The Interest of Surgical Treatment in The Management of Olecranon Fractures
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Abstract
Olecranon fractures are the most common fractures of the elbow. Their treatment is surgical each time there is a displacement, because only the osteosynthesis allows an anatomical reduction, a stable assembly and an early rehabilitation which is very important for the functional result. We reviewed a series of 98 cases of olecranon fractures, treated surgically in the traumatology and orthopedics II department of University Hospital Center HASSAN II Fez, between January 2009 and December 2019. The type of osteosynthesis was a Tension-band wire fixation in 93 cases, a screwed plate in 4 cases, and cortical screw in 1 case. The final results were satisfactory in 80% of the cases, the complications were dominated according to the functional classification of Mayo Clinic by the stiffness of the elbow (6.25%).

Keywords: Olecranon, surgery, fracture.

INTRODUCTION
Olecranon fractures are the most common joint fractures of the elbow. The sequelae are dominated by stiffening of the elbow. The failure of initial bone reconstruction is all the more derogatory as it concerns the articular surfaces and imposes an often complex reconstruction and rehabilitation program, the results of which are limited by the occurrence of post-traumatic osteoarthritis.

MATERIAL AND METHODS
This is a retrospective study that focuses on the analysis of 98 cases of olecranon fracture, treated surgically in the traumatology and orthopedics II department of the Hassan II University Hospital center between January 2009 and December 2019.

RESULTS
We report a retrospective study of 98 cases of olecranon fracture surgically treated. The follow-up varies between 12 months and 3 years, with an average follow-up of 14 months. These are 89 men and 9 women. The average age is 29 years old. Right-sided involvement is predominant with 67%, compared to 33% for left-sided lesions. (Figure 1).

Fig-1: Distribution of patients by age
AVP are incriminated in the majority of cases (46%), followed by aggression (28%) and falls with (26%). The skin opening was classified according to the classification of CAUCHOIX and DUPARC. It was noted in 14 patients with stage I in 10 cases and stage II in 4 cases (figure 2). We did not find any cases in our series of vascular attacks. We found 5 cases of paresthesia of the territory of the ulnar nerve.

Associated lesions they were noted in 6 patients
* Dislocation of the homolateral elbow + fracture of the radial head: 2 cases
* Fracture of the contralateral humeral palette: 1 case
* Cranio-facial trauma: 2 cases
* Fracture of the left tibia: 1 case

![Fig-2: Distribution of cases according to skin opening](image)

Among all the classifications of olecranon fractures, we have opted for that of MERLE AUBIGNE, it includes 3 types according to the location of the fracture line (figure 3):

Type I: Fracture of the apex or olecranon beak (32 cases)
Type II: Middle part fracture (43 cases)
Type III: Base fracture (23 cases)

The fracture was simple in 76 cases and complex or comminuted in 22 cases.

![Fig-3: Distribution of cases by the classification of MERLE AUBIGNE](image)

All patients received surgical treatment. The type of osteosynthesis was a guy line in 93 cases, a screw plate in 4 cases, a cortical screw screwing in 1 case (figure 4).

Associated gestures: a suture with transposition of the ulnar nerve was performed in 5 cases. Rehabilitation was started from the 1st week post-operatively. And it was delayed until the 3rd week for 3 cases with a comminuted fracture.

![Fig-4: Distribution of cases by the type of osteosynthesis](image)
There were 2 cases of late sepsis that required removal of the osteosynthesis material. We found a single case of non-union requiring a resumption of surgery by spongy bone graft with a good radio-clinical course.

No case of vicious cal was observed. In our series, we noted 03 cases of stiffness (3%) due to the absence of nearby specialized Rehabilitation centers as well as the low socio-cultural level and the lack of resources of the Patients who did not allow early and appropriate treatment.

The results were assessed according to the functional classification of the Mayo Clinic; mobility of the elbow in extension flexion and pronosupination, residual pain and extension force of the elbow (Tables 1).

Table-1: Results according to the type of osteosynthesis

| Results                      | Very good (%) | Middle (%) | Bad (%) |
|------------------------------|---------------|------------|---------|
| Tension bande Wire fixation  | 90,33 %       | 9,67 %     | -       |
| (93 cas)                     |               |            |         |
| Screwed plate (4cas)         | 75 %          | 25 %       | -       |
| Screwing (1 cas)             | 100 %         | -          | -       |

DISCUSSION

Olecranon fractures are the most common fractures of the elbow. They occur mainly in young and active men, while they are rare in children. The most frequent etiologies are falls and AVP, by a direct or indirect mechanism.

Skin opening remains frequent in fractures of the olecranon, testifying to a direct and violent shock which affects the prognosis of these fractures by exposing them to the risk of infection. These lesions are extremely rare and are seen only exceptionally in violent and complex trauma [2,4].

Lesions of the post-traumatic peripheral nerves are variously appreciated, they vary between 0 and 4% (1.5) and mainly concern the ulnar nerve. Staged osteoarticular lesions of the same limb often complicate treatment and postoperative operations, thus hampering rehabilitation. They represent 33% for GICQUEL [6], 32% for LINS [3].

The diversity of therapeutic methods proposed in the treatment of olecranon fractures illustrates the difficulty of trying to standardize them.

Table-2: Results of the tension bande wire fixation in differente studies of littérateure

| studies          | Number of cases | Tension bande wire fixation | % of Very good and good results |
|------------------|-----------------|-----------------------------|---------------------------------|
| Doursounian       | 52              | 36 (73%)                    | 87%                             |
| [1]              |                 |                             |                                 |
| CHAUDIS           | 62              | 62 (100%)                   | 88.0%                           |
| [8]              |                 |                             |                                 |
| Our study         | 98              | 93 (94%)                    | 89%                             |

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However, each technique retains its place for its indications. Simple or eight strapping is not recommended. Screwing is reserved for low fractures with oblique lines. The screwed plate is indicated in the event of comminuted fractures. Tension bande wire fixation simple technique and applicable to all varieties of fractures. Surgical treatment whenever there is a displacement, allows an anatomical reduction, a stable assembly and an early rehabilitation which is of capital importance for the functional result (table 2).

Orthopedic treatment also keeps an indication in the elderly osteoporotic subject for whom a limited objective is aimed [7]. Complications of fractures of the screen are dominated by stiffness; hence the importance of early mobilization (table 3).

| Studies            | Elbow stiffness | Non-union | Infection | Secondary Displacement |
|--------------------|-----------------|-----------|-----------|------------------------|
| HUTEN (70 cases)   | 1%              | 5%        | 3%        | 5.5%                   |
| MENKOUR (60 cases) | 4.4%            | 1.5%      | 2.5%      | 4%                     |
| CHALIDIS (62 cases)| 3.5%            | 2%        | -         | 2.5%                   |
| Notre série (88cas)| 3.08%           | 1%        | -         | 0                      |

CONCLUSION

The review of our cases and those of the literature encourages us to continue in the path of osteosynthesis, nevertheless adapting the indications to the type of fracture and using the most codified technique, while keeping in mind the notion formulated by MERLE AUBIGNE in 1968: “osteosynthesis shows superiority over non-bloody treatment, but only when a perfect reduction has been followed by a fairly solid structure allowing immediate active mobilization”.

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