

CLINICAL CASE REPORTS

Newborn Epiphysiolysis of the Proximal Humerus

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ABSTRACT

Musculoskeletal injuries resulting from childbirth trauma, including humeral head epiphysiolysis, are rare. This case report describes the clinical presentation, diagnostic evaluation, treatment, and mid-term follow-up of a premature male newborn with humeral head epiphysiolysis due to birth trauma. The infant exhibited limited left shoulder mobility and internal rotation preference. An ultrasound confirmed epiphyseal detachment, informing conservative treatment without immobilisation. Over time, bone callus formation with concurrent humeral deformity was observed. Rehabilitation and postural recommendations were implemented to encourage normal limb mobility and function, while minimising the risk of growth plate anomalies. By the age of one year, the child presented with harmonious limb movements, and normal strength and psychomotor development, with nearly complete resolution of the structural alterations.

This case underscores the importance of considering humeral head epiphysiolysis in the differential diagnosis of newborns with impaired upper limb mobility, despite being a rare condition. The ultrasound exam proved valuable for diagnosis, and conservative treatment yielded positive outcomes. Regular radiographic monitoring may be necessary in these cases to control the progress of bone remodelling and development. Clinicians should be aware of this condition to ensure timely and appropriate management, ultimately leading to favourable clinical, functional, and radiological outcomes.

Keywords: birth trauma; conservative treatment; epiphysiolysis of the proximal humerus; humeral head epiphysiolysis

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INTRODUCTION

The prevalence of mechanical birth trauma may be underreported, with an estimated incidence of 0.82% and a prevalence of 9.5 per 1000 live births.⁽¹⁾ These injuries encompass both muscular and skeletal lesions, including bony fractures and soft tissue injuries. While birth-related fractures in newborns are rare, their identification is crucial due to the non-specific presentation, compounded by the challenge of detection in the presence of unossified cartilage.⁽²⁾ Among these fractures, clavicular fractures are the most common, with an incidence of 2.7–5.7 per 1000 live births.^(3,4)

Epiphysiolysis of the proximal humerus is a rare birth injury that presents difficulties in the diagnosis due to its non-specific clinical features and the limitations of conventional radiography for visualising the growth plate and epiphysis.^(5,6) Fortunately, the humeral epiphysis exhibits remarkable remodelling potential, and conservative management of epiphysiolysis typically leads to a favourable prognosis with proper healing.^(5–7)

This case report aims to detail in a comprehensive manner the clinical presentation, diagnostic approach, therapeutic strategy, and mid-term outcomes of a newborn diagnosed with humeral head epiphysiolysis. The parents have consented to the publication of data pertaining to this case.

CLINICAL CASE

Male newborn, born via caesarean section at 28 weeks due to non-reassuring cardiotocography. The infant faced an increased risk of infection due to premature rupture of the membranes at 25 weeks and a positive maternal screening test for Group B Streptococcus. The newborn was promptly admitted to the Neonatal Intensive Care Unit (NICU). Delivery was further complicated by a pelvic presentation, which posed challenges during extraction and warranted an upper limb stretching manoeuvre.

The infant had an Apgar score of 5/7/8 and weight of 950g at birth. On the first day of life, he presented oedema, ecchymosis, and decreased spontaneous mobility of the left shoulder. X-ray examination of the thorax (**Figure 1**) did not show any acute osteoarticular lesion, prompting a cautious observation approach.

In the absence of improvement in upper limb posture and movement, the child was assessed by the Physiatry team. The evaluation revealed anteriorization of the left shoulder with preference for internal rotation. Passive range of motion was limited to 90° of lateral and anterior elevation, and discomfort was visible during shoulder mobilisation. However, distal flexion and extension of the elbow, wrist, and fingers were preserved, similar to the contralateral limb. A left shoulder ultrasound (**Figure 2**) showed ossification of the humeral shaft in the anterior and proximal area, with overlapping of the (posterior) humeral head, confirming the diagnosis of

proximal humerus epiphyseal detachment. The Orthopaedics team opted for a conservative approach focused on promoting internal rotation.

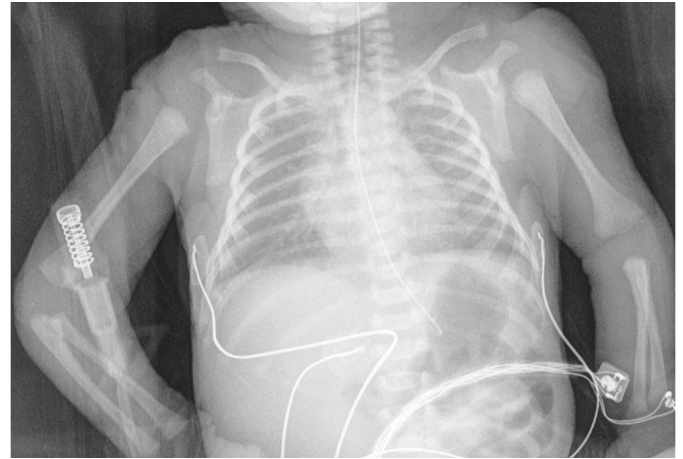


Figure 1 – An anteroposterior chest radiography obtained on day 1 did not reveal any acute osteoarticular lesion.

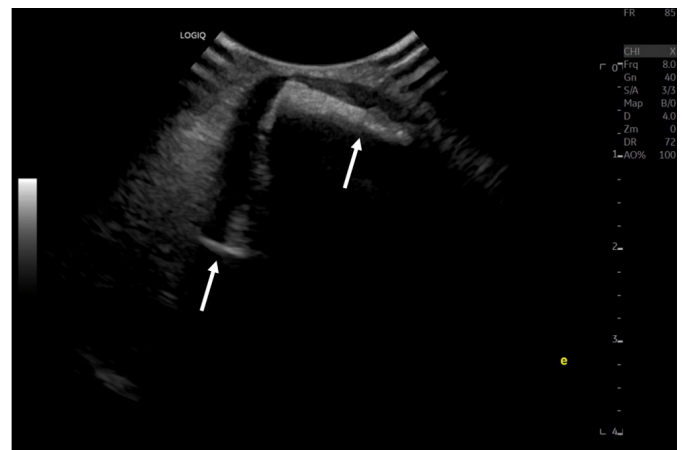


Figure 2 - Ultrasound of the left shoulder, showing the ossified humeral diaphysis in a more anterior and apparently proximal location (right arrow), with posterior positioning of the humeral head (left arrow).

By day 15, the newborn maintained limitation of mobility, and a thoracic X-ray showed visible bone callus formation on the humeral head (**Figure 3**). At three months of age the infant exhibited asymmetric upper limb posture with internal rotation of the left shoulder. The passive lateral elevation of the shoulder reached 120°, and active mobility remained reduced. Psychomotor development was appropriate for the corrected age.

Concurrent deformity of the ipsilateral humeral metaphysis

and diaphysis was detected on the radiological control (**Figure 4**). The caregivers were provided with homecare instructions and postural recommendations, and a rehabilitation programme was initiated. Its goals included stimulating the left upper limb, ensuring full mobility and minimising the risk of glenoid dysplasia, normalising posture, promoting body symmetry, and reintegrating the left upper limb into the body schema.

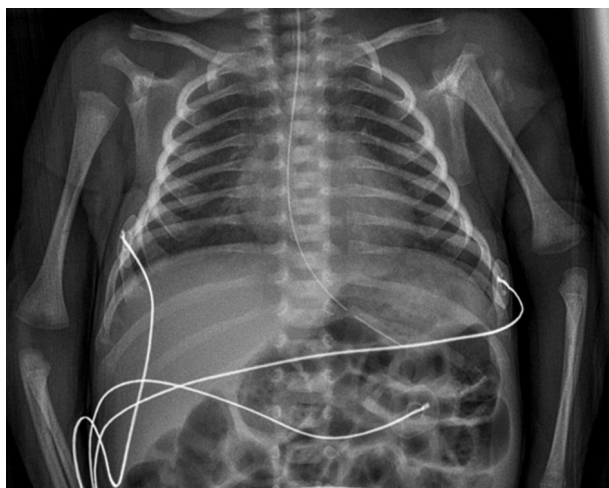


Figure 3 – Follow-up of the anteroposterior chest radiography obtained on the 15th day of life, showing visible bone callus formation at the site of the humeral head.



Figure 4 – Follow-up of the anteroposterior chest radiograph obtained at 3 months of age, revealing a concurrent deformity of the left humeral metaphysis and diaphysis.

Asymmetrical posture persisted at eight months, characterised by a tendency for extension and internal rotation of the left shoulder, decreased mobility, and less harmonious scapular-thoracic movements during passive lateral elevation. It is worth noting that these evaluations were conducted

as part of a comprehensive multidisciplinary follow-up. The control X-ray revealed persistence of the diaphyseal lesion, now accompanied by a spiculated image, which prompted radiological evaluation every two months (**Figure 5**).

At one year of corrected age, the child showed harmonious and symmetrical movements for all limbs, symmetrical mobility and strength of the upper limbs, appropriate crawling patterns, and a psychomotor development corresponding to the corrected age. The radiological study indicated an almost complete resolution of the previously observed structural alterations (**Figure 6**).

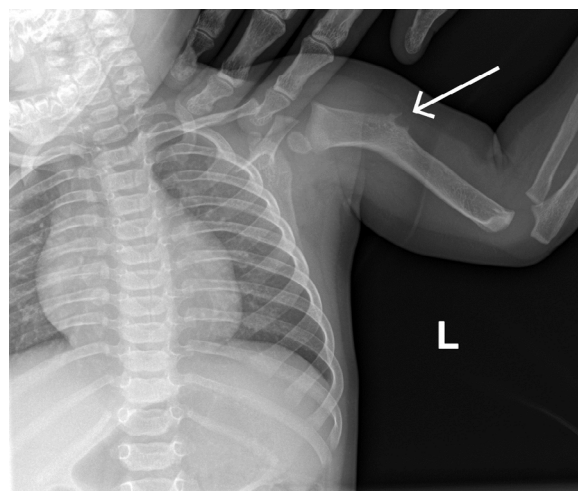


Figure 5 – Follow-up of radiography obtained at 8 months of age, showing persistence of the diaphyseal lesion and a spiculated image.

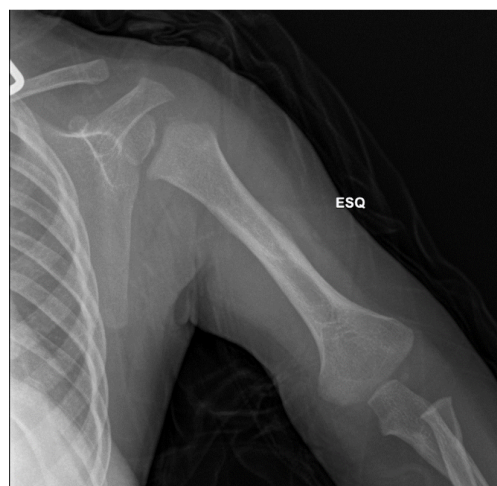


Figure 6 – Follow-up of the left shoulder radiography obtained at one year of corrected age, demonstrating almost complete resolution of the previous structural lesions.

DISCUSSION

The clinical presentation of this case closely resembles the few documented cases of humeral head epiphysiolysis resulting from intrapartum trauma in the medical literature. Apart from birth trauma, there is significant clinical variability in the cases reported, including variations in birth weight, mode of delivery, presentation, and gestational age, with no clearly identified associated risk factors.^(5–12) When evaluating a newborn with impaired proximal mobility of the upper limb, it is crucial to consider the differential diagnosis, which includes epiphyseal slippage, diaphyseal fracture of the clavicle or humerus, brachial plexus palsy, and the rare Parrot pseudoparalysis.^(6,8–10)

Ultrasonography has proven to be more accurate than radiography in the diagnosis of this condition, but radiography is still necessary to exclude other potential differential diagnoses.^(6,8–10) During follow-up, regular radiographic monitoring was deemed important, not only to assess bone remodelling and rule out complications, but also to evaluate humeral growth over time. The follow-up period should focus on the functional recovery of the affected limb, which may take years, as well as on the monitoring of humerus growth given the risk of rotational deformities and shortening. While humeral shortening rarely has significant cosmetic implications, it remains an important consideration in the long-term follow-up of the condition.

Our patient was managed conservatively with favourable clinical, radiological, and functional outcomes. In the largest case series of proximal humeral epiphysiolysis in newborns, reported in 2014, Wael El-adl *et al.* used open reduction and Kirschner wire fixation as the primary treatment after unsuccessful attempts at closed reduction.⁽¹⁰⁾ Nevertheless, considering the significant potential for epiphyseal remodelling and the excellent outcomes achieved with a non-surgical approach (which does not involve immobilisation for several weeks) in other recently reported cases,^(5,7,8,12–15) we opted for the approach described here.

CONCLUSION

Humeral head epiphysiolysis resulting from birth trauma is a rare injury. However, it is crucial for all clinicians involved in newborn care to be aware of this condition in the differential diagnosis comprising brachial plexus injury and clavicle fractures, which are more common conditions. Understanding the clinical features, methods of diagnosis, and proper management of humeral head epiphysiolysis in newborns is essential. Conservative treatment is, at present, an initial approach with favourable clinical outcomes.

AUTHORSHIP

Mafalda Cunha – Conception and Planning; Clinical Data Acquisition; Data Analysis and Interpretation; Manuscript Writing

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