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Intercondylar Fracture of the Elbow in a Pediatric Patient

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ABSTRACT

Objective: To present a case assisted at the Pereira Rossell Hospital Center of a very rare injury, its evolution, as well as an update on the diagnostic and therapeutic measures for this type of injury.

Clinical case: A 12-year-old adolescent with no significant personal history who suffered a fall from a horse with direct trauma to the right elbow and no other trauma. Physical examination at the emergency room revealed a painful and swollen right elbow, no skin lesions, and no distal neurovascular alterations were found. Diagnosis was confirmed after requesting a CT scan of the elbow, which showed a supracondylar fracture. The fracture line divided the capitellum and was directed medially. A closed reduction maneuver and medial approach without arthrotomy were performed to identify the ulnar nerve. Three medial and one lateral Kirschner needles were placed. A brachypalmar splint was made. The Kirschner needles were removed at 6 weeks. Follow-up at 3 months after the injury.

KEYWORDS: elbow fracture, pediatric patient

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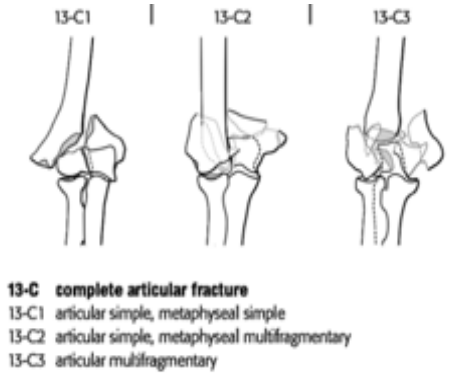
INTRODUCTION

Intercondylar fractures of the distal humerus are injuries with low frequency in the group of adolescents and children. Its incidence is not clear in the literature but there are authors who indicate that it would be <2% of all elbow fractures. [(1)] They are more frequent in adolescents > 10 years old. The mechanism is a direct blow to a flexed elbow, generating a direct impact of the semilunar fossa or the coronoid process on the trochlea, thus dividing the condyles, generally in a Y or T pattern. The diagnosis of this type of fracture is difficult, they are generally confused with supracondylar extension fractures; the difference between these two types of fracture is achieved by identifying the intercondylar line, which can be achieved by performing traction x-rays or requesting a computed axial tomography of the elbow. Its diagnosis is essential because both fractures follow a totally different therapeutic algorithm, failure to diagnose these fractures can have serious consequences in the short and long term.

The complex development and appearance of the ossification nuclei in the elbow must always be kept in mind. It must be remembered that there are 6 and we must manage the time in which they appear and their closure, these are different in each of the ossification centers. Long before the complete fusion of the elbow, the epiphysis of the distal humerus is composed of 2 articular surfaces that must be restored at the time of treatment, the trochlea in the ulno-trochlear joint and the capitellum in the radio-capitellar joint. The anatomical restoration of these is our main objective, the failure of this will lead to bad unions, cosmetic alterations and alterations in the range of movements. [(2)]

The classifications found in the literature are those of Toniolo and Wilkinson, which classify them into three types: minimally displaced type I, displaced type II but without comminution, and comminuted type III. The classification of the Arbeitsgemeinschaft für Osteosynthesefragen/Orthopaedic Trauma Association (AO/OTA) is the most widely used, classifying them as C1, those intercondylar fractures without comminution, C2, fractures that divide the condyles and present metaphyseal comminution, and finally C3 are those intercondylar fractures with epiphyseal comminution. [(3)]



Treatment will depend on the type of fracture, the degree of displacement and comminution.

There is no clear recommendation in the literature about the management of this type of injury in pediatric and adolescent age. Kasser et al [4] and Remia et al [5] both show the benefit of the posterior paratricipital approach without affecting the extensor mechanism and obtaining good results. In adults with this type of injury that present joint involvement, olecranon osteotomy is frequently performed to visualize the joint surface. However, pediatric intercondylar fractures tend to have less comminution than adults, given the low incidence it is difficult to generate consensus on which management is optimal. Within the therapeutic arsenal found in the literature we highlight closed reduction and Kirschner and/or intramedullary titanium elastic nailing (TENS) as proposed by Kanellopoulos et al, open reduction and internal fixation, within open reduction we find different approaches such as transtricipital, olecranon osteotomy and Bryan-Morrey approach. Internal fixation can be performed with Kirschner (Kw) wires , screws or with reconstruction plates similar to those in adults as suggested in their article by Bell et al [6,7].

OBJECTIVE

To present a case of a very rare injury seen in our department and its evolution, as well as an overview of the diagnostic and therapeutic measures for this type of injury.

CLINICAL CASE

Teenager 12 years old with no personal history to highlight that he suffered a fall from a horse with direct trauma to the right elbow without other traumas. The physical examination at the emergency room highlights a painful and swollen right elbow, no skin lesions, perfusion and sensitivity of the hand were normal. Anteroposterior and profile radiographs of the elbow were performed, which showed an intercondylar fracture of the right distal humerus. (Figure 2)

Figure 2 Initials X-Rays

It was decided to request a CT scan of the elbow to complete the assessment, analyze the displacements and plan the surgery. The CT scan revealed a line in the capitellum that then moved medially, leaving a large trochlear fragment. (Figure 3)

Figure 3 CT scan

The patient is taken to the operating room under general anesthesia and blockade by an anesthesiologist. A closed reduction maneuver is performed. The reduction is monitored with an image intensifier and an anatomical reduction is observed in the front and profile. Therefore, a medial approach without arthrotomy is performed to identify the ulnar nerve (3) . A first 2.0 medial Kirschner needle is placed through a counter-opening parallel to the joint to align the articular surface and work without risk of displacing the epiphysis. Then, 2 medial kw are placed laterally parallel to each other, and finally, a lateral kw 1.8 that passes through the capitellum.

Reduction and stability were monitored with radioscopy, obtaining good reduction and stability. (Figure 4)

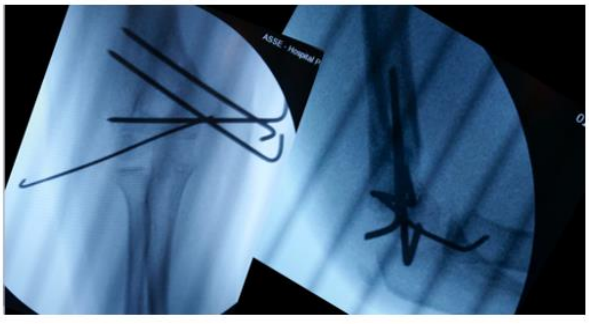


Figure 4 Intraoperative reduction

A protective brachypalmar splint was made.
Control radiographs were requested. (Figure 5)

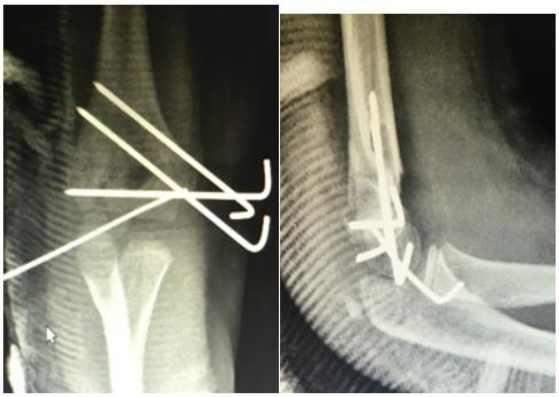


Figure 5 Postoperative X-rays

There were no complications in the immediate postoperative period, distal sensitivity was unchanged, and the patient was discharged home 24 hours later. The patient was monitored at 1 week, 3 weeks, 6 weeks, and 3 months after the injury.
At 6 weeks, the kw needles and splint were removed to begin rehabilitation where the patient was sent to physical therapy to be taught exercises that he then performed at home.
At 3 months the patient presents consolidation of the fracture in anatomical position, The Mayo Clinic Elbow Performance Score was administered. The Mayo Elbow Performance Score (MEPS) was originally published in 1993 in the book "The Elbow and its Disorders, 2nd ed." The MEPS is a modification of a scoring system originally published by Borberg and Morrey in 1987 in the journal Clinical ORTHOPEDIC Related Research.
The MEPS measures elbow function in four aspects: pain (45 points), stability (10 points), range of motion (20 points) and basic daily activities (25 points). Scores are classified as 90-100 = excellent, 75-89 = good, 60-74 = fair, 0-59 = poor. Our patient had a score of 95 points, VAS 0/10, full pronation-supination, flexion-extension 20-110º , and leads a normal life and sports without limitation in his usual tasks. (Figure 6)

Figure:6 Clinical images and final X-

DISCUSSION

Intercondylar fractures of the elbow represent unusual patterns in the pediatric age group. Often, these types of fractures are difficult to diagnose, given the cartilaginous component still present in the elbows of these patients and can be interpreted as supracondylar fractures of the elbow. Diagnosis is essential because management, if misinterpreted, generally has poor results. Decisions are generally influenced by adult literature and its management. If we briefly recall the anatomy of the distal humerus, it is the continuation of the humeral diaphysis. When the anteromedial and anterolateral faces of the diaphysis separate, they form the two columns that are the mechanical pillars of the metaphysis. In the center of these columns we find the coronoid fossa in front and the olecranon fossa behind. [8]
The anatomic reduction of the articular surface and restoration of both columns are the main objectives. Regarding the fixation methods there are controversies, there are those who are in favor of achieving the objectives in a closed manner and placement of kirschner this would be favorable, other authors have shown satisfactory results with the use of a kw to solidify the articular surface and then the placement of TENS to stabilize the metaphyseal-diaphyseal sector, these fixation methods show a lower rate of iatrogenic involvement of the ulnar nerve, heterotopic ossification, infection and stiffness. (9) (10) When it is not possible to achieve a closed reduction or by preference of the surgeon it is decided to perform an open reduction and internal fixation, we find a wide range of approaches, among the approaches we find posterior ones such as transtricipital or paratricipital

which would be useful for fractures with a simple displaced pattern, fractures with more complex patterns require more extensive and aggressive approaches such as the posterior Bryan-Morrey approach or the olecranon osteotomy. As for the implants for fixation, we find headless compression screws if it is necessary to fix in the osteochondral area, generally an intercondylar screw is used, to solidify the metaphyseal-diaphyseal sector we can use 3.5mm and 2.7mm reconstruction plates or pre-molded plates for adults, the double plate configuration is recommended in adolescents and adults, they can be 90º-90º or 180º; in children's elbows, screws or kw would be recommended given the large periosteum they have and the physes still present.

From the literature it is clear that if an anatomical reduction is achieved with closed maneuvers or if the articular surface has no displacement, a kw must be placed parallel to the joint to solidify it and transform a T fracture into a Garland 3 supracondylar fracture and manage it as such, either with kw or TENS · (11) If closed maneuvers do not achieve anatomical reduction, we find a wide range of approaches, the evidence is not clear to indicate which would be the safest and most effective, the decision when choosing one of them is multifactorial, combining the comminution of the fracture, the preference and comfort of the surgeon · (3,12–14) To ensure that the reduction obtained is anatomical, an arthrogram can be performed.

The particularity of our case is that an anatomical reduction was obtained with closed maneuvers in a displaced fracture and a closed treatment with kw was possible, achieving an anatomical reduction. The results obtained are excellent. Our patient does not present discomfort with the result obtained. We know that the follow-up period is still short to rule out avascular necrosis

CONFIDENTIALITY OF DATA

The authors declare that they have followed institutional protocols regarding the publication of patient data and that all participants in the study have given their written informed consent to participate in this study.

REFERENCES

I. Donald J, Fahey JJ. FRACTURES OF THE ELBOW IN CHILDREN Supracondylar. 2015;

II. Popkin CA, Rosenwasser KA, Ellis HB. Pediatric and Adolescent T-type Distal Humerus Fractures. JAAOS Glob Res Rev. 2017;1(8): e040.

III. Anari JB, Neuwirth AL, Carducci NM, Donegan DJ, Baldwin KD. Pediatric T-Condylar Humerus Fractures: A Systematic Review. 2015;00(00):1–5.

IV. NKasser JR, Richards K MM. The triceps-dividing approach to open reduction of complex distal humeral fractures in adolescents: a cybex evaluation of triceps function and motion. J Pediatr Orthop. 1990;10:93–6.

V. Remia L, Richards K WP. The Bryan Morrey triceps-sparring approach to open reduction of T-condylar humeral fractures in adolescents: cybex evaluation of triceps function and elbow motion. J Pediatr Orthop. 2004;24:615–619.

VI. Bell P, Scannell BP, Loeffler BJ, Brighton BK, Gaston RG, Casey V, et al. Adolescent Distal Humerus Fractures: ORIF Versus CRPP. J Pediatr Orthop. 2017;37(8):511–20.

VII. Kanellopoulos AD, Yiannakopoulos CK. Closed Reduction and Percutaneous Stabilization of Pediatric T-Condylar Fractures of the Humerus. J Pediatr Orthop. 2004;(July):13–6.

VIII. Chantelot C, Wavreille G. Fracture of the distal end of the humerus in the adult. EMC - Apar Locomot [Internet]. 2006;39(4):1–12. Available from: http://dx.doi.org/10.1016/S1286-935X(06)47915-6

IX. Bell P, Scannell BP, Loeffler BJ, Brighton BK, Gaston RG, Casey V, et al. Adolescent Distal Humerus Fractures: ORIF Versus CRPP. 2015;00(00):1–10.

X. Pant A, Huda N, Ahmed W. Closed Reductions and Percutaneus 'K' Wire Fixation for Adolescent Intercondylar Fractures of the Distal Humerus. 2013;7(8):1666–8.

XI. Kanellopoulos A, Yiannakopoulos C. Closed Reduction and Percutaneous Stabilization of Pediatric T-Condylar Fractures of the Humerus. 2018;(July).

XII. Dreyfuss D, Eidelman M. Treatment of complex intercondylar humeral fractures in adolescents by open reduction and internal fixation through the transolecranon approach. 2014;364–8.

XIII. Ljungquist KL, Beran MC, Awan H. Effects of surgical approach on functional outcomes of open reduction and internal fixation of intra-articular distal humeral fractures: a systematic review. J Shoulder Elb Surg [Internet]. 2012;21(1):126–35. Available from: http://dx.doi.org/10.1016/j.jse.2011.06.020

XIV. Zlotolow DA, Iii LWC, Barron OA, Glickel SZ. of the Humerus.