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Research Article

Malleolar Fractures in Adults: Therapeutic and Evolutionary Aspects at the Dalal Jamm National Hospital in Guédiawaye

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Abstract

Introduction: Malleolar fractures are joint injuries that seriously compromise ankle function. They are treated surgically or orthopedically, depending on the indications.

The aim of our study was to evaluate the anatomy and function of these fractures.

Material and methods: We conducted a retrospective descriptive study over a 15-month period of 50 patients in the Orthopedics-Traumatology Department of the Dalal Jamm National Hospital in Guédiawaye (Senegal).

Results: Treatment was orthopedic in 29 patients (58%) and surgical in 21 patients (42%). We assessed our patients with a minimum follow-up of 6 months. Our results were satisfactory overall, with 84% good results according to the Kitaoka score. Orthopedic treatment and surgical treatment gave 79.31% and 90.47% good results respectively. Seven (07) patients had complications. One (01) case of postoperative infection, two (02) cases of secondary displacement, two (02) cases of malunion and two (02) cases of pseudarthrosis.

Conclusion: At the end of this study, we can conclude that surgical and orthopedic treatment gives good functional and anatomical results, provided that the reduction criteria are rigorously respected.

Keywords: Malleolar Fracture; Orthopedic Treatment; Osteosynthesis; Therapeutic Evaluation

Introduction

Malleolar fractures are joint injuries that seriously compromise ankle function. These fractures may or may not be associated with ligament damage and may progress to tibiotalar dislocation. These are serious joint fractures, significantly compromising ankle mobility. They are treated surgically or orthopedically, depending on the indications. However, orthopedic treatment is attracting less and less interest, both from patients, because of the discomfort caused by the brace and from surgeons, who point to the need for prolonged immobilization and the risk of secondary displacements that may require complex repeat surgery [1]. In addition, it is often difficult to reduce osteo-ligament lesions and restore normal anatomical relationships using external maneuvers. These technical difficulties explain the frequency of cases of osteoarthritis observed, resulting from imperfect reduction [2]. Anatomical reduction of malleolar fractures, whether orthopedic or surgical, generally leads to satisfactory results without long-term osteoarthritis.

Material And Methods

Material and Study Population

This was a retrospective, descriptive and analytical study conducted over a 15-month period from 1 January 2023 to 1 March 2024 on patients admitted to and treated for malleolar fractures in the Orthopedics-Traumatology Department of the Dalal Jamm National Hospital in Guédiawaye (Senegal) with a minimum follow-up period of 6 months. All patients over 16 years of age admitted and treated for a malleolar fracture, whether or not associated with other lesions and treated surgically or orthopedically, with a follow-up of at least 6 months, were included in the study.

Patients lost to follow-up, uni-malleolar fractures and incomplete records were not included in the study. A total of 50 patients were selected according to our inclusion criteria. The mean age of the patients in our study was 39.94 years, with a sex ratio of 0.9.

Most patients (80%) sought medical attention within the first 6 hours after the accident. In addition, 44% had a medical, surgical or toxic history. Of these, 12% were chronic smokers, 12% had high blood pressure (hypertension) and 6% were diabetics. Domestic accidents accounted for 44% of the circumstances of occurrence, followed by road traffic accidents (24%). Indirect mechanism was the most common, accounting for 84% of cases. The right side was affected in 29 patients (58%), while the left side was affected in 19 patients (38%). A bilateral bimalleolar fracture was reported in two patients (4% of the sample).

Of the 50 patients, 26 (52%) had skin lesions. No vasculo-nerve involvement was observed in our series. Associated lesions were noted in 11 patients (22%), with a predominance of tibiotalar dislocations, which accounted for 45.54% of all such lesions. Bimalleolar fractures were the most common, accounting for 68% of cases (34 patients). Bimalleolar-equivalent fractures accounted for 30% and only one case of a tri-malleolar fracture was recorded. The oblique line was most common at the lateral malleolus (27 cases, 54%), followed by the spiral line (15 cases, 30%). The medial malleolus was the most common site for the transverse line (27 cases, 77.15%). According to Weber's classification, type B (inter-ligament) was the most frequent (70%), followed by type C (supra-ligament) with 28% and type A (sub-ligament) with 2%.

- *Methodology*

The parameters selected for our study were:

- Therapeutic aspects
  - Time to treatment
  - Type of treatment
  - Immediate post-operative complications

- Evolutionary aspects
  - Anatomically, the quality of the reduction was judged on the basis of a combination of seven morphological criteria:
    - Restoration of the length of the ML
    - Good reduction of the ML
    - Good reduction of the MM
    - Respect for the radiological U
    - Respect for syndesmosis
    - Skinner's test (radiography of the ankle face and profile)
    - Respect for the regularity of the joint space

It was judged Excellent (7 criteria), Good (5 or 6 criteria), Average (4 or 3 criteria) and Poor (1 or 2 criteria).

- Complications were assessed by:
  - Delayed healing, defined as the absence of callus on at least one malleolus at 16 weeks post-fracture
  - Vicious callus, defined as the healing of at least one malleolus without compliance with the initial reduction criteria
  - Pseudarthrosis, defined as the definitive absence of healing on at least one malleolus from the sixth month
  - Infection
  - Secondary displacement
- Patients' functional results were assessed using the KITAOKA clinical rating system [3], which is based on the following weighted parameters: pain, function, gait perimeter, lameness, limitation of joint amplitude and axial alignment. The result is considered good between 100 and 75 points, average between 74 and 50 points and poor below 49 points

The data was analyzed statistically using Sphinx Plus2 version 5 software. To interpret the statistical results, we used P value (p) with a significance threshold of 0.05.

Results

In our series, 44 patients (88%) were treated in less than 48 hours, 5 in 2 to 8 days and 1 in more than 8 days. Orthopedic treatment was used in 29 cases, with a predominance of crural plaster cast (20 cases) and plaster boot (08 cases). The average duration of immobilization was 45 days in most cases, with extremes of 28 days and 90 days. Treatment was surgical in 21 cases. Osteosynthesis of the lateral malleolus was performed by screw plate in 14 patients (66.66%) (Fig. 1) and by pinning in 07 cases. Osteosynthesis of the medial malleolus was achieved by bracing in 09 patients, screw fixation in 07 and pinning in 05. The syndesmosis was screw-fixed in 11 cases. In one case of posterior marginal fracture, anteroposterior screw fixation was used.

None of our patients had any immediate post-operative complications. All our patients were placed on anticoagulants: low molecular weight heparin in iso-coagulant doses for the duration of immobilization. The mean time to total weight-bearing was 10.88 weeks, with extremes of 4 and 33 weeks. Functional rehabilitation was performed in 29 patients (58%). Self-rehabilitation was performed in 16 patients (32%). Patients were assessed with a minimum follow-up of 6 months (extremes of 6 months and 18 months). Anatomically, the result was excellent or good in 64% of cases, with an overall mean time to consolidation of 87 days +/-10.96. Functionally, according to the KITAOKA score, the results were very satisfactory, with an overall score of 84%. Orthopedic treatment was good in 79.31% of cases and surgical treatment was good in 90.47% of cases (Table 1). Seven (07) patients had a complication, including three (03) secondary and four (04) late complications. Two (02) patients (4%) treated orthopedically had a secondary displacement. One (01) patient had a post-operative infection. Late complications included callus in 2 cases (Fig. 1,2) and pseudarthrosis in 2 cases.

Kitaoka Score	Orthopedic Treatment	Surgical Treatment
Good	**23** (79,31%)	**19** (90,47%)
Average	**4** (13,79%)	**1** (4,76%)
Poor	**2** (7%)	**1** (4,76%)
Total	**29**	**21**

Table 1: Functional assessment by type of treatment.

Figure 1: Osteosynthesis of a bimalleolar fracture using an external screw plate and internal bracing with screw fixation of the syndesmosis.

Figure 2: Bimalleolar malunion secondary to orthopedic treatment.

Discussion

Our study encountered a number of difficulties:

- The non-use of some files due to poor archiving
- Non-cooperation of some patients in data collection and evaluation due to their unavailability

In our study, 88% of cases were admitted within 24 hours, 10% between 48 hours and 8 days and only 2% after 8 days. These results are comparable with those of Khortame, who reported that 82% of patients received a reduction within 24 hours of the accident and those of Batchom, who observed that 68.9% of patients consulted a doctor within the first 24 hours [4,5]. This trend is explained by the need for urgent management of malleolar fractures, in order to reduce complications and improve functional prognosis.

Although surgical treatment is the treatment of choice for malleolar fractures, orthopedic treatment is still indicated in the management of these injuries. In our study, malleolar fractures were treated surgically in 21 cases and orthopedically in 29 cases. In our series, 29 cases (58%) underwent orthopedic treatment. This type of treatment is used for stable, non-displaced closed fractures. Lack of financial resources, apprehension about surgery and the clinical condition of some patients motivated orthopedic treatment of malleolar fractures. Our results are similar to those of Fadjoukou with (80.77%) in favor of the cruropedic cast [6].

In our series, the majority of patients received orthopedic treatment. As far as surgical treatment was concerned, the screw plate was the most commonly used material for the lateral malleolus, with 14 cases (66.6%) and bracing for the medial malleolus, with 9 cases (42.85%). Our results are compatible with those of Khortame, who found that 87% of patients benefited from a screw-retained plate at the level of the lateral malleolus and osteosynthesis of the medial malleolus was mainly performed with a screw-retained plate (87%) [4]. In the literature, the lateral malleolus is important for the stability of the mortise; its open osteosynthesis with a screw plate remains the reference treatment. Most medial malleolus fractures require screw fixation. In our series, the reason for bracing was that the fracture line was usually transverse and the equipment needed for closed screw fixation (image intensifier) was temporarily unavailable.

In our series, rehabilitation was carried out in 90% of cases after treatment, including 58% by a physiotherapist and 32% by the patient himself. This result is better than that of Ngo Yamben Ma, et al., in 2016 in Cameroon, who reported a rate of 65% in their study [7]. Rehabilitation is one of the pillars of treatment and guarantees the best results after optimal surgical treatment. Early initiation of rehabilitation helps to limit the sequelae of joint immobilization.

According to the KITAOKA score, the results were satisfactory overall, with 84% good results. This rate is comparable to that reported by Karouane (80%), Berhil (77.3%) and Fadjoukou (73.5%) [6,8]. Batchom, et al., obtained similar results, with a success rate of 74.2% [5,9]. These data confirm that our results are in line with previous studies, demonstrating the effectiveness of our treatment.

The functional results of orthopedic treatment were satisfactory overall, with 79.31% good results. The results found by Karouane (66.66%) and Berhil (76.4%) are almost similar to ours due to the quality of the initial reduction, which was generally satisfactory [8,9].

The functional results of surgical treatment were satisfactory overall, with 90.47% good results and better than those of Alji and Karouane with 83.9% and 83.33% [8,10]. These results can be explained by the fact that we have a short average follow-up with a small series, but also a great deal of experience with orthopedic treatment, given the problem of resources that many patients present. The overall mean time to consolidation was 87 days +/- 10.96 days, which corresponds to the time to consolidation reported in most studies [2,11].

Two patients (4%) treated orthopedically had secondary displacements detected by follow-up radiographs. Berhil found a percentage of 0.8% [9]. These secondary displacements were diagnosed late in 2 patients. This delay in diagnosis can be explained by the fact that more than half of the patients in plaster (78.70%) were seen in consultation after D21 and were not seen again at D3 for a repeat cast after the oedema had subsided.

One patient (2%) had an infection on osteosynthesis equipment. Targeted antibiotic therapy was prescribed after swabbing, in conjunction with antibiotic susceptibility testing. Our infection rate was lower than those of Fadjoukou and Berthé M, with 14.12% and 11.8% of cases respectively [6,12]. Krissian reports that infection varies from 1 to 48% depending on the study and has a poor prognosis after surgical treatment [13]. This requires rigorous prevention.

We had pseudarthrosis in two patients (4%). Some authors have found only a few cases of pseudarthrosis in their series [2,8]. These pseudarthroses can be explained by a reduction defect (joint congruence) and by secondary displacement in plaster. We obtained a vicious callus in 2 patients (4%) as often reported in several series [12,13]. Sane, et al., did not find any vicious callus in their study [14]. This is a rare complication, caused in our study by secondary displacement under plaster and by a reduction defect.

Conclusion

Malleolar fractures are common fractures that affect the anatomy of the ankle, with repercussions on its function. Management is based on orthopedic or surgical treatment, with the aim of reconstructing the anatomy of the ankle and avoiding complications.

Conflict of Interests

The authors declare no conflict of interest.

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