

The Timing of Ankle Fracture Surgery and its Effect on Complications and Hospital Stay- A Prospective Study in a Tertiary Centre

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Abstract

Ankle fracture is one of the most common injuries treated by an orthopaedic surgeon. Ankle fractures are common among young adults especially involved in RTA and extreme or contact sports. The aim of the study was to see whether timing of surgery affects the relative risk of complications and hospital stay following internal fixation of closed ankle fractures. Prospective Hospital based observational study done on 50 patients with closed ankle fractures, both male and female of 18-60 years age groups were treated by operative procedure, 25 patients (Group 1) were operated within 5 days and the other 25 patients were operated after 5 days (Group 2). Type C fractures according to weber classification were most common in both the groups. Complications were more in Group II. In group I, the mean duration of hospital stay was 5.92 days with ranging from 2-8 days. In group II, the mean duration of hospital stay was 8.56 days with ranging from 5-12 days. This study concluded that the timing of surgery affects the recovery and a delay of more than one week gives rise to infections and wound complications, which significantly lowers the final functional outcome including patient satisfaction with increase of financial burden.

Keywords

Ankle Fracture, Timing of Surgery, Complications, Hospital Stay Duration

Introduction

Ankle fracture is one of the most common injuries treated by an orthopaedic surgeon. Ankle injuries are usually caused by simple twisting injury to high energy injuries (1-3). Ankle fractures are common among young adults especially involved in RTA and extreme or contact sports. Overall, most ankle fracture are isolated malleolar fractures, accounting for 2/3 of fractures, with bimalleolar fractures occurring in 1/4 of patients and trimalleolar fractures occurring in the remaining 7%. Open fractures are rare injuries accounting for just 2% of all ankle (4).

The aim of study was to see whether timing of surgery affects the relative risk of complications and hospital stay following internal fixation of closed ankle fractures.

Material and Method

This study included patients attending the OPD, emergency of orthopaedics department, Govt. Medical College Jammu from October 2014 to October 2015 diagnosed with closed ankle fractures.

Both male and female patients between the age group of 18-60 years were treated by open reduction and internal fixation. 50 patients were divided into two equal groups (25 each) as per the timing of surgery.

Group 1- cases of early internal fixation within 5 days

Group 2 -cases of delayed internal fixation after 5 days.

This group included those who presented after 5 days of injury, those could not be operated because of unavailability operation theatre, cost and social circumstances.

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Inclusion and exclusion Criteria for patient selection were as follows.

Inclusion Criteria

1. All displaced fractures
2. Age-skeletally mature patients (>18 years).
3. Sex both Males and Females.
4. Entire definite treatment done in our institution.
5. Patients who complied with regular followup for a period of atleast 6 months.

Exclusion Criteria

1. Skeletally immature patient.
2. Open fractures
3. Fracture associated with neurovascular injury.
4. Severe Peripheral vascular diseases.
5. Uncontrolled Diabetes Mellitus.
6. Patient with underlying Medical contraindication to surgery.
7. Undisplaced fracture.
8. Bad condition of soft tissue (excessive swelling with blister formation, ecchymosis) at the time of presentation.
9. Fractures older than 3 weeks.

After complete evaluation, the patients were treated by operative management, as per the guidelines of AO and a protocol was followed to open or closed reduction and internal fixation of the fractures at the earliest possible opportunity over allocated period of study.

Internal Fixation of the Lateral Malleolus: The lateral malleolus was approached through a posterolateral incision. The fibula was exposed subperiosteally by deepening the incision through subcutaneous tissue and deep fascia. Full thickness skin flaps were retracted anteriorly and posteriorly. Fixation of the fracture was done using 1/3 tubular plate with or without a lag screw, with lag screws alone or with an intramedullary device namely a Rush pin.

Fixation of the Medial Malleolus: A medial longitudinal incision was put over the medial malleolus between its anterior and posterior borders with the lower end curving anteriorly at the tip of medial malleolus. The fracture was fixed with one or two 4 mm cannulated cancellous screws or malleolar screw with washer, or by tension band wiring depending or buttress plating depending on the configuration and size of the fracture fragment.

Posterior Lip Fractures: Reduction of posterior lip fragments was done indirectly through either posteromedial or posterolateral incisions. The choice was made by the location of the fragment on the AP radiograph. Posterior lip fragments were reattached with one or two lag screws, occasionally supplemented with K-wires, washers. The most secure fixation was provided by interfragmentary fixation with lag screws, which glide through the fragment adjacent to their head and be threaded only into the opposite fragment. Such screws were placed from posterior to anterior if the fragment is exposed using a posterolateral incision.

Syndesmotic injury: The syndesmosis must be anatomically reduced and held with provisional Kirschner wires or a reduction clamp before the syndesmotic screws are inserted. The screw should be positioned 2 to 3 cm proximal to the tibial plafond, directed parallel to the joint surface, and angled 30 degrees anteriorly so that it is perpendicular to the tibiofibular joint. The AO group recommended a fully threaded syndesmotic screw in a neutralization mode or position; however, others have suggested that a lag screw provides more secure fixation.

After open reduction and internal fixation, check x-ray was taken in antero-posterior lateral views and mortise view. A well padded PoP slab was applied for 3-5 days. Patients were instructed to keep the limb elevated for prevention of oedema for 3-5 days.

Statistical analysis

In this study total fifty patients sample was taken divided into two groups early and delayed group with 25 patients in each group. The sample was confirmed by all of the patients of the study period who fulfilled the inclusion criteria. Statistical analysis was carried out according to the complete sample analysis. Data were analyzed by use of the SPSS 19 (SPSS Inc., Chicago, IL, USA).

Results

Group 1 = Mean age \pm SD (range) = 36.24 \pm 11.15 (21 – 60) years

Group 2 = Mean age \pm SD (range) = 36.04 \pm 12.59 (21 – 60) years

. Statistically, there was no significant mean age difference between the two groups ($p > 0.05$).

Group 1 = Male to female ratio = 2.57:1

Group 2 = Male to female ratio = 1.78:1

Statistically, there was no significant sex difference between the two groups ($p > 0.05$).

Both the groups had RTA as most common mode of injury. Statistically, there was no significant difference. More patients in Group 1 had Weber type C (52%), followed by Weber type B (24%), Isolated Medial malleolus (16%) and Weber type A (8%). Similarly, more patients in Group 2 had Weber type C (44%), followed by Weber type B (40%), Isolated Medial malleolus (12%) and Weber type A (4%). Statistically, there was no significant difference between the two groups ($p > 0.05$).

Fig. 1 Distribution & Comparison of Patients of Group 1 & Group 2 according to Age

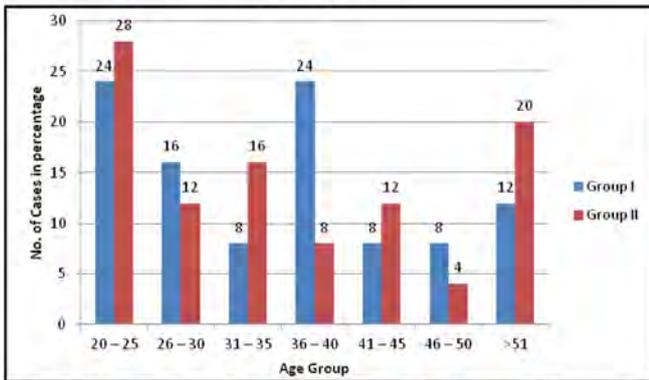
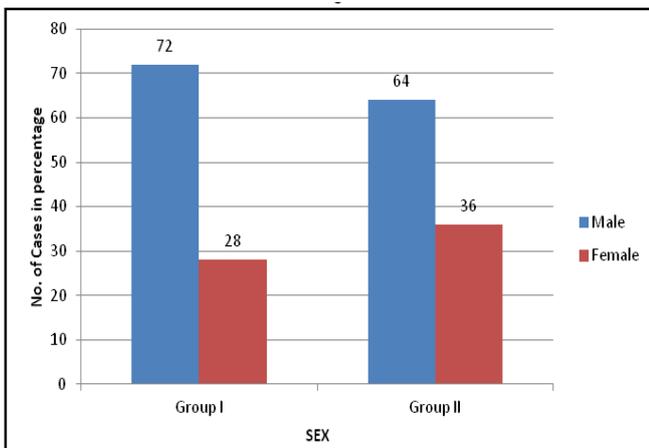


Fig. 2 Distribution & Comparison of Patients of Group 1 & Group 2 according to Sex



Discussion

Ankle fractures represent approximately 10 % of all fractures and are among the most frequently encountered surgically treated fractures (5). 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 stabilization. Nonetheless, immediate definitive fixation may not always be feasible.

In Group 1, there were 3 cases of complications (12%) as compared to 8 (32%) in Group 2. The difference was statistically not significant ($p = 0.40$).

Fig. 3 Distribution & Comparison of Patients of Group 1 & Group 2 according to Mode Of Injury

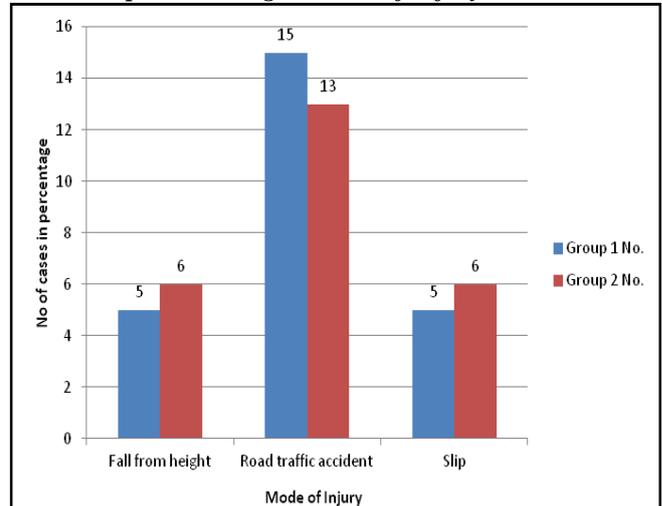


Table.1 Distribution & Comparison of Patients of Group 1 & Group 2 according to Weber Type Classification

Weber type	Group 1		Group 2	
	No.	%	No.	%
A	2	8.00	1	4.00
B	6	24.00	10	40.00
C	13	52.00	11	44.00
IM(isolated medial malleolus)	4	16.00	3	12.00
Total	25	100.00	25	100.00

Soft tissue swelling is not a contraindication to early surgery (6–12 hours after injury); there is less danger of disturbing the micro-circulation in wound margins due to oedema during surgery.

In this study of 50 closed ankle fractures with age group ranging from 18–60 years, average being around 36 years in both the groups. Maximum numbers

Fig. 4 Distribution & Comparison of Patients of Group 1 & Group 2 according to Sex

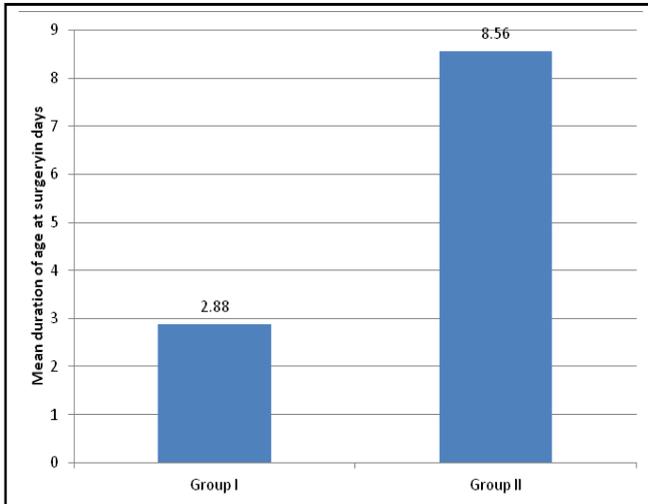


Table.2 Distribution and comparison of patients of Group 1 and Group 2 according to complications

Complications	Group 1		Group 2	
	No.	%	No.	%
Persistent ankle swelling	1	4.00	0	0
Chronic ankle pain	1	4.00	2	8.00
Deep wound infection	0	0	1	4.00
Implant exposed	0	0	1	4.00
Implant symptoms	0	0	1	4.00
Nonunion medial malleolus	0	0	1	4.00
Superficial infection	1	4.00	2	8.00
No complications	22	88.00	17	68.00
Total	25	100.00	25	100.00

p = 0.40 (Fisher's exact test); Not significant

of patients were in third and fourth decade of their life. The mean age in our study was comparable to other studies (mean age 40 years) and (mean age 42 years). The predominance of the fractures in the younger and middle age group in this study was probably related to the fact that young people are more prone to road traffic accidents and other forms of trauma. In our series

Fig. 5 Show Bimalleolar Fracture Fixed with 1/3rd Tubular Plate for Lateral Malleolus Fracture and 4 mm Malleolar Screw For Medial Malleolus Fracture.



Fig. 6 Show Complication of Superficial Wound Infection Over Medial Malleolus



of 50 patients (25 in each group) it was found that ankle fractures were more common in males in both the groups. In this series, right side was seen to be involved more commonly compared to the left side (56%).

In Group I, 13 cases (52%) out of 25 were of type C, fractures according to weber classification whereas in Group II 40% of cases were of type C. Predominance of Type B & type C fractures in our study was

Fig. 7 Show Complication of Exposed Fibula Plate Over Lateral Malleolus



comparable with that of other published series although proportion of type B fractures is lower because in the present series high energy trauma (RTA) were the major cause of energy and there are more men than women. In our study of 50 closed ankle fractures. In group I all patients were operated within 5 days with mean age of fracture was 2.88 days. Most of cases 18 patients (72%) were operated within two or three days since injury. 3 patients were operated on 1st day and three were on 4th day and one patient on 5th day.

In group II out of 25 cases, most patients (32%) i.e. 8 patients were operated on day 7 of injury followed by six days (24%) i.e. 6 patients. 4 Patients were operated on day 8, 2 patients on day 9 and 1 patient each on 10, 11, 12, 14 and 15th day. Mean age of fracture at surgery in this group was 8.56 days. The difference between the two group in the mean age of fracture at surgery was statistically highly significant ($p=0.001$).

Complications

In group I, only 3 patients had complications. One patient had superficial wound infection involving just 1 or 2 stitches at wound site managed with oral antibiotics and antiseptic dressings. There was no instance of skin necrosis. One patient had persistent ankle swelling which was managed with oral NSAIDS and physiotherapy. One

patient had chronic ankle pain. There was no instance of delayed or non union in this series.

In group II, out of 25 patients 8 patients had complication. 2 patients had superficial wound infection. One patient had deep wound infection which was managed with serial wound debridement, antiseptic dressings and oral antibiotics. One patient had complication of implant exposed in which the fibular plate was exposed. Plate was removed at 3 months, by that time the fracture had united. One patient had asymptomatic non union medial malleolus. Patient advised reoperation but he refused. The end result was fair in this case with persistent ankle pain. One patient had implant symptoms and required removal after the fracture union. 2 patients had chronic ankle pain.

When complications were compared between Group I and Group II the difference between the two was found to be statistically non significant ($p=0.40$). Our study is in concordance with that of Tim Schepers *et al* (2013) study in which patients treated within one day experienced no wound complications whereas in the delayed group 11 % (6). A similar significant difference was found for the patients treated within one week (2/98) versus after one week (14/107). Therefore it was concluded that every effort should be made to operate on closed ankle fractures as soon as reasonably possible. A delay in surgery is associated with a significant rise in infectious wound complications, which significantly lowers outcome and patient satisfaction. These fractures should preferably be treated within the first day.

Hospital stay duration:

In group I, the mean duration of hospital stay was 5.92 days with ranging from 2-8 days. Most patients stayed in hospital for 5-6 days (64%). In group II, the mean duration of hospital stay was 8.56 days with ranging from 5-12 days. Most patients stayed in hospital for 7-8 days (40%) followed by 9-10 days.

When mean stay in hospital between Group I and Group II were compared, the difference between the two was found to be highly significant ($P<0.0001$). Our study is in concordance with that of Pietzik *et al* (2006) study (7) and Manoukian *et al* study (8). There was no increase in complication rate after implementation of the fast-track system. This study shows that early operative intervention for ankle fractures reduces the length of hospital stay.

In this study other factors, other than trauma and surgical characteristics, which have been identified as negatively

influencing outcome are obesity, smoking, alcohol abuse, and a lower level of education . These parameters were not assessed in the current study.

Conclusion

In conclusion, it was observed that the timing of surgery affected the recovery. Every effort should be made to operate closed ankle fractures as soon as reasonably possible. A delay of more than one week gives a significant rise in infections and wound complications, which significantly lowers the final functional outcome including patient satisfaction with increase of financial burden.

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Nil

Conflicts of interest

There are no conflicts of interest.

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