



Bimalleolar Fractures Admitted to the Trauma Emergency Department of a Sahelian Hospital: What are the Epidemiological, Lesional and Therapeutic Aspects and their Evolution?

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Abstract

Summary: Introduction. Bimalleolar fractures are fractures that combine a fracture of the external malleolus and a fracture of the internal malleolus. They are very common. It is an entity that occurs in a context of high energy secondary to a road accident. Our study aims to determine the epidemiological, lesional, therapeutic and evolutionary aspects of bimalleolar fractures at the National Hospital of Niamey.

Patients and methods: This was a retrospective study of patients with a bimalleolar fracture treated in the orthopedic surgery and traumatology department of the National Hospital of Niamey from January 1, 2010 to December 31, 2015. Recruitment concerned patients of both sexes aged 18 years or older. From their files we collected epidemiological data and those relating to etiologies, clinical presentation, type of treatment as well as complications observed during their follow-ups. The data are entered on Word 2013 and Microsoft office Excel 2013 software.

Results : 251 cases of bimalleolar fractures had met our inclusion criteria. The average age of our patients was 48.5 years. The sex ratio (M/F) is 3.92. The bimalleolar fracture had affected more young active people with 35.06% of cases. The consultation was early in the majority of cases, i.e. 71.31% of cases. The circumstances of the trauma were predominated by the AVP, i.e. 75.30%. The indirect mechanism predominated with 186 patients, i.e. 74.10% of cases. The right sides were affected in 114 cases, or 57% in men, and 2 bilateral cases, or 1%, compared to 26 cases on the right side, 25 cases on the left side, and 0 cases on the bilateral side. Pain and functional impotence were found in all our patients, or 100% of cases. Weber C supraligamentary fractures are the most common in many of our patients with a percentage of 44% of cases, skin opening was found in 115 cases of our patients, or 45.82%, and stage III of the Gustillo classification was the most represented. 67 patients were treated orthopedically, or 26.69%, compared to 184 patients treated surgically, or 73.31% of cases. 28.29% of our patients had complications. Conclusion

Keywords: Bimalleolar Fracture; Epidemiology; Lesions; Treatment; Niamey-Niger.

INTRODUCTION

Bimalleolar fractures are fractures that combine a fracture of the external malleolus and a fracture of the internal malleolus, it ranks third after fractures of the lower end of the radius and fractures of the upper end of the femur [1]. They preferentially affect young active subjects and there are several varieties with different prognoses. The first problem is

diagnostic. It requires the identification of features and displacements, followed by classification. Malleolar fractures compromise the transverse stability of the ankle. This destabilization can be simply osseous as it can also be ligamentous [2]. The second problem is therapeutic. The articular nature of these fractures increasingly codifies the treatment. Anatomical reduction is the rule. Thus, the restoration of the damaged means of stability, essentially the syndesmosis and the medial collateral ligament, requires pre- and per-operative determination for a better result in the medium and long term. The continence of the tibio -tarsal mortise, the degree of joint congruence and the skin condition remain the main prognostic elements which guide the therapeutic approach [3].

MATERIALS AND METHODS

This is a retrospective study of patients with bimalleolar fractures treated in the orthopedic surgery and trauma department of the Niamey National Hospital from **January 1, 2010 to December 31, 2015**, a period of **5 years**. Recruitment involved patients of both sexes aged 18 years or older. From their files, we collected data relating to sociodemographic aspects (age, sex, profession, origin), etiologies, clinical presentation (admission time, affected side, type of fracture, associated injuries) as well as those relating to the type of treatment and complications observed during their follow-ups. Data were entered into Word 2013 and Microsoft Office Excel 2013 software.

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RESULTS

In our series we collected 251 cases over a period of 5 years with an annual incidence ranging from 23 to 83 cases and an average of 58 cases per year. The age of the patients ranged from 18 to 79 years with an overall average age of 48.5 years. The average age of women was 41.5 years with extremes ranging from 18 to 65 years. The age group between 20 and 30 years was the most represented with 35.06% of cases. Bimalleolar fractures affected the youngest active people (Table 1). In our study there is a very strong male predominance 200 patients or 79.68% of cases with sex ratio is 3.92 (Table 2). 9.56% of patients were referred either from within the country or from abroad, 90.44% of trauma cases occurred in Niamey. The etiology was dominated by road accidents in 75.30% of cases. There was a predominance of right-sided involvement with 55.78% of cases in both sexes versus 43.42% of left-sided cases in both sexes. Most of our patients consulted early within less than 24 hours. The indirect mechanism is the most frequent with 186 patients or 74.10% of cases. 100% of our patients presented pain and functional impotence at admission. According to Weber, supraligamentous fractures

Weber C are the most frequent in many of our patients with a percentage of 44% of cases. On the other hand, subligamentous and interligamentous fractures represented 23% and 33% of cases respectively. 44 cases of bimalleolar fracture were associated with a tibio-talar dislocation, the skin opening was found in 45.82% of our patients and stage III of Gustillo classification was the most represented, 18 cases of bone lesions associated with a bimalleolar fracture (Table 3). No cases of vascular-nervous lesions were reported in our study. The therapeutic modality was dominated by osteosynthesis (184 patients) or 73.30% of cases including 50 by external fixator, 40 patients by a screwed plate and screwing, 55 by pinning and screwing, 17 by guying and 22 by pinning and pinning. Pinning of the lateral malleolus and the face of the medial malleolus was the most indicated type of treatment with 55 cases or 41.04% (Table 4). The remaining 64 or 26.69% had benefited from orthopedic treatment by plaster immobilization not displaced or after reduction by external maneuvers. 28.29% of our patients had complications: malunion 7.97%, osteoarthritis 5.97%, infection 6.77%, joint stiffness 3.98%, non-union 3.18%, and only one case of amputation, or 0.39%. 71.71% of our patients had consolidation

Table 1: Distribution of patients by age

Slice	Number of cases	Percentage
< 20 years old	17	6.77
20-30 years old	88	35.06
30-40 years old	50	19.92
40-50 years old	38	15.14
50-60 years old	42	16.73
>60 years old	16	6.37
Total	251	100

Table 2: Distribution by sex

Sex	Number of cases	Percentage
Men	200	79.68
Women	51	20.32
Total	251	100

Table 3: Distribution of bone lesions

Associated bone lesions	Number of cases	Percentage
Polytrauma	2	11.11
Bilateral leg fracture	1	5.55
Talus fracture	1	5.55
L1 compression fracture	1	5.55
Patella and calcaneus fracture	1	5.55



Tibial pilon	2	11.11
Radial styloid fracture	2	11.11
Skull fracture	2	11.11
Fracture of the base of the 3rd and the head of the 4th metatarsal	1	5.55
Rib fracture	1	5.55
Fractured left leg	1	5.55
Petrochanteric fracture of the right femur	1	5.55
Cervical spine fracture	1	5.55
Impacted femoral neck fracture	1	5.55
Total	18	100

Table 4: Distribution according to the type of osteosynthesis

Type of osteosynthesis	Number of cases	Percentage%
Internal and external malleolus		
Lateral malleolus bracing and medial malleolus pinning	17	12.69
Pinning of the lateral malleolus and screwing of the medial malleolus	55	41.04
Lateral malleolus screw plate and medial malleolus screw	40	29.85
Lateral malleolus pinning and medial malleolus pinning	22	16.42
Total	134	100

DISCUSSION

The study included 251 cases of bimalleolar fractures over a period of 5 years, representing an annual frequency of 23 to 83 cases and an average of 58 cases per year. This annual incidence is comparable to that of S KHORTAME and M.LATIFI which is 63 cases/year [4]. The analysis of different series [4-7], shows that the bimalleolar fracture is a fracture of the young active male subject and whose etiology is dominated by AVP and falls, which is consistent with the results of our study in which an age group of 20-30 years was the most represented, sex ratio was 3.92 in favor of the male sex, and AVP was 75.30 % the predominant etiology. In our study the injury mechanism was indirect in 74.10% of cases. These data are comparable to those in the literature [4,9]. The right side was more affected (55.78%) which is consistent with most studies [9,10]. In our study, 115 cases of bimalleolar fractures presented a skin opening, i.e. a percentage of 45.82%, with a predominance of type III of Cauchoix Duparc which represents 42% of all skin openings, a frequency quite consistent with that of the literature, thus Kaidiatou M [9], found 37.94% of cases of skin opening, Sore Hermann H [11]: 42.60% of cases were open but type II was the majority with 54.8% of cases. According to the classification of Weber and Danis, type C was predominant in our study with a high percentage of 44% of cases which is consistent with Doumane B [12], but with a much higher percentage (56%). On the other hand, in some authors, type B predominated: Sore Hermann H [11], 56.4% of cases,

Saliha Khortame [4], 82% and Lecoq C [13]: 80% of cases. The presence of tibio -fibular diastasis is a fairly frequent complication of bimalleolar fractures but often unrecognized and responsible for ankle instability, this is consistent with our work which objectified a high frequency of supra-ligamentous fracture which is almost always associated with an inferior tibio -fibular diastasis [14]. dislocation tibio -astragalian fracture was found in 44 of our patients, or 15.94%, this figure is significantly lower than that of Doumane [12]. Bimalleolar fracture is a therapeutic emergency whose management should not suffer any delay, the desired time of management is 6-8 hours. Most patients were treated at a later date than the day of the accident: 7 days, 135 patients, or 53.78% of cases. 63 patients, or 25.10%, were treated within more than 24 hours. This could be explained by the unavailability of osteosynthesis equipment and the multiple therapeutic choices. Only 21.12% were treated urgently. Long treated orthopedically, osteosynthesis has become the reference treatment for these fractures [1]. On the fibular side, plate osteosynthesis is the most used technique [15]. According to a randomized study [16], comparing plate and fibular nailing in ankle fracture, there is no difference in terms of consolidation, however plate osteosynthesis gives a significant rate of complications unlike nailing (7% versus 47%). Nail osteosynthesis has the advantages of a minimally invasive percutaneous technique and stable fixation: the main limitation remains the comminuted nature of the fracture. In our study, 184 patients benefited from surgical treatment,



i.e. 73.30% of cases: 50 patients were treated with external fixator, 40 patients with a screwed plate and screwing, pinning and screwing in 55 cases, guying and pinning in 17 cases, pinning and pinning in 22 cases, and the remaining 67 patients, or 26.69%, were treated orthopedically. None of our patients were treated with nailing.

CONCLUSION

At the end of this work, we conclude that the bimalleolar fracture is a common fracture which most often affects young active subjects. It is most often secondary to road accidents and the mechanism is most often indirect.

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