

Epidemiological, Lesional, Therapeutic and Evolutionary Aspects of Olecranon Fractures

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Abstract

Introduction: Olecranon fractures are the most frequent articular fractures of the elbow.

Objective: The aim of our work is to study the epidemiological, lesional, therapeutic and evolutionary aspects of olecranon fractures in the Orthopaedic-Traumatology Department of Aristide Le Dantec Hospital in Dakar.

Patients and methods: This was a retrospective study over a period of 4 years, from January 1, 2014 to December 31, 2017, including 32 patients operated for a recent olecranon fracture using the pinning-hooking technique.

Results: The series included 21 patients, 18 males and 3 females with an average age of 34 years (extremes 21 and 62 years). Road and traffic accidents were the leading cause with 09 cases ie 43 percent. According to the Mayo Clinic classification, we observed 04 type I fractures (03 type IA and 01 type IB), 17 type II fractures (13 type IIA and 4 type IIB). The associated lesions were: skin openings with 03 cases (type I of Cauchoix and Duparc); section of the ulnar nerve; osteochondral and tendon fractures and lesions involving the elbow, forearm, radius and humerus. The average delay to consultation surgery was 13 days. Evaluation according to the modified Mayo Clinic criteria showed 80% good and excellent results and 20% fair results. The average follow-up was 3 years. Complications included 1 case of infection, 3 cases of secondary displacement, 2 cases of stiffness and 1 case of mal union.

Conclusion: The treatment of olecranon fractures remains surgical and the technique of tension band wiring is the gold standard.

Keywords: Fracture, Olecranon, Trussing

Introduction

Olecranon fractures are common joint fractures and account for 10% of elbow fractures in adults [1]. They most often occur after direct trauma to a flexed elbow or a fall on the hand [2]. The treatment of olecranon fractures is mainly surgical. Complications of this surgery are not exceptional, and the sequelae are dominated by elbow stiffness.

The objective of this study was to investigate the epidemiological, lesional, therapeutic and evolutionary aspects of olecranon fractures in the orthopaedic and traumatological surgery department of

the Aristide Le Dantec University Hospital in Dakar from January 2014 to December 2017.

Patients And Methods

Patients

This is a 4-year retrospective study (January 1, 2014 to December 31, 2017) on the epidemiological, lesional, therapeutic and evolutionary data of olecranon fractures.

The inclusion criteria were patients with an olecranon fracture, treated by osteosynthesis and with a complete file. Non-inclusion

criteria were patients with incomplete or untraceable records. Of a total of 32 patients, 21 were included in the study.

Methods

For each patient included in this series, an evaluation form was established. Epidemiological data were collected on age, sex, affected and dominant side, circumstances of occurrence and mechanism and time of consultation. The lesional aspects were studied by looking for olecranon fractures on standard AP and lateral Xray views of the elbow and then classified according to the Mayo Clinic [3] and by the existence of associated cutaneous, vasculonervous and osteoarticular lesions.

Therapeutically, a locoregional anesthesia of the axillary block type was performed in 19 patients. The posteromedial approach was used in all patients. Osteosynthesis by tension band wiring was performed in all patients. Associated injuries were treated according to their nature. Rehabilitation, first passive, then passive-active and finally active, was prescribed in all patients after sedation of the pain.

The treatment was evaluated according to the modified Mayo Clinic score for pain, mobility, stability and function [4].

Results

The average age of our patients was 34 years with extremes of 21 and 62 years. The male sex was represented in 18 cases. The right side was affected in 12 patients compared to 9 on the left side. no cases of bilateral injuries were found. The dominant limb was affected in 17 patients.

Road traffic accidents were involved in 09 cases and assaults or fights in 04 cases. The direct mechanism was found in 20 cases.

With a recent fracture, the median time to consultation was 7 days. In which eleven (11) patients consulted in the first 24 hours in 84 days.

The olecranon fractures were classified according to the Mayo Clinic classification (Table 1) with a predominance of type II A (13 cases) (Figure 1).



Figure 1: Type IIA fracture according to the Mayo Clinic classification

Table 1: Distribution of olecranon fractures according to the Mayo Clinic classification

Radiology : Mayo clinic Classification	Number	Percentage
Type IIA: displaced, stable, non- comminuted fracture	13	62%
Type IIB: displaced, comminuted fracture	4	19%
Type IA: non-displaced, non- comminuted fracture	3	14%
Type IB: non-displaced, comminuted fracture	1	5%
TOTAL	21	100%

Cutaneous lesions were found in 7 patients (04 dermabrasions and 03 open lesions, all classified as stage 1 according to the classification of Cauchoix and Duparc). No cases of vascular lesions were found. Only one case of ulnar nerve section was noted.

Associated osteoarticular lesions were found in 7 patients (33% of cases). They were of various types (Table 2).

Table 2: Distribution of olecranon fractures according to the Mayo Clinic classification

Other injuries	Number
Fracture of 02 forearm bones	1
Fracture of distal end of radius	1
Diaphyseal fracture of humerus	1
Fracture of the surgical neck of the humerus	1
Fracture of the coronoid process	1
Fracture of the radial styloid	1
Chondral lesion of the trochlea	1

the average time to treatment was 13 to 85 days and 38% of cases were operated on between D2 and D7. Locoregional anesthesia, such as axillary block, was used in 90% of cases. All our patients were operated on using Tension band wiring haubanage!! (Figure 2). Temporary immobilization was performed in 20 patients.



Figure 2: Tension band wiring of a type IIA fracture according to Mayo

With an average follow-up of 3 years (extremes 01 and 05 years), all twenty-one (21) patients were evaluated. One (01) case of superficial infection, 03 cases of secondary displacement (revision surgery), 02 cases of stiffness of the elbow joint and one (01) case of pseudarthrosis were noted in our series.

Evaluation according to the modified Mayo Clinic criteria showed 81% excellent, 14% good and 05% fair results.

Discussion

Olecranon fractures are seen with greater frequency in young active subjects. However, they are rare in children varying between 4 and 6% according to Lins [1, 2, 5]. our results correlate with those of other study series. The average age in the different series varies between 29 and 55 years [6, 7].

Olecranon fractures are characterized by a clear male predominance in most series studied as well as in our own (18M males or 86% against 3F or 14% with a sex ratio of 6) [8, 9]. This particularity would be due to the male exposure to violent trauma related

to professional activity and to traffic accidents. Nevertheless, this predominance is not constant as demonstrated by Kim et al. (57% women for 43% men) and Van der Linden et al. (31 women against 28 men in their series of 59 cases) [10, 11].

Most studies, in contrast to ours, show that the left side is most often affected. In our series, the dominant side affected is the right side with 12 cases (57%). This can be justified by the fact that patients tend to protect themselves with the dominant side [10, 12].

The etiologies are dominated by road accidents as confirmed by our series with 43% of cases, followed by work accidents (24%), assaults (19%) and domestic accidents in 14% of cases. This may be due to the lack of respect for traffic regulations by drivers, which is responsible for many traffic accidents.

In our series, the direct mechanism was found in 20 patients, i.e., 95% of cases, and in 5% of cases the mechanism was indirect. these results are close to those reported in other series geographical location [13, 14]. However, the indirect mechanism may be the most frequently encountered, as in the series by Rimasson with 78% of patients [15].

Standard plain AP and lateral Xray views of the elbow are generally [16, 17]. If there is any doubt, the assessment should be completed with oblique views to show the superimposition of the coronoid and radial head, or even a CT scan to better assess the injury [17].

The Mayo Clinic classification used in our study has the advantage over the Merle d'Aubigne classification of providing information on displacement, comminution and dislocation. Type IIA was the most frequently found with 62% of cases. This was followed by type IIB with 19%, IA with 14% and IB with 5% of cases. This means that in 76% of cases the fracture line was simple and in 24% of cases it was comminuted. In the literature, the Merle d'Aubigne classification is most often used, with types II and III being the most frequently encountered [18, 19].

Associated osteoarticular lesions around the homolateral elbow are common in olecranon fractures. They are dominated by frac-

tures of the radial head, coronoid and elbow dislocation [20]. They often complicate the treatment and postoperative course, thus hindering rehabilitation. We have identified one case of coronoid process fracture. In Niglis' series, 41% of olecranon fractures were associated with other fractures of the same elbow, 18% with radial head fractures alone and 23% with radial head and coronoid process fractures [20].

Three anatomical particularities must be remembered when treating olecranon fractures, namely: the insertion of the tricipital tendon on the olecranon vertex, hence the significant risk of secondary displacement, the articular nature by definition of this fracture and the primordial role of the posterior process of the olecranon in the stability of the elbow [17].

Tension band wiring is the technique used for all our patients. It is based on the transformation of distraction forces into compression forces during the flexion movement. It is a very stable technique, minimally invasive and allows early rehabilitation. It generally gives satisfactory results as has been noted in many studies [17].

The infection rate is very low according to the literature. This can be explained by the rarity of the skin opening which would increase the infectious risk. Rommens et al. report 2 cases, i.e., a percentage of 2.1% [21]. In our series, only one case of postoperative infection was reported and it progressed well under antibiotic therapy.

The risk of secondary displacement exists regardless of the fracture site immobilization technique used. Post-operative radiological controls are of great interest here. The rate of secondary displacement is similar to other series [15, 22]. Only one case of non union was reported in our study and the data are similar to those in the literature. Pseudarthrosis remains a rare complication due to its metaphyseal location [21, 23].

In the series by Hutten, 03 cases (4%) of malunion were reported, and in the series by Toumi only one case (2%) [14, 18]. No cases of mal union were found in our study. The rate of elbow stiffness is in the same range for most authors in other studies or series [21, 23].

In the series by Rommens et al., 20% of cases of moderate osteoarthritis were reported and 12% of severe osteoarthritis [21]. In our series, no cases of osteoarthritis were noted. According to the Mayo Clinic criteria modified, tension band wiring gives excellent results regardless of the type of fracture. In our study, we noted persistent pain in some patients and extension deficits which are a limitation of this technique.

The studies of Villanueva and Rommens, revealed the total absence of influence of age on the final results. Rimasson and Menkour concluded in their studies that age has little influence on prognosis. Indeed, poor outcomes increase with age, while excellent and good outcomes remain equal in the different age groups [15,

17, 21, 23].

However, fractures in the elderly pose the problem of poor fixation of osteosynthesis devices in porous bone [16]. Most authors agree that the final result depends on the anatomical and radiological type of fracture [24, 25]. Rimasson found that whether the fracture is simple or comminuted is critical: comminuted fracture has a worse prognosis than simple fracture. In his study, the excellent and good results for simple fractures were 72.5% [15].

In our study, we found that the fracture line, whether simple or complex, had no influence on the prognosis of the treatment of these fractures (20% of our average results were all simple line fractures). In contrast, all comminuted fractures had excellent results with brace pinning.

However, whether the fracture is isolated or associated influence the final outcome. Villanueva et al. found in their series that the association of the fracture with other lesions influences the final functional outcome [17]. They recorded 89.65% excellent and good results for isolated fractures versus 62.5% for associated fractures.

Conclusion

Olecranon fractures are common joint fractures of elbow in adults. The treatment of these fractures remains surgical and the technique of tension band wiring is the gold standard.

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