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(CASE REPORT)

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Neglected Hahn-Steinthal fracture in older children

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Abstract

The Hahn-Steinthal fracture or type I fracture of the capitellum humerus is an articular lesion with a frontal fracture line. This fracture is uncommon in the pediatric population but can occur in adolescent and adult. The diagnosis is often missed.

The avulsed fragment must be identified on good quality lateral X-rays. We present the case of a 13 years old adolescent who sustained a Hahn-Steinthal fracture of the capitellum, occurring at the time of basketball competition. It was treated operatively by open reduction and internal fixation using screws. At the time of the latest follow up, the result was satisfactory.

Keywords: Hahn Steinthal fracture; capitellum; Herbert screws; internal fixation; osteosynthesis

1. Introduction

The Hahn-Steinthal fracture is a rare joint fracture and this lesion is seen exceptionally in adolescents. Capitellum fractures remain very rare joint trauma to the lower end of the humerus, usually encountered in adults. Pediatric cases are unusual and constitute less than 1% of elbow trauma in children (1).

These fractures are classified into four types according to the Bryan and Morrey classification, modified by McKee. We report the case of a type I fracture of the capitellum, also called Hahn-Steinthal fracture, in a 14-year-old girl following a sports accident (2,3).

The purpose of the study is to discuss the diagnostic difficulties and the benefit of open surgery, to restore the anatomy of the lower end of the humerus, and avoid complications.

2. Case presentation

We report the case of a 14-year-old female child, right-handed, victim of indirect elbow trauma following a sport accident 3 months ago, initially treated with traditional treatment.

He had no particular history, the clinical picture dominated by elbow pain and swelling around, localized edema on the opposite side, an elbow blocked in flexion at 90°, as well as a limitation of prono-supination. There was no neurovascular deficit.

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Standard radiography reveals a “half-moon” intra-auricular bone fragment, raised and attached to the anterior surface of the lower humeral epiphysis.

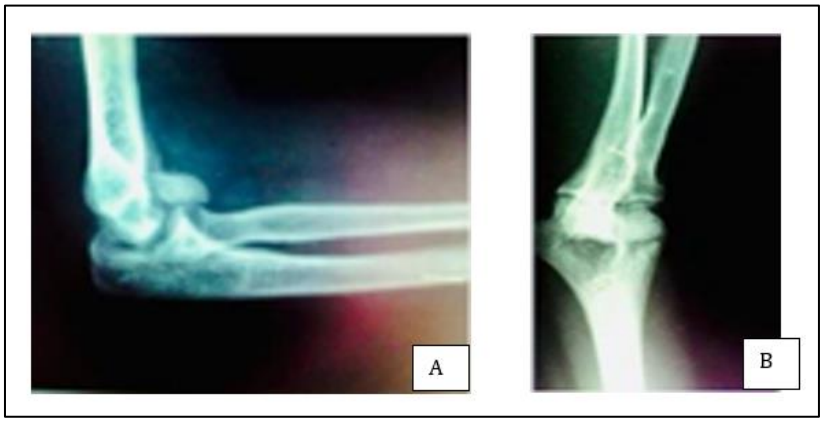

Figure 1 X-ray frontal (A) and profile(B) incidence of the elbow hahn sthental fracture

The anesthesia was of the axillary plexus block type. After placement of a pneumatic tourniquet, surgical treatment was performed openly using a lateral approach followed by screw osteosynthesis.

The reduction was obtained temporarily by Kirschner wires controlled by image intensifier followed by fixation of the fragment by screwing. After checking the mobility of the elbow, additional immobilization of the elbow using a posterior brachio-antebrachial splint was implemented for a period of three weeks. No immediate intra- or post-operative incident to report, the patient left the hospital 24 hours after surgery.

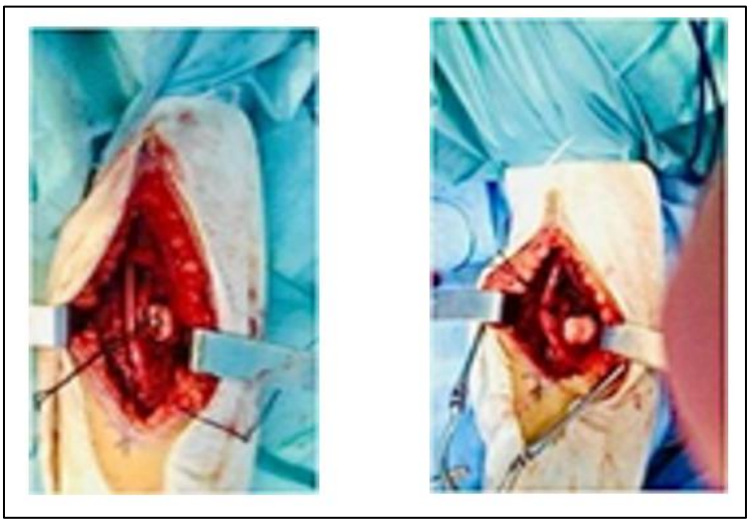

Figure 2 Peroperative aspect of the fracture with screw fixation

The follow-up period was one year with regular clinical and radiological examinations. The patient was asked about pain and daily activities. Mobilities were compared with respect to the opposite side. Reduced mobility was noted upon removal of the splint. Rehabilitation began at 4 weeks with progressive mobilizations programme guided by the physiotherapist. She was followed up at 4 weeks, 6 weeks, 3 months, 6 months and 12 months. She attained full range of movement at 3 months with no further complications later. Joint range of motion was restored at 3 months. The MEPI (Mayo Elbow Performance Index) score was 96. The radiological signs of consolidation were partial at 6 weeks and complete at 2 months. There was no dismantling of equipment.

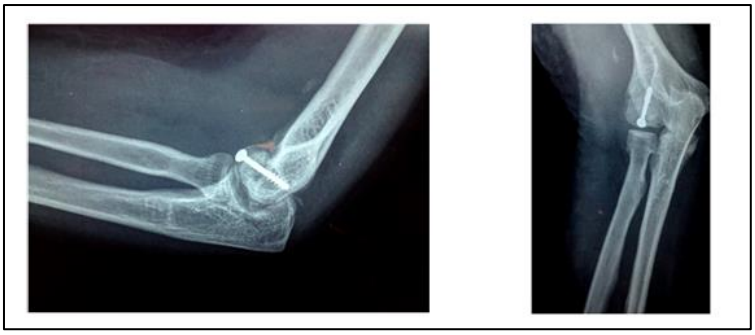

Figure 3 Postoperative X-ray frontal and profile incidences after 6 weeks

3. Discussion

Type I, called Hahn-Steinthal fracture, detaches a large bone fragment comprising the entire condyle and the external part of the trochlea. The key to diagnosis is based on strict profile radiography showing a characteristic half-moon appearance (1).

This is a rare fracture in adolescents. Among 850 elbow fractures recorded in six years at the Rabat pediatric hospital, only one fracture of the capitellum was found (4). The vast majority of published cases, as in our observation, concern adolescents (3).

Most authors suggest an indirect mechanism of injury due to a fall on the hand with the elbow extended. The rare Hahn fractures favoring Steinthal reported describe a female predominance dominated by patients aged over 12 years (5) . The factors are ulna-valgus and ulna-recurvatum (2). The case we report was a 14-year-old female child.

The causes described in the literature and also for our patients are falls on a flexed elbow. This results from the transmission of an axial force through the radius which shears the capitulum in the coronal plane (1,4). The typical presenting sign is pain with sometimes lateral swelling of the elbow and, as in our case, the frontal x-ray may appear normal.

The diagnosis is thus made by the profile images which show a fragment in the shape of a “crescent Moon” detached from the humeral condyle. A computed tomography with possible reconstruction can be performed to study the size of the fragment and operative planning (6)i. This was not essential in our case.

The treatment of displaced fractures of the capitulum gives rise to debate, there is no universal agreement on the treatment of this fracture. Hahn was the first to report the unsatisfactory result of orthopedic treatment of a coronal shear capitulum fracture (7,8). Closed reduction of type I has been advocated (3). It can be treated surgically by open reduction and internal fixation using minifragment standard screw set, Kirschner wires (K-wires), small/minifragment Herbert screws, absorbable pins, compression screws, staples and bone pegs as in the present case (4,9)

The follow up include X-ray control with continuous elbow mobilisation assessment (8,10). Our patient was followed up at 4 weeks, 6 weeks, 3 months, 6 months and 12 months. She attained full range of movement at 3 months with no further complications later. Joint range of motion was restored at 3 months.

4. Conclusion

The Hahn-Steinthal fracture is a specific injury to the adolescent elbow. Any diagnostic delay can compromise the functional prognosis of the limb in children.

Open reduction with internal fixation is the treatment of choice for Hahn Steinthal fracture. Stabilization by Herbert screw, which is a modern method, gives satisfactory results because it allows strong inter-fragmentary compression, early mobilization, and thus functional recovery of the elbow. Removal of the osteosynthesis material is rarely necessary.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest regarding this publication.

Statement of ethical approval

This research involved human subjects but did not involve any invasive procedures or interventions that might require formal ethics approval.

Statement of informed consent

Informed consent was obtained from all participants prior to their inclusion in the study.

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