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Outcomes of Surgical Treatment of Midshaft Clavicle Fracture (About 66 cases)

ABSTRACT

Clavicle fractures are very common in trauma emergencies. The treatment of midshaft clavicle fractures is still a subject of debate in the literature. Our work is a retrospective single-center study including all the patients operated on for a recent midshaft clavicle fracture between 2013 and 2019 in our department of trauma surgery B4. The results of our work show that surgical treatment retains an important place in the treatment of displaced midshaft clavicle fractures with a rate of complications which remains lower than that of nonoperative treatment.

KEYWORDS: Clavicle fracture; Midshaft; Outcomes; Surgery

INTRODUCTION

Midshaft clavicle fractures are the most common fractures of this bone (69 to 82%) [1]. There is still a debate in the treatment of these fractures in the literature, between those who recommend an orthopedic treatment allowing to obtain satisfactory functional results and others who prefer a surgical treatment allowing an earlier mobilization with recovery of a better function.

The purpose of our work is to evaluate the results and the main outcomes of the surgical treatment of midshaft clavicle fractures in order to better clarify the therapeutic indication for a recent fracture and to answer to the question: Should all recent midshaft clavicle fractures be operated on? Or only operate on orthopedic treatment failures?

MATERIALS AND METHODS

This is a retrospective single-center study conducted at the trauma-orthopedic department "B4" of CHU Hassan II- FEZ, between 2013 and 2019. The study includes all the patients operated on in our department for a recent midshaft clavicle fracture.

We have excluded:

- Lateral and medial clavicle fractures.
- Neglected fractures.
- Patients lost to follow-up for whom follow-up could not be established.
- The unusable files.

The data were analyzed using Epi Info software.

RESULTS

We identified 92 patients operated on in our department for clavicle fracture including 66 midshaft clavicle fractures operated on. Of these 66 patients, 53 were male and 13 were female with a sex ratio of 4.07. The average age was 34 years old with extremes ranging from 22 to 56. Involvement of the left side was predominant (62% of cases). The aetiologies were dominated by road traffic injuries and sports accidents with predominance of direct shocks (80% of cases). Clinically, 10 patients presented an ecchymosis next to the clavicle, 4 open fractures was detected. Radiologically, all fractures were classified as type 1 according to the modified Neer classification, 48% of the fractures were simple (32 cases) and 52% complex or comminuted (34 cases). Overlapping displacement was the most common (70% of cases). Two patients presented with associated pneumothorax. All the patients were operated on within an average of 22.6h with extremes ranging from 6h to 72h. Under general anesthesia in a semi-seated position, using an antero-inferior approach following the relief of the clavicle, reduction with osteosynthesis by anatomical S-plate was performed. All the patients were hospitalized for 24 hours post-operatively for analgesia and antibiotic prophylaxis. Immobilization of the upper limb with a sling for 1 month was prescribed on discharge in all patients. The first check-up has been set at 3, 6 weeks then 3, 6 and 12 months. The radiological assessment is based on standard radiographs such as clavicular views which allowed us to define the time to bone healing and the main radiological complications. Functional assessment was done using the Constant score [2].

The average operating time was 40min; the average follow-up of our series is 26 months (6 and 78 months). The overall mean time to union was 6.2 weeks (6-8). We have identified as complications two cases of secondary displacements with a removal of the plaque (Figure 1), two cases of early sepsis with exposed plate, one case of late sepsis and one case of aseptic nonunion (Figure 2,3). Furthermore, we did not identify any postoperative pneumothorax or vascular complications. The mean Constant Score was 93.2 (89 and 100).

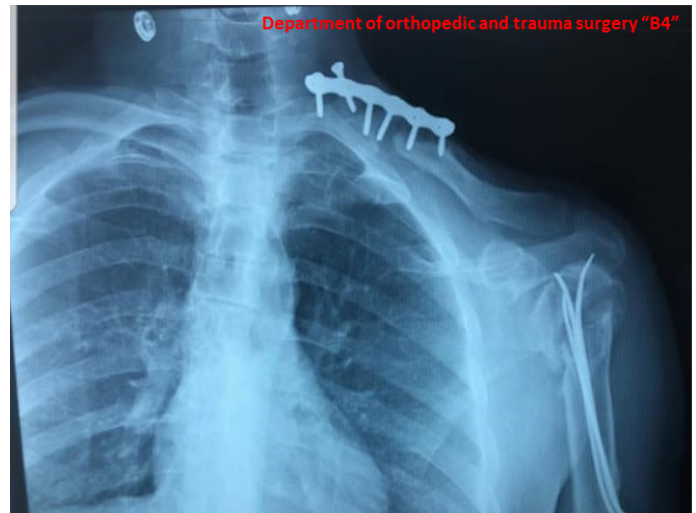


Figure 1 : secondary displacement with a removal of the S-plate.
Figure 1: Secondary displacement with a removal of the S-plate.

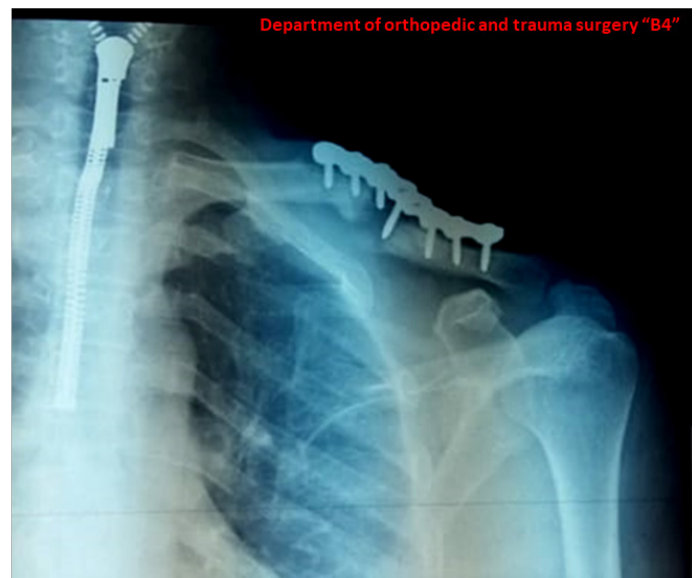


Figure 2 : Pseudarthrosis of mid third of clavicle

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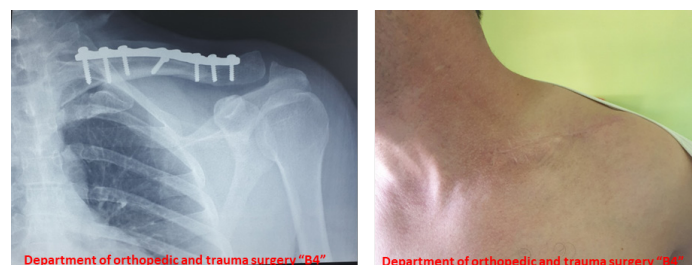


Figure 3: Consolidation of Midshaft clavicle fracture treated by S-plate with direct screw

Figure 3: Consolidation of midshaft clavicle fracture treated by S-plate with direct screw.

DISCUSSION

Fractures of the middle third of the clavicle are the most common fractures of the clavicle (account for about 82% of clavicle fractures), quite common in trauma emergencies. The treatment of these fractures remains a subject of controversy in the literature. Thus, it is clearly accepted that midshaft clavicle fracture, not or only slightly displaced, treated orthopedically, give satisfactory functional results [4]. However, displaced midshaft clavicle fractures still pose a problem of therapeutic decision: apart from the absolute indications for surgical treatment (open fractures, significant displacement with skin pain, significant shortening, lateral shoulder impaction syndrome, associated pneumothorax, associated sternoclavicular dislocation, associated vasculo-nervous complications), Should all recent fractures displaced from the middle third of the clavicle be operated on?

The complication rate in our series was 9.09% (all complications combined) with a non-union rate of 1.51%, which matches the data in the literature (3% against 15% for fractures treated nonoperatively [6]. The results of our series; in which we adopted osteosynthesis by anatomical "S" plate (with an average Constant score of 93.2 and referring to data from the literature), give more preference for surgical treatment allowing early mobilization of the shoulder with a relatively low rate of complications.

The Canadian Trauma Society has also reported more preference for surgical treatment of displaced midshaft clavicle fracture compared to nonoperative treatment with a sling, in particular shorter time of bone healing, a low rate of non-union and vicious callus (13, 8% complications) [7]. Wang [8] also reported in his meta-analysis (including 13 recent randomized prospective studies comparing the surgical and nonoperative treatment of these fractures) a significantly lower rate of non-union (1.7% vs 14.3%) and vicious callus (1.8% vs 20.9%) in the surgical group with Constant and DASH scores which remain without significant difference (Table 1).

Liu w, et al. [9] reported in their retrospective study including 804 cases, 12% of non-union after non-operative treatment and they concluded as predictors of non-union: age, female sex, comminuted fracture, displacement without fragmentary contact.

Intramedullary osteosynthesis (elastic intramedullary nails, pins, etc.) are increasingly being developed and minimally invasive techniques (MIPO). Complications related to the type of osteosynthesis material remain comparable to those of plates with almost the same functional results [8,10].

CONCLUSION

The results of our study, by comparing them with those in the literature, show that surgical treatment retains an important place in the treatment of midshaft clavicle fracture with a complication rate which remains lower than nonoperative treatment, a delay faster functional recovery and satisfactory functional results.

CONFLICT OF INTEREST

None declared. All the authors cited above have actively contributed to this work:

- DRISS OUDRHIRI (principal author): planning the study, using patient records, analyzing the results and writing the manuscript.

- M. Pefakouo Touondounko, H. FILALI BABA, S. SENHAJI: use of medical records and analysis of results.

- HATIM ABID, MOHAMMED EL IDRISSE , ABDELHALIM EL IBRAHIMI ET ABDELMAJID EL MRINI: critical analysis of the work and final approval.

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