

Functional Outcome of Open Reduction and Internal Fixation in Danis-Weber Type B Ankle Fracture

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ABSTRACT

Aim: To determine functional outcome of open reduction and internal fixation in danis-weber type B ankle fracture.

Methods: This descriptive case series study was carried at Department of Orthopaedics, Lady Reading Hospital, Peshawar from October 2012 to September 2014. A total of 145 patients were included in the study. Open reduction and internal fixation techniques under spinal/general anesthesia were used for patients confirmed with Weber type-B ankle fracture. Plain films were taken immediately postoperatively to evaluate reduction. Patients were followed up at sixth week. At each visit patients were assessed for post-operative pain and fracture was assessed radiologically. Also functional outcome of ORIF was measured.

Results: The most of the patients were in age range 41-60 years (44%) followed by 20-40 years (38%). The mean age was 40±3.66 years. Sixty three percent patients were male and (37%) patients were female. The status of pain was analyzed as (65%) patients didn't had pain, (20%) patients had mild pain, (13%) patients had moderate pain while (2%) patients had severe pain.

Conclusion: Surgical management of malleolar fractures of ankle is simple, effective and economical. It ensures good function of the ankle joint and restoration of anatomy.

Keywords: Open reduction, Internal fixation, Danis-Weber type B ankle fractures

INTRODUCTION

Ankle fracture is a fracture involving distal tibia, distal fibula, talus, and/or calcaneus. These fractures are one of the most frequently occurring musculoskeletal injuries, having an annual rate of approximately 0.18% globally. For the past 20 years it has been observed that their incidence is rising and they represent approximately 10% of all kinds of fractures¹.

Danis-Weber classification is one of the most commonly used classifications². It classifies the ankle fracture into three categories, in which the fracture of the fibula at the level of the syndesmosis is called the Type B ankle fracture.³ Syndesmosis is the fibrous joint with a strong membrane or ligaments joining two adjacent bones. Tibiofibular syndesmosis formed by two bones and four ligaments also comes under this definition⁴. Syndesmotic injury occurs in 50% of Weber type B fractures and 10% patients have a concomitant distal tibiofibular syndesmotic disruption requiring surgical repair^{4,5}.

Weber type-B ankle fracture may be stable or unstable depending upon the mechanism of injury and the stability of ankle fracture is the most important factor for deciding operative or non-operative treatment for it. The best choice of treatment in cases of suspected unstable ankle fracture having medial malleolus fracture and/or ligament injury in addition to a fibular fracture, is open reduction and internal fixation (ORIF)⁶. Open reduction means open surgery to set bones, and internal fixation refers to fixation of screws and/or plates, intramedullary bone nails to enable or facilitate healing.⁷ Because in Weber type-B fracture the fracture is either unstable or the

talus tends to shift in the mortise so several surgeons recommend ORIF for it⁸.

The decision whether to operate or not the Weber type-B ankle fracture is highly dependent upon the surgeon's individual judgment on displacement. There is consensus that because of their mechanism or nature of injury, other Weber classified ankle fractures rarely require operative treatment^{9,10,11}. So it is only Weber type-B ankle fractures which are left with gray area of operative treatment.

PATIENTS AND METHODS

This descriptive case series study was carried at Department of Orthopaedics, Lady Reading Hospital, Peshawar from October 2012 to September 2014. A total of 145 patients were observed. All patients presented to emergency department of both genders and age between 16 to 80 years with Danis-Weber type-B ankle fracture, with acute and single-sided fracture and with the ability to walk without any assistance before injury were included in the study. Patients with nonunion or pathological fractures, trimalleolar fracture, severe open fractures, severe comminuted fractures and with syndesmosis instability were excluded from the study. All patients had Radiograph done both in AP and Lateral view of the ankle joint to determine Danis-Weber Type B ankle Fracture. Patients confirmed with Weber type-B ankle fracture were operated through open reduction and internal fixation under spinal/general anesthesia. Pre-Operative antibiotic was given before application of Tourniquet. Plain films were taken immediately postoperatively to evaluate reduction. Patients were followed up postoperatively at sixth week. Wound was checked and stitches were removed, POP cast was removed, fracture was assessed radiologically and patients were assessed for post-operative pain. A pre-defined questionnaire was used to measure the functional outcome of ORIF. Data was analyzed using SPSS V16.

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RESULTS

Age distribution among 145 patients was analyzed as 55(38%) patients were in age range 20-40 years, 64(44%) patients were in age range 41-60 years and 26(18%) patients were in age range 61-80 years. Mean age was 40±3.66 years (Table 1). Gender distribution among 145 patients was analyzed as 91(63%) patients were male while 54(37%) patients were female (Table 2). Status of pain among 145 patients was analyzed as 94 (65%) patients didn't had pain, 29(20%) patients had mild pain, 19(13%) patients had moderate pain and 3(2%) patients had severe pain (Table 3). Stratification of pain with age and gender distribution is given in Tables 4-5.

Table 1: Frequency of age (n = 145)

Age (years)	n	%age
20-40	55	38.0
41-60	64	44.0
61-80	26	18.0

Table 2: Frequency of genders (n=145)

Gender	n	%age
Male	91	63.0
Female	54	37.0

Table 3: Frequency of pain (n=145)

Pain	n	%age
No pain	94	65.0
Mild pain	29	20.0
Moderate pain	19	13.0
Severe pain	3	2.0

Table 4: Stratification of pain with age

Pain	Age (years)			Total
	20-40	41-60	61-80	
No pain	45	44	5	94
Mild pain	8	11	10	29
Moderate pain	2	8	9	19
Severe pain	-	1	2	3
Total	55	64	26	145

Table 5: Stratification of pain with gender

Pain	Gender		Total
	Male	Female	
No pain	61	33	94
Mild pain	18	11	29
Moderate pain	11	8	19
Severe pain	1	2	3
Total	91	54	145

DISCUSSION

Ankle fractures refer to fractures of the distal tibia, distal fibula, talus, and/or calcaneus. Ankle fractures are one of the most frequently encountered musculoskeletal injuries¹². Danis emphasized that the internal fixation should be so complete and rigid that the injured joint can be exercised in the early postoperative period. Danis recommendations and biomechanical studies of the importance of the lateral malleolus and the syndesmosis for the stability of the ankle was the basis for AO principles for the treatment of ankle fractures¹³.

Increased knowledge about function of the ankle joint and normal and post traumatic anatomy, has led to

demands for exact reduction and rigid internal fixation of ankle fractures. Closed, non-operative methods of treatment are not suitable to satisfy these demands. Therefore for displaced and unstable fractures about the ankle, open reduction and internal fixation is the standard treatment of choice, as proved by Cedell, Cotton CL and many other authors¹⁴.

The present study showed that the incidence of ankle fracture was more in age group 41-60 years (44%) followed by 20-40 years (38%). Similarly the occurrence of ankle fracture was more common in male (63%) as compare to female (37%). More over the status of pain was analyzed as (65%) patients didn't have pain, (20%) patients had mild pain, (13%) patients had moderate pain while (2%) patients had severe pain. Similar results were found in other studies like Makwana et al¹³ who found superior outcome in patients of age over 55 years having Weber type-B ankle fracture managed by ORIF. In another study, Lee YS et al.¹⁴ reviewed Knowles pins and lateral plates using ORIF surgery for weber type-B ankle fracture in patients and found both the procedures with favorable results (92% and 86.4% respectively) in terms of pain, ability to walk and run, stability of the ankle and motion of the ankle.¹⁵ Srinivas¹⁶ and fellows obtained excellent to good ratings in their study as per Weber's protocol by using ORIF surgical procedure, in which 60% of the cases had no pain¹⁷. Shivarathre and fellows found 86% functional outcome using ORIF surgical procedure for Weber type-B ankle fracture in patients above 80 years of age¹⁸. Due to the subcutaneous location of the hardware in thin individuals following ankle fracture fixation, hardware prominence is fairly common¹⁹. This most commonly involves lateral fibular plates and screws.

In the present study 12 patients had slight pain with excess activity (+), slight diminution of range of movements at ankle and subtlar joint (SD), had normal work with restriction of strenuous activity (NW RSA) and there were no complications. Five patients had a score of 1 and 7 patients had a score of 2. Taking all these criteria into consideration this group was rated as good. Of the 5 poor results, one case was a compound fracture. Compound injury was the reason for delayed surgery in this case. At the end of 6 months, he had pain with normal activity, range of movement at ankle and subtalar joint was limited >1/2 of sound side. The fracture united by 16 weeks.

One case was a 50 year old male with ankle dislocation and this patient had slight pain on excess activity (+), slight diminution of range of movements at the ankle and subtalar joint. Fracture united in 14 weeks and normal work with restriction of strenuous activity was present. Another 45 year old female patient had mild pain on excess activity, slight diminution of ankle and subtalar joint movements at the end of 6 months. The fracture united in 12 weeks. Patient had normal work with restriction of strenuous activity.

CONCLUSION

Surgical management of malleolar fractures of ankle is simple, effective and economical which can be carried out in a minimal basic orthopedic set up. It ensures restoration of anatomy and good function of the ankle joint.

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