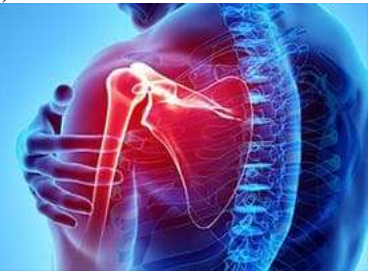


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Surgical results of recent closed bimalleolar fractures: About 38 cases at the Brazzaville University hospital center (Chub)

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Abstract

Objective: Bimalleolar fractures are breaks in bone continuity affecting the processes of the distal end of the tibia and fibula. The aim of our study was to evaluate the surgical outcome of closed bimalleolar fractures at the Brazzaville University Hospital Center (CHUB).

Materials and Methods: This is a retrospective study carried out on 38 patients who presented a closed bimalleolar fracture at the CHUB between January 2021 and December 2023, a period of three years. 38 patients were evaluated including 20 women and 18 men. There were 22 or 57.9% who presented an intertubercular bimalleolar fracture, 10 or 26.3% who presented a supratubercular bimalleolar fracture, and 06 or 15.8% who presented a subtubercular bimalleolar fracture. The average age of the study was 46.73 years, standard deviation ± 17.44 (range: 25-65 years).

Results: Among the 38 patients who presented a closed bimalleolar fracture of the operated ankle, 34 had no complications or 89.48%, and 4 had complications or 10.52%, of which 2 had ankle stiffness and the rest had a complex regional pain syndrome. All ankles have been consolidated or 100%.

Conclusion: Bimalleolar fractures are essentially surgical and fibular displacement is not an independent factor in deciding on surgical intervention. Joint congruence and medial stability are the key points when choosing between surgical and non-surgical treatment.

Keywords: Bimalleolar fracture, ankle, result, surgery

Introduction

Bimalleolar ankle fractures are bone continuity solutions affecting the processes (Tuberosities or malleoli) of the distal end of the tibia and fibula. They are among the most common types of fractures in the world [2, 3, 10]. The incidence of ankle fractures is between one hundred and one hundred and fifty per hundred thousand person-years and is increasing. More than half of ankle fractures occur during sports activities by abduction and external rotation mechanisms [1, 2, 3, 4, 10]. Ankle fractures rank 3rd after fractures of the distal end of the radius and fractures of the proximal end of the femur. The management requires a lot of resources that are related not only to the operation and the subsequent hospitalization but also to the duration of the professional incapacity [4, 8, 10]. To reduce these latter costs, an early functional return is crucial. There are different classifications to describe ankle fractures, the most used in our context is the classification of Duparc and Alnot, the surgical indication depends on the congruence of the ankle joint [9, 10-11]. In the presence of an incongruent joint, fractures are often treated by open reduction and internal fixation to stabilize the ankle joint. Postoperative care regimens vary considerably, for example from non-weight-bearing cast immobilization for several weeks to immediate postoperative protected mobilization. Even direct postoperative unprotected weight-bearing, depending on tolerance, has been suggested [11]. Several systematic reviews have been published on various aspects of postoperative care regimens [11-12]. The objective of our study was to evaluate the surgical outcome of recent closed bimalleolar fractures of the ankle at the University Hospital of Brazzaville.

Materials and Methods

This is a retrospective study that was carried out on all patients who had a bimalleolar ankle fracture at the CHUB between January 2021 and December 2023, i.e. a period of three years (36 months), longitudinal with a minimum postoperative follow-up of six (06) months. All patients who had a bimalleolar ankle fracture and whose files included at least one complete clinical observation, an operative report, and a preoperative and postoperative radiograph were included in the study. All patients who had an open bimalleolar ankle fracture, patients with an ankle fracture treated orthopedically and patients with neglected bimalleolar fractures were not included in the study.

During the study period, one hundred and six (106) patients had a bimalleolar fracture, including thirty (30) or 28.30% an open bimalleolar fracture, sixteen (16) or 15.10% a neglected bimalleolar fracture, twenty-two (22) or 20.76% an ankle fracture treated orthopedically and thirty-eight (38) or 35.84% a closed bimalleolar fracture. These latter constituted our study series.

These 38 patients were seen and re-evaluated, including twenty (20) women and eighteen (18) men constituted our series. There were 22 or 57.9% who had an intertubercular bimalleolar fracture, 10 or 26.3% who had a supratubercular bimalleolar fracture, and 06 or 15.8% who had a subtubercular bimalleolar fracture. The mean age of the study was 46.73 years, standard deviation ± 17.44 , (range: 25-65 years).

Operative technique and postoperative care protocol

The patient was placed in the supine position on a regular table with a cushion under the buttock, with the lower limb to be operated on extended. A pneumatic tourniquet and a support were placed at the root of the limb (Figure 1). The entire lower limb was included in the field and free of any movement during the operation.

The initial approach was a lateral approach to the ankle with a skin incision of approximately 5 to 6 cm in the axis of the fibula centred on the fracture site (Figure 2). The second approach was the curved medial approach centred on the fracture site (Figure 3) ^[12, 13].

The actual procedure consisted of two successive stages described below ^[12, 13]:

1st stage: Approach to the lateral malleolus

After opening the skin and subcutaneous tissues, exposure of the fracture site then reduction maintained by 2 forceps then placement of the third (1/3) tube plate with 6, 7 or 8 holes that we screw proximally and distally with 35 mm diameter cortical screws. Closure plane by plane on a suction redon drain. In case of opening of the syndesmosis, a long cortical screw of 45 mm diameter was placed to close the syndesmosis, ankle being placed at 90° (Figure 2).

2nd stage: Approach to the medial malleolus

After opening the skin and subcutaneous tissues, exposure of the fracture site then reduction maintained by a lion's tooth type forceps then placement of an 18/10th Kirschner pin then a 45 mm malleolar screw oriented vertically and perpendicular to the fracture line (Figure 3). Release of the tourniquet then check of hemostasis deemed satisfactory then closure layer by layer, then dry and sterile dressing. Placement of a fenestrated plaster boot, ankle at 90°.

Postoperative care and follow-up

In the immediate postoperative period, morphine allowed effective pain control. Administration of low molecular weight heparin to avoid thromboembolic complications and 2nd cephalosporins to prevent infections. The Redon drain was removed on the 2nd or 3rd postoperative day and the first dressing change on the 3rd day. Standard X-rays of the operated ankle from the front and side allowed us to assess the positioning of the plate, screws and pin and especially if there was no conflict between the malleolar screw and the talar dome. The syndesmosis screw was removed on the 21st day.

Objective assessment

The objective assessment was made on clinical and radiological criteria.

Clinical criteria: Postoperatively and at follow-up, the objective assessment was made on the basis of the Kitaoka score.

Radiological criteria: At follow-up, the X-ray included ankle images (Front, profile). The criteria studied are:

- Consolidation or malunion for the lateral malleolus.
- Consolidation or pseudarthrosis for the medial malleolus.

Results

Anatomo-radiological results

Among the 38 patients who presented a closed bimalleolar fracture of the operated ankle, all were consolidated, i.e. 100% (Figure 4).

Complications

Among the 38 patients who presented a closed bimalleolar fracture of the operated ankle, 34 had no complications and four (04) had complications (Table 1).

Table 1: Summary of patients according to the frequency of complications

Type	Frequency	%
complication	04	10,52
Non-complication	34	89,48
Total	38	100

Among the four (04) patients who had complications, i.e. 10.52%, two (02) had ankle stiffness and the other two (02) had complex regional pain syndrome.



Fig 1: Patient setup



Fig 2: Lateral approach to the ankle



Fig 3: Medial approach to the ankle



Fig 4: X-ray image of the consolidated bimalleolar fracture at follow-up

Discussion

Our indications took into account the data from the literature. Indeed, among the 38 patients who presented a closed operated bimalleolar fracture, there were twenty (20) women and eighteen (18) men. These were twenty-two (22) cases of intertubercular bimalleolar fracture, ten (10) cases of supratubercular bimalleolar fracture, and (06) cases of subtubercular bimalleolar fracture. The mean age of the study was 46.73 years, standard deviation ± 17.44 , (range: 25-65 years).

1. Anatomico-radiological

This result was identical to that of Chen *et al.* [1], who had conducted a study combining a bimalleolar fracture and a fracture of the body of the talus in a rare case, had found bone consolidation after 3 months post-operatively, similarly Fisher *et al.* [2] who had conducted a study on the surgical repair of bimalleolar fractures in geriatric patients had found bone consolidation, Fukuyama *et al.* [3] in a study conducted on bimalleolar fractures and deltoid ligament rupture in 26 patients had found bone consolidation, as well

as Lee *et al.* [4] in a study conducted on bimalleolar fractures and deltoid ligament rupture had found bone consolidation, then Ochman *et al.*, Ortiz *et al.*, Ostrum *et al.*, Shafiq *et al.*, Shukla *et al.*, Smeeing *et al.* [5, 6, 7, 8, 9, 10, 11] had found bone consolidation at the level of the lateral and medial malleolus.

2. Complications

This result was identical to that of Chen *et al.* [1], who had conducted a study combining a bimalleolar fracture and a fracture of the body of the talus in a rare case, had found a limitation of the amplitudes of the ankle and swelling at the last follow-up, similarly Ortiz *et al.* [6] in a study done on fractures of the ankle associated with a rupture of the deltoid ligament had found bone complications such as osteomyelitis of the distal tibia and complications of the soft tissues such as wound dehiscence and septic arthritis, Shukla *et al.* [9] in a study of 17 patients including 5 women and 12 men had found complications such as infection, complex regional pain syndrome, deep vein thrombosis and blisters, then Smeeing *et al.* [10] in a study done on weight-bearing and mobilization in the postoperative care of ankle fractures, a systematic review and a meta-analysis of trials Randomized controlled trials and cohort studies have found complications such as complex regional pain syndrome. This could be explained by the prolongation of immobilization and the lack of early functional rehabilitation.

Conclusion

Bimalleolar fractures are exclusively surgical, they are common injuries that must be properly managed to return patients to their baseline functional level. Surgical intervention restores early ankle range of motion with progression after stabilization of the site allowing weight-bearing as tolerated at 6 weeks postoperatively. Fibular displacement is not an independent factor in deciding surgical intervention. Joint congruence and medial stability are the key points when choosing between surgical and non-surgical treatment. The goal of surgery is to restore joint congruence, a deformed and painless ankle. Active mobilization allows for a faster return to work. This active mobilization and immediately protected weight-bearing can be safe postoperative care strategies after ankle surgery. The choice of treatment regimen should therefore be based on the patient's requests with an emphasis on active mobilization. Unprotected weight-bearing, as tolerated after ankle surgery, may also be a safe and promising choice.

Conflict of Interest: Not available

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