

## Sonography of slipped humeral epiphysis due to birth injury

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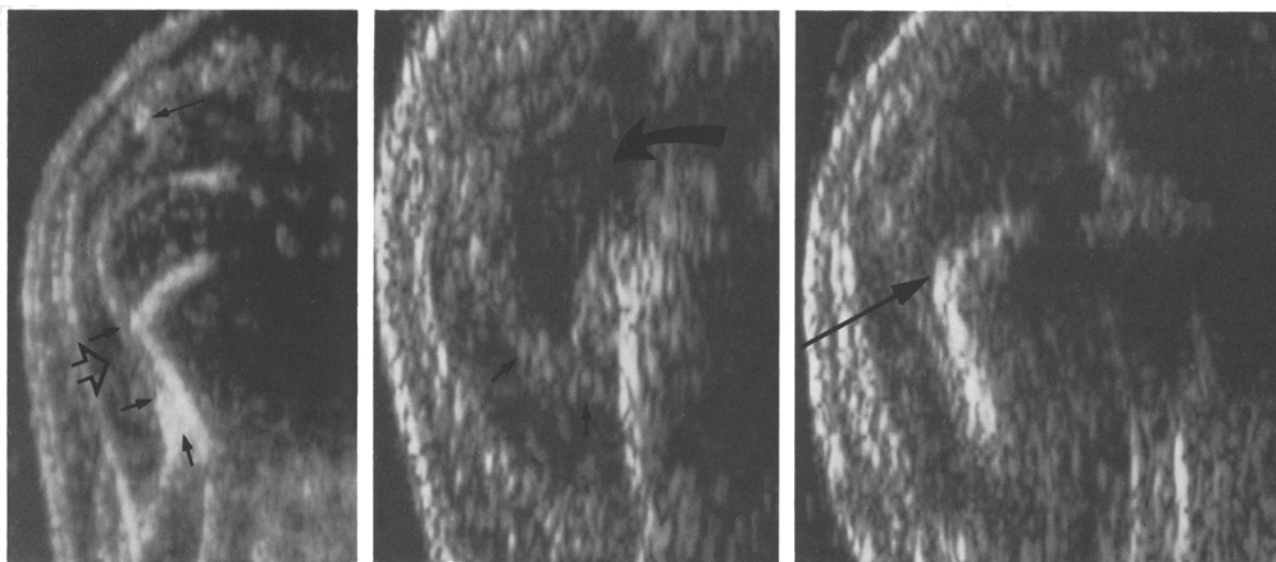
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**Abstract.** Sonographical diagnosis of slipped epiphysis of the proximal humerus is reported in a newborn with birth traumatic etiology. In these rare conditions sonography is recommended as method of choice.

Injury of the skeletal system due to birth trauma occurs in 0.2-2% of all deliveries and most are diaphyseal fractures of the clavicle. Slipped epiphysis due to birth injury represents a rare condition with diagnostic problems [1, 2]. With no epiphyseal ossi-

fication center and most commonly a fracture type I corresponding to Salter and Harris [3] the radiological signs of a slipped epiphysis namely enlarged joint space, displacement of the nidus, distancing of the metaphysis and metaphyseal bony fragmentations can be missing. On the other hand, only early diagnosis and correct repositioning will give a good outcome. Thus, arthrography has been proposed for confirming the diagnosis [3].

We report on the sonographical diagnosis and follow up of a traumatic slipped humeral epiphysis which has as far as we know not been presented in the literature.



**Fig. 1.** (Left) Normal shoulder. Coronal section using water delay presented upright. Joint capsule (small arrows), deltoid muscle (open arrow), acromion (long arrow)

**Fig. 2.** (Middle) Slipped humeral epiphysis. Slipped head (curved arrow), displaced and thickened joint capsule (small arrows)

**Fig. 3.** (Right) After repositioning. Remaining unsharpness of the growth plate (arrow)

## Case report

A mature female was born in breech presentation with extraction by a Veit-Smellie procedure. The next day the neonate presented with a pain induced position of the left arm with internal rotation of the upperarm, and discrete swelling of the proximal soft tissues.

X-Ray films of the shoulder revealed no abnormalities. Sonography depicted the lateral and caudal dislocation of the proximal epiphysis of the humerus.

The normal anatomy of the shoulder joint in a neonate as seen by sonography in a coronal section is shown in Figure 1: the proximal humeral bone is seen in its outer contour as a sharp echogenic line with a harmonious transition into the convex shaped humeral head which is echo-poor due to its cartilagenous composition. The joint capsule is delineated as a slender line parallel to the humeral bone, fixed at the periosteum distal to the growth plate which presents as a sharp echogeneous band.

Under normal conditions the joint space can not be separated from the capsule or the bone.

The echo-poor structures lateral of the proximal humerus correspond to the deltoid muscle.

In case of slipped epiphysis the lateral and caudal displacement of the head leads to an interruption in the transition of the humeral bone into the head (Fig.2). Additionally, the growth plate is enlarged with unsharp demarcation, the caudal part of the joint capsule is thickened with some echoes within possibly because of intraarticular clot formation. Finally, the deltoid muscle is displaced laterally. The sonographical control after repositioning is shown in Figure 3. Almost anatomical repositioned humeral epiphysis, the growth plate remains unsharp, and the joint capsule thickened. No evidence of an intraarticular effusion was found by additional sagittal and axial scans.

The radiological control 10 days later confirmed the previous slipping of the humeral epiphysis by demonstrating overshooting callus formation at the proximal metaphysis.

## Discussion

The differential diagnosis of a pain induced position of the arm postpartum comprises the uncommon slipped epiphysis, diaphyseal fractures of the clavicle or of the humerus, brachial plexus palsy

and the also rare Pavvot's pseudoparalysis in congenital lues. Fractures can easily be detected clinically and radiologically, the luetic pseudoparalysis is recognized serologically and by the typical stigmata, but the differential diagnosis between Erb's palsy and slipped epiphysis can be difficult.

Conventional radiography has been proved not to be sensitive if the ossification center is still missing. Arthrography represents an invasive and expensive method posing additional stress on the neonate who has just had a hard delivery.

Sonography can easily depict the position of the proximal humeral epiphysis as well as its relation to the humeral bone. The degree of persisting malposition after repositioning can be rapidly demonstrated.

In conclusion, sonography is highly recommended as method of choice for suspicion of slipped epiphysis of the proximal humerus.

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