



Surgery Timing and Postoperative Hospital Stay in Closed Ankle Fractures

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Abstract**Objective:**

The ankle joint is a highly complex joint. The ankle joint has multidirectional mobility for its complex role in supporting the weight of the body and fulfilling a myriad of daily functions. To determine and compare the mean hospital stay between early and late management through open reduction and internal fixation of the closed ankle fractures.

Material & Methods:

Study Design: Descriptive case series

Place: Inpatient, Outpatient and Emergency departments of the Orthopaedic Surgery.

Data Collection: After meeting the inclusion criteria 80 patients were enrolled. Open Reduction and Internal Fixation surgery used to stabilize and heal a bony fracture, in which bone pieces are repositioned and aligned after surgically exposing the bone and internally fixed with screws, plates, or K wires which prevents bones from healing abnormally. Post-operative length of hospital stay of patients presenting early and late was determined.

Results:

The mean age of the patients was 43.90 ± 14.64 years, 58(72.50%) patients were male. The mean hospital stay of the patients was 2.67 ± 0.87 days. In patients with late presentation the mean length of hospital stay was 3.04 ± 0.80 days while in patients with early presentation the mean length of hospital stay was 2.36 ± 0.82 days ($p\text{-value} = < 0.001$).

Conclusion:

This study concluded that the late presentation to hospital is associated with longer hospital stay as compared to early presentation in management through ORIF of the closed ankle fractures.

Keywords:

Early Presentation, Late presentation, Ankle Fractures, Hospital Stay

Introduction

Ankle fractures are common fractures of lower limbs with incidence of 174 per 100000 among adults in a single year. Unstable fractures of ankle are treated by Open Reduction and Internal fixation to achieve anatomical reduction which reduces the chances of developing Post Traumatic ankle arthritis[1].

Ankle fractures most of the times require operative fixation. Delay in surgery can lead to increase in hospital stay of the patient along with increased complication rates [2]. Delay in surgery leads to blister formation at fracture site and excessive ankle swelling causing problems in wound closure[3]. For management of ankle fractures, it is essential to understand the structures providing stability to ankle joint. Stability of a normal ankle joint can be defined as one that can move within its physiological limits.

In instability, the physiological limits are surpassed either passively or actively proving the stabilising structures to be insufficient[4]. Some authors believe that surgery performed within 24 to 48 hours after injury reduces patient's hospital stay and the risk of wound complications while other studies have postulated problems in wound healing due to massive swelling if surgery is performed soon after the fracture. But delay in surgery causes hindrance in anatomical reduction[5]. Sedentary lifestyle is increasing the incidence of metabolic syndrome which is an independent risk factor for increase in complications within 30 days of ORIF[6]. There was a substantial difference in cost and length of stay in patients operated less than and more than 24 h, and less than and more than 48 h from admission. However no difference in cost and length of stay was observed in 2 groups of less than 24 and 48 hr, but length of stay and cost increased significantly if the operation was delayed more than 48 h 7. In another study done on ORIF of Ankle fractures, there was significant decrease in postoperative length of hospital stay in patients who were operated within 24 hours and after surgery [8]. However others have not found a significant impact of early surgery on hospital stay [9]. Of all the ankle fractures, isolated fibular fractures account for approximately 70 % and understanding of Lauge Hansen classification is essential for their management. Literature has shown complication rate of 20 % in surgically managed cases of isolated distal fibular fractures[10].

This study is to be conducted keeping in mind the findings and recommendations of the other studies in the same area. It is postulated that early intervention in terms of ORIF would result in a decrease in the length of hospital stay. However there is still a scarcity of such data at local level. This study will help us guide the optimal timings for operative fixation of closed ankle fractures in terms of ORIF.

Material and Methods:

Procedure of Data Collection:

After obtaining approval from the Hospital Ethical Committee, patients was selected from the outpatient, Emergency department and consequently admitted patients from the inpatient department of the Orthopaedic Surgery Department of Benazir Bhutto Hospital using the inclusion and exclusion criteria given above. All the patients admitted through Emergency and Outdoor Patient Department was explained regarding the operative details of Open Reduction and Internal Fixation (Surgery used to stabilize and heal a bony fracture, in which bone pieces are repositioned and aligned after surgically exposing the bone and internally fixed with screws, plates, or K wires which prevents bones from healing abnormally. Details regarding the time elapsed since fracture to the time till presentation in hospital was collected and its effect on post-operative length of hospital stay of patients presenting early and late was determined. Reasons for delay in surgery like late presentation of patient to hospital, swelling at the fracture site, Unavailability of Operation Theatre were noted. Patients operated within or equal to 8 hours were classified as those managed early and those operated after 8 hours were classified in the category of late managed patients. The purpose of the study was explained in detail to each patient and an informed consent was obtained. The demographic details (age, gender, and place of residence) were collected on a predesigned proforma given as Annexure 'A'. The information regarding time delay before surgery, length of hospital stay after surgery (ORIF), early and late managed patients group and reasons for delay in surgery was collected in a pre-designed questionnaire in a tabulated form given in Annexure 'B'.

Sample Size

Sample size was calculated by taking confidence interval 95%. Population Mean \pm S.D= 5.5 \pm 1, Absolute precision =0.5. and Sample size was n=80 cases.

Sample Selection:

Inclusion Criteria:

1. Patients between 15 and 65 years of age.
 2. Diagnosed case of closed ankle fracture according to operational definition
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Exclusion Criteria:

1. Patients having open ankle fractures
2. Patients unable to give consent for the surgery, or those who refuse consent for the surgery
3. Already infected skin condition with dirty wound and Blisters

Statistical Analysis:

The collected data was entered into SPSS version 23 and analyzed. The qualitative variables including gender, place of residence, early and late managed groups and the reasons for delay in surgery like late presentation to hospital, swelling at fracture site and non-availability of operation Theatre was presented as frequencies. For the quantitative variables like age, time before surgery, and the length of hospital stay, simple descriptive statistics like mean and Standard deviation was calculated. Effect modifiers like age, gender, and time before surgery were stratified. Post stratification independent sample t- test was applied for comparison of timing of surgery and length of hospital stay, keeping p-value <0.05 as significant. All results were presented in the form of tables and graphs. Hospital stay between two group was compared by independent sample t-test.

Results

In this study total 80 patients were enrolled. The mean age of the patients was 43.90 ± 14.64 years with minimum and maximum ages of 17 & 65 years respectively. In our study 58(72.50%) patients were male and 22(27.50%) patients were females. Male to female ratio of the patients was 2.6:1. The late presentation at hospital was observed in 37(46.3%) patients. According to this study swelling at fracture site was found in 42(52.5%) patients. The study results showed that the non-availability of operation theatre was found in 16(20%) cases. In our study ≤ 8 hours time before surgery was noted in 43(53.75%) patients and >8 hours time before surgery was noted in 37(46.25%) patients. In our study the mean hospital stay of the patients was 2.67 ± 0.87 days with minimum and maximum hospital stay of 1 & 4 days respectively. In patients with late presentation the mean length of hospital stay was 3.04 ± 0.80 days while in patients with early presentation the mean length of hospital stay was 2.36 ± 0.82 days. This difference was statistically significant. i.e. p-value= <0.001 . In patients having age ≤ 50 years: in patients with late presentation the

mean hospital stay was 2.98 ± 0.73 days while in patients with early presentation the mean hospital stay was 2.26 ± 0.81 days (p-value=0.002). In patients having age > 50 years: in patients with late presentation the mean hospital stay was 3.18 ± 0.98 days while in patients with early presentation the mean hospital stay was 2.50 ± 0.83 days (p-value=0.059). In male patients: in patients with late presentation the mean hospital stay was 3.07 ± 0.83 days while in patients with early presentation the mean hospital stay was 2.37 ± 0.82 days (p-value=0.002). In female patients: in patients with late presentation the mean hospital stay was 2.95 ± 0.76 days while in patients with early presentation the mean hospital stay was 2.33 ± 0.86 days (p-value=0.094). In patients with swelling at fracture: in patients with late presentation the mean hospital stay was 3.02 ± 0.82 days while in patients with early presentation the mean hospital stay was 2.73 ± 0.47 days (p-value=0.278). In patients without swelling at fracture: in patients with late presentation the mean hospital stay was 3.17 ± 0.75 days while in patients with early presentation the mean hospital stay was 2.23 ± 0.88 days (p-value=0.020). In patients with non-availability of operation theatre: in patients with late presentation the mean hospital stay was 3.28 ± 0.75 days while in patients with early presentation the mean hospital stay was 2.22 ± 0.67 days (p-value=0.010).

Discussion

Surgical management for unstable ankle fractures is recommended for most patients. The degree of articular damage and anatomic reduction are determinants of satisfactory outcome. The optimal management for soft tissue is prompt reduction and stabilisation. Nonetheless,

immediate definitive fixation may not always be feasible. The timing of surgery affects the time to bone union. Delayed surgery secondary to delayed presentation of 5 to 8 days results in slower bone healing at 6 weeks and therefore prolonged immobilisation and non-weight bearing status, although the range of ankle motion at late follow-up is not affected.[31, 60-62] In this study in patients with late presentation the mean length of hospital stay was 3.04 ± 0.80 days while in patients with early presentation the mean length of hospital stay was 2.36 ± 0.82 days. Statistically late presentation found to be associated with longer hospital stay i.e. p-value=<0.001. Some of the studies are discussed below showing their results as;

The mean length of hospital stay has been reported to be 5.4 days for early surgery (<24 hours) and 9.5 days for late surgery (>24 hours).[2] The longer postoperative length of hospital stay could be explained by the slower progress in physiotherapy secondary to a longer period of preoperative immobility. The length of

hospital stay is usually shorter after early (<24 hours) than delayed surgery.[62]

A retrospective study carried out over a period of 14 months in 98 patients showed that cost and length of hospital stay was less in patients who were operated 24 and 48 hours before surgery with a significant p-value difference of <0.001.[7]

The postoperative length of hospital stay is longer after early (<48 hours) than late surgery (6.98 vs. 4.93 days), because of different thresholds for surgery and peri-operative protocols. The length of hospital stay can be shortened in delayed surgery, because patients are discharged initially if significant ankle swelling or blistering has precluded early surgery, and semi-elective re-admission for surgical fixation is arranged.[63] According to a study by Rohit Amol Singh et al[8] the mean postoperative length of hospital stay was shorter in the early surgery group (2.9 vs. 5.5 days, p=0.009). They concluded that the patients with delayed surgery for ankle fracture had a longer postoperative length of hospital stay.

In another study done on Open Reduction and Internal Fixation of Ankle fractures, there was significant decrease in post-operative length of hospital stay (2.9+1 vs 5.5+1 days, p=0.009) in patients who were operated within 24 hours and after surgery.[8] Singh et al.,[64] resulted in their study that the delay in ORIF of ankle fractures is associated with increased complication, increased morbidity and increased hospital stay. These fractures should be surgically fixed within 24 h.

Hoiness and Stromsoe[37] investigated whether the timing of surgery had any influence upon soft tissue complications and hospital stay. They reviewed the clinical course of the first six postoperative weeks of 84 closed ankle fractures that were treated by ORIF. Seventeen patients were operated on after 5 days or more. The author reported that the delayed surgery of closed ankle fractures increased the risk of soft tissue complications and prolonged hospital stay. However others have found not a significant impact of early surgery on hospital stay. [9] Of all the ankle fractures, isolated fibular fractures account for approximately 70 % and understanding of Lauge Hansen classification is essential for their management. Literature has shown complication rate of 20 % in surgically managed cases of isolated distal fibular fractures.[10]

In the end its suggested that since ankle fractures are common and its difficult to deal with them so standards of practice should be updated and more literature should be reviewed/research done in order to devise a proper management plan for them. Hence improving the efficiency and decreasing cost for managing such fractures.

Conclusion

This study concluded that the late presentation to hospital is associated with longer hospital stay as compared to early presentation in management through ORIF of the closed ankle fractures.

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