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An unusual case of neonatal elbow septic arthritis mimicking a distal humerus physeal injury/elbow dislocation

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Abstract
Neonatal septic arthritis is a rare entity and an important differential diagnosis of distal humeral epiphyseal separation (DHES). DHES is yet again an infrequent phenomenon seen in less than 3.9% of physeal injuries which often masquerades as elbow dislocation. We report on a 20-day old term neonate referred with a suspected diagnosis of elbow dislocation following trauma. Subsequent to evaluation in a tertiary care hospital this was found to be a rare case of septic arthritis of elbow in a neonate mimicking DHES. The diagnosis of septic arthritis in neonates is often delayed because the characteristic symptoms and signs seen in older children are absent or subtle. DHES is a rare injury, which to an untrained eye, may be misdiagnosed as an elbow dislocation. Septic arthritis and acute osteomyelitis are differential diagnoses of DHES, however, the history of incidental trauma hoodwinked us to provisionally diagnose it as the latter.

Keywords: Septic arthritis, distal humeral epiphyseal separation, elbow dislocation

Introduction
Neonatal septic arthritis is a rare and distinct entity and needs to be considered separately from those seen in older children. Narang *et al.* reported an incidence of 1/1500 in India but the true incidence of septic arthritis in infants wherein the elbow is involved is not known [1]. A distal humeral epiphyseal separation is yet again an infrequent phenomenon often masquerading as an elbow dislocation and seen in less than 3.9% of physeal injuries [2]. So, when such sporadic entities allude to co-exist it not only results in a diagnostic conundrum but leaves the treating orthopaedic surgeon in a quagmire. We present a rare case of septic arthritis of elbow in a neonate who presented with an injury mimicking distal humeral epiphyseal separation following a history of trauma.

Case Report
A 20-day old term neonate hailing from coastal Karnataka in South India was referred to our department with swelling and deformity of left elbow and pseudo-paralysis of the left upper limb of 10 days duration. The child was referred from a primary healthcare centre with a provisional diagnosis of elbow dislocation subsequent to a series of radiographs taken over the course of the disease which revealed an abnormality. The informant was the mother and she first noticed the swelling after an episode of local trauma in which the elder sibling had accidentally sat on the baby's arm. This was associated with increased crying and irritability when an attempt was made to move the elbow. She reported that the child was feeding normally and there was no history of fever, cough, fast breathing, seizures or any other associated complaints. The neonate was a term healthy female baby delivered by elective caesarean section. On the 2nd post-natal day she was shifted to the neonatal intensive care in view of neonatal jaundice for phototherapy. Due to ABO incompatibility, direct coomb's test was done which was negative. Child was discharged from intensive care after 24 hours.
On examination, diffuse swelling and ecchymosis was present around the left elbow. No local warmth was appreciated and absence of spontaneous movement at the left elbow was noticed. The three-point bony relationship could not be appreciated due to significant swelling.

Passive movement of the elbow caused discomfort. The peripheral pulses were well felt. No specific findings were observed during other orthopaedic and systemic examinations. Radiographs done at the primary care hospital were available. The first x-ray was taken immediately following trauma which was an oblique projection of the left upper limb (figure 1). It did not reveal any gross bony abnormality but showed a soft tissue shadow around the elbow. A second x-ray taken prior to referral was an antero-posterior and lateral view of the left elbow which showed postero-medial displacement of the proximal ulna and radius with a significant soft tissue shadow around the elbow with minimal periosteal reaction (figure 2). An ultrasonography of the elbow was reported as widening of the elbow joint space with subluxation and significant joint effusion suggestive of hematoma (figure 3). Based on the history of antecedent trauma and the clinical and radiographic evidence, a provisional diagnosis of distal humeral epiphyseal separation was made and arrangements were made for the child to undergo an urgent closed reduction and stabilization with Kirchner wires. Intraoperatively after closed reduction, however, frank pus was found draining from the elbow joint on inserting the K-wire (figure 4). Hence, the final diagnosis was an unexpected case of septic arthritis mimicking a transphyseal separation. An arthrotomy and thorough debridement was done and the wound was closed over a drain. An above elbow slab was applied in 90 flexion.

Lab parameters unavailable prior to procedure reinforced the diagnosis which was reported as Hb-7.3 TC-30,000 and CRP 68.22. Post operatively the child received intravenous meropenem and vancomycin for two weeks followed by oral antibiotics for 4 weeks. The pus culture grew staphylococcus aureus. The child was followed up at 6 weeks and 3 months and was found to be keeping well with full range of motion of the left elbow.

Fig 1: Plain radiograph showing the arm, elbow and forearm in an oblique projection with a soft tissue shadow around the elbow.

Fig 2: Plain radiograph of the left elbow in the antero-posterior and lateral view which showed postero-medial displacement of the proximal ulna and radius with a significant soft tissue shadow around the elbow with minimal periosteal reaction.

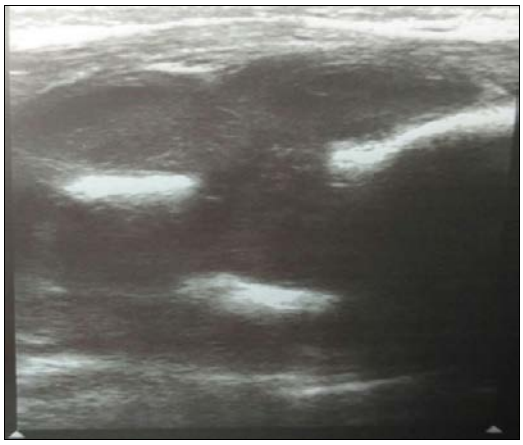

Fig 3: Ultrasonography of the left elbow which showed widening of the elbow joint space with subluxation and significant elbow joint effusion with coarse internal echoes and debris into peri-articular soft tissue suggestive of hematoma.

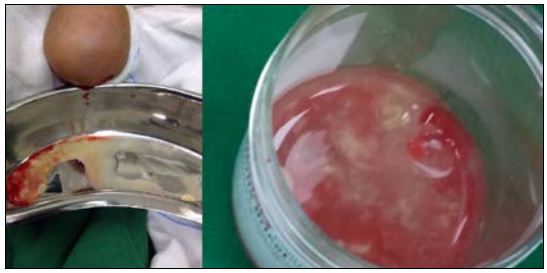

Fig 4: Intra-operative picture showing frank pus drained from the left elbow suggesting septic arthritis.

Discussion

Septic arthritis in a neonate is a serious condition which can result in debilitating deformity or permanent dysfunction thereby necessitating early diagnosis and treatment [1, 3]. Risk factors for bacterial arthritis in neonate include umbilical vessel catheterization, central venous catheter, femoral vessel blood sampling and osteomyelitis. Staphyloccus aureus is the most common organism implicated. The diagnosis of septic arthritis is often delayed because the characteristic symptoms and signs seen in older children are less apparent in neonates [1]. The typical presentation is that of septicaemia (e.g.- irritability, poor feeding) or fever without a focus of infection. Clues to joint involvement include lack of use of the involved extremity, aversion to or discomfort on being handled and unilateral swelling of extremity, buttocks or genitalia. The above clinical setting when compounded with a distinct history of trauma is likely to mislead the treating surgeon.

Distal humeral epiphyseal separation is a rare injury seen in neonates and its description has been limited mostly to case reports and small case series. To an untrained eye, the condition may often come across as an elbow dislocation which is a very rare injury in neonates [2, 4]. Moreover, an elbow dislocation most commonly occurs postero-laterally in this age group as against the former which occurs postero-medially. Diagnosing a transphyseal separation can be additionally arduous because the ossification centre for capitellum appears only after the age of 8 months and most or all of the distal humeral epiphyses is made up of cartilage and cannot be visualized directly by conventional radiographs. An ultrasonography has been described as a good adjunctive tool to aid in diagnosis provided the radiologists are aware of the radiographic signs suggesting distal humeral epiphyseal separation [4].

Our case was unique and presented with confounders giving rise to a conundrum. By convention, septic arthritis and acute osteomyelitis must be kept in mind as differential diagnoses of distal humeral epiphyseal separation. While the history of incidental trauma may have led the treating surgeons to misdiagnose the condition, the event may have conversely brought the condition to the mother's notice. When treatment is delayed beyond 6 to 7 days of injury a distal humeral epiphyseal injury is not manipulated regardless of displacement, because the epiphyseal fragment is no longer mobile and other injuries may be precipitated, rather, splinting for comfort is done [3, 5]. In the absence of any other systemic signs of sepsis at presentation it may have gone unnoticed for longer by both the mother and treating physician with catastrophic consequences.

Conclusion

In summary, early diagnosis and management of neonatal septic arthritis is quintessential. In neonates and young infants, presentation may be as vague as transphyseal separation and must always be considered a differential diagnosis in suspected cases of distal humeral epiphyseal separation. While history and clinical examination findings may overlap, routine lab parameters, ultrasonography, MRI and arthrography may aid in diagnosis. The treating consultant must also keep in mind that distal humeral epiphyseal separation is a rare entity and may give the illusion of an elbow dislocation.

Authors' contributions

All authors contributed equally to this work.

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