"Fishtail deformity" and secondary osteochondral lesion of the elbow as a late onset complication after juvenile distal humeral fracture, a case report

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Introduction and Background

"Fishtail deformity" is a rare complication seen in patients who suffered a distal humeral fracture in the early childhood after conservative or surgical fracture treatment [1-4,6,9].
It occurs probably due to an avascular necrosis of the humeral trochlea due to compromised vascularisation in the so called watershed area (Fig. 9), resulting in a fishtail shaped deformity [3,4,6-8]. It is accompanied by loss of motion, pain in the elbow and eventually by development of osteoarthritis, cubitus valgus and formation of intraarticular lose bodies [4-6]. Radiologic findings include an underdevelopment of the lateral humeral trochlea, joint space narrowing, subchondral cysts, synovitis and volar subluxation of the radial head [4-6]. As the trochlear ossification takes place at the age between 7-11 years and the fusion to the humeral metaphysis later at the age between 12-17 years, this complication is rarely recognised at the early stage [4,6,9].

Methods

Using a case report and a review of the literature, we give an overview on pathogenesis, clinical presentation and treatment options.

There are only few case reports in the literature on this subject. Based on a case of a 13-year-old patient, who presented himself to our clinic with a dislocated osteochondral lesion, fishtail deformity and a history of surgical treated transcondylar fracture at the age of four, we want to draw attention to this rare complication and give an overview of the current literature.

Results

4-year-old boy, after a fall on the right arm, suffering pain and impaired range of motion in the elbow

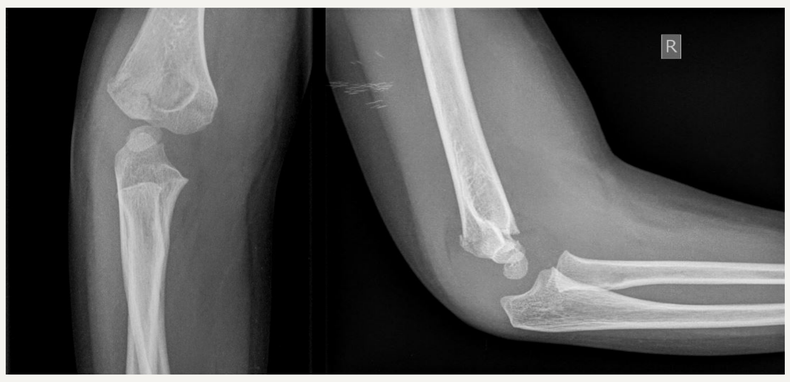

Fig. 1: ap/lateral radiograph, transcondylar humeral fracture, posterior dislocation ad axim

1 week after closed reduction, K-wire fixation and splinting

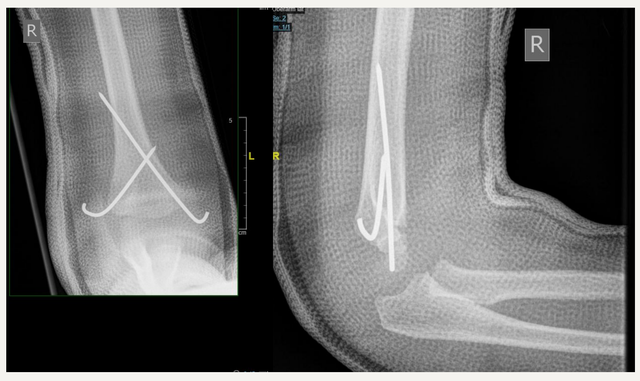

Fig. 2: ap/lateral radiograph, 1 week postoperatively

4 weeks postoperatively, clinically no impairment, full range of motion in the follow-up after K-wire removal

Fig. 3: ap/lateral radiograph, 4 weeks postoperatively after K-wire fixation, after splint removal

9 years later: 13-year-old boy with pain at the radial epicondyle, impaired range of motion and sensation of joint blockage after suffering a slight distorsion of the right elbow

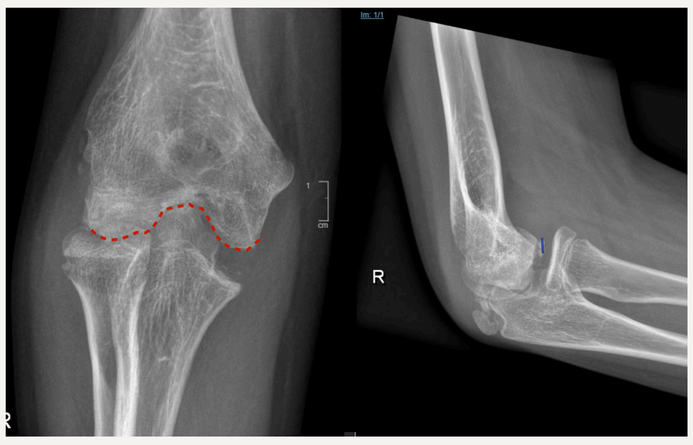

Fig. 4: ap/lateral radiograph, deformity of the humeral trochlea involving the trochlear groove, „fishtail deformity“ (red line), loose bodies lying anterior to the humeral capitulum, subluxation of the radial head, fat pad sign

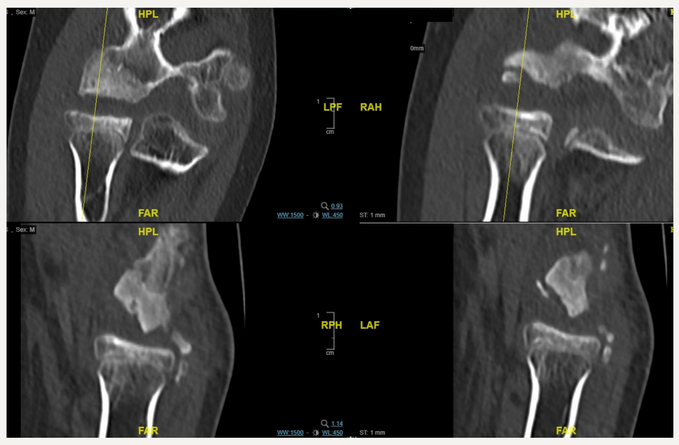

Fig. 5: CT-scan, osteochondral lesion in the proximity of the humeral capitulum with dorsal dislocation of the fragments, dysplastic deformity of the humeral trochlea

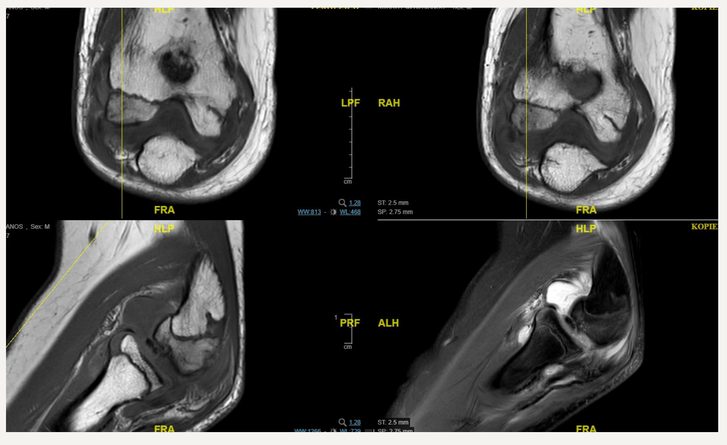

Fig. 6: MRI, deformity of the humeral capitulum with a loose fragment, concomitant synovitis and joint effusion, suspicious for a chronic osteochondral lesion and fishtail deformity of the distal humerus

After partial refixation of the osteochondral fragment, bone grafting and minced autologous chondral AMIC procedure

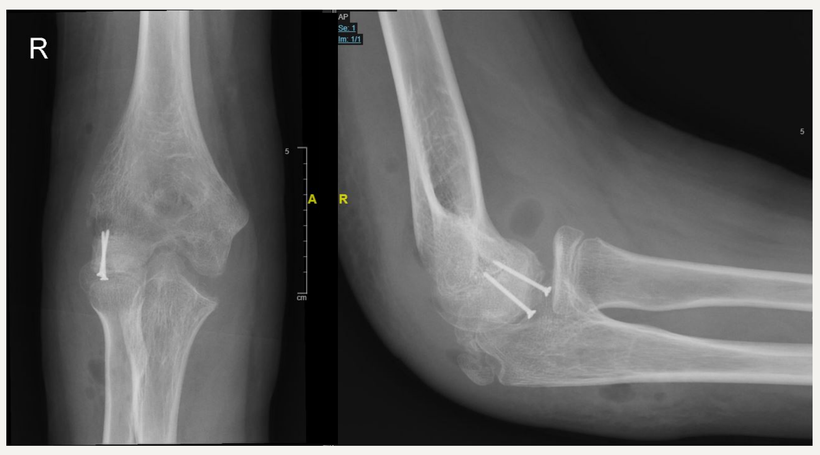

Fig. 7: ap/lateral radiograph, 1 day postoperatively, reconstructed humeral capitulum by screw osteosynthesis, slight deformity of the humeral capitulum and olecranon

6 weeks postoperatively, clinically slightly swollen ellbow, range of motion after splint removal: flexion-extension 110-60-0°, pronation-supination 70-0-30°

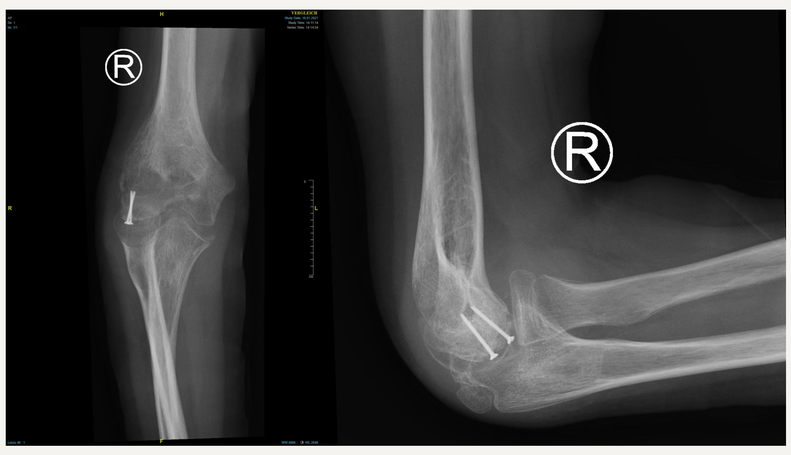

Fig. 8: ap/lateral radiograph, 6 weeks postoperatively, slight deformity of the humeral capitulum and olecranon, demineralisation of the humeral trochlea, of the radial capitulm and olecranon

Follow-up:

3 months postoperatively the patient shows still a slightly swollen ellbow, an irritation-free scar and slight pain at the current maximum range of motion. The range of motion is as follows:

flexion-extension 100-40-0°

pronation-supination 90-0-30°

5 months postoperatively the patient presents without any swelling, shows an irritation-free scar and good strength against resistance. The range of motion is as follows:

flexion-extension 120-15-0°

pronation-supination 90-0-70°

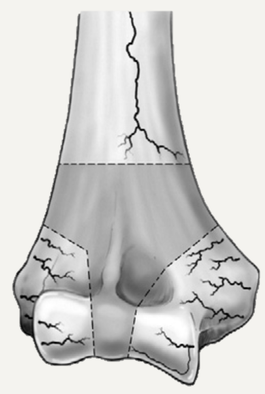

Fig. 9: blood supply of the distal humerus, the deep grey area shows the watershed area [8]

Discussion

Fishtail deformity is a rare growing disorder in children with a history of a distal humeral fracture. Patients can complain about pain and impaired range of motion of the elbow up to many years after the first trauma. Some present with osteochondral lesions. It can occur both after non-operative and operative treatment of a distal humeral fracture. It is probably caused by an arrest of the ossification or impaired vascularisation between the humeral capitulum and the humeral trochlea. An observational treatment is recommended if the range of motion is just slightly impaired. An operative treatment should be considered in patients with highly impaired range of motion, pain or joint blockage. Radiological long-term follow-up after distal humeral fractures could be discussed, even in asymptomatic patients to avoid delayed diagnosis and complications.

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