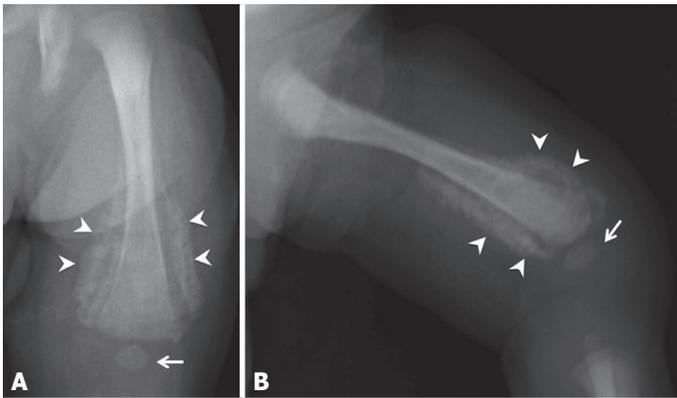


FIGURE 1. Radiograph of the left femur and knee demonstrates periosteal reaction (arrowheads) and soft tissue swelling at the left distal femur. Slight posterior displacement of the femoral epiphyseal ossification center is seen (arrow). No fracture line is identified.

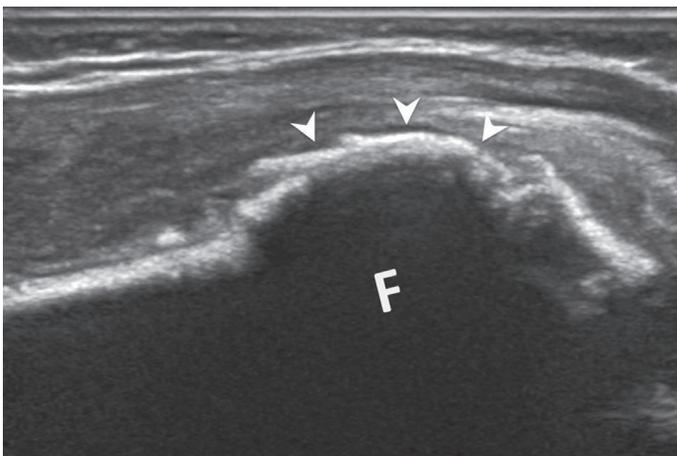


FIGURE 2. Sagittal US image of the left distal femur shows calcified periosteal elevation (arrowheads) at the distal femur (F).

posterior displacement of the distal femoral epiphysis was suspected. Further investigation with ultrasound (US) demonstrated calcified periosteal elevation (Fig. 2). Patient underwent a MRI which demonstrated posterior displacement of the distal femoral epiphysis (Fig. 3). Femoral physis fracture and subperiosteal hemorrhage was the final diagnosis.

Serum vitamin C levels in both the patient and his mother were tested to rule out neonatal scurvy and they were within the normal limits. A skeletal survey was performed to rule out a non-accidental trauma and no other fractures were identified. Metabolic tests for osteogenesis imperfecta were negative. The family was advised that



FIGURE 3. Sagittal T2-weighted MRI of the left thigh shows posterior displacement of the distal physis (asterisk) and periosteal elevation around the distal femur (arrowheads).

the fracture was already in the healing process and no active therapeutic intervention was needed. The infant was discharged and closely followed up. Follow-up plain radiograph performed three weeks later demonstrated periosteal new bone formation at the distal femur (Fig. 4).

DISCUSSION

Distal femoral physis fracture is rare birth related injury causing subperiosteal hemorrhage in newborns. It may occur after a difficult vaginal or cesarean delivery [2,3]. Traumatic femoral physis fractures are usually associated with a sudden, forced traction of the limb with acute angulation or twisting. The force causes rupture at the epiphyseal attachment of the periosteum where is the weakest portion [2]. Tear in the periosteum results in subperiosteal hemorrhage which gradually calcifies and results in callus and new subperiosteal bone formation. Infants present with

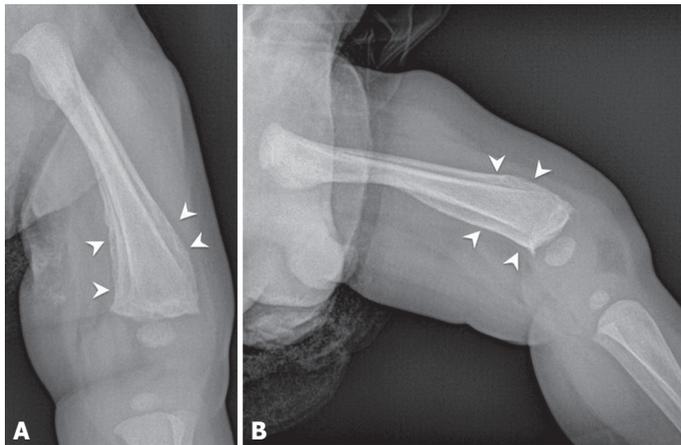


FIGURE 4. Follow-up plain radiograph of the left femur shows periosteal new bone formation (arrowheads).

swelling, erythema and tenderness at the affected area. It is often mistaken for septic arthritis or osteomyelitis and many patients receive antibiotics [3]. Coexistence of subperiosteal hemorrhage with epiphyseal fracture is important to exclude other causes of subperiosteal hemorrhage such as infection, tumor or scurvy [4].

Initial radiographs of a physis fracture in a neonate may demonstrate soft tissue swelling but if the physis is not ossified, they may reveal no bone abnormality. Plain radiograph findings include epiphyseal displacement, widening of the physis and haziness of the smooth margins of the metaphysis and epiphysis [5]. MRI and US were also shown to be useful in making the correct diagnosis [3, 6, 7]. They may show periosteal elevation around the distal femur and displacement of the epiphysis. If the periosteal reaction calcifies, acoustic shadow due to calcification may obscure the fracture. Follow up radiographs can confirm the diagnosis by showing periosteal reaction and new bone formation at the injured site [5]. Treatment strategies differ widely from an uneventful spontaneous healing process to a closed reduction [8].

Initial evaluation of our patient was in another local hospital and the initial radiograph was evaluated as normal by a pediatrician. There was no history of any birth related complication, so physis fracture was not considered in the differential list and the patient received antibiotics for a preliminary diagnosis of a soft tissue in-

fection. After the patient did not respond to the medical therapy and immobility of the joint was noticed, he was re-evaluated in our center. Combined interpretation of plain radiograph and MRI of the region demonstrated distal femoral physis fracture.

As the physeal fractures are rare and their radiological findings are variable, they present a diagnostic challenge in newborns. Physis fracture should be considered in the differential list in any neonate presenting with a limb swelling. Thus, invasive procedures such as joint aspiration for diagnostic purposes or unnecessary use of antibiotics can be avoided. MRI is very helpful in making the correct diagnosis. Pediatricians, orthopedists and radiologists dealing with newborns should be familiar with this rare condition.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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