Discussion
DISCUSSION

The treatment of fractures of the ankle have received great attention and elicited diverging opinions. These injuries have been a matter of serious concern to the orthopaedic surgeons, as the ankle joint has to bear the maximum static body weight. Ankle injuries are indeed very common.

This means that ankle injuries constitute a quantitative therapeutic problem that must be solved in the best way considering the available economic and medical resources, however the demand for high quality in the treatment must not be omitted.

In the present study; by using various parameters to cover different aspects of ankle fractures, analysis has been made to analyze and understand the problem associated with these common yet complicated injuries.

AGE AND SEX INCIDENCE

Harvey (1965); Segal (1975); Cedell (1975); noticed ankle injuries are more common in young adults. Similar observation has been made in this study also. Maximum incidence was found in adults between the age of 16-45 years (Fig no.1). This is because they lead more vigorous outdoor life and hence more exposed to injury. Burwell and Charnley (1965), reported maximum incidence between 60-69 years of age. In this series however, is sharp decline in incidence of injury [71]
after the age of 60 years. The oldest patient in this study was 65 years. The disparity in the age incidence is due to lower average life span in our country as compared to the west and also because people in our part are less active in their old age than their western counterparts.

This sex incidence showed that the ratio of male and female was 9:1 as there were 36 males four females in the present series. Sex ratio observed by authors is as follows:

Lange Hansen (1952) 1.6:1
Vasli (1957) 1:1.4
Klossnee (1962) 2:3
Meyer & Kumbler (1980) 1:1.25

Burwell and Charnley (1965) also noted higher incidence of ankle injuries among males. This is because the male leads an active life and females are generally confined to home. While in western countries, this is not so. Sex incidence was equal in the series of Brostrom (1965).

**SIDE OF INJURY**

In the present series 23 cases had left side involvement and 17 cases had right side involvement.

Brostrom (1965), reported more involvement of right side and C.L. Colton (1971) reported more involvement of left side.

[72]
DELAY IN REPORTING TO THE HOSPITAL

Only 55% cases reported within 24 hours but within 48 hours after injury, rest cases reported after that including 10% (four cases) who reported after 15 days.

The delay in coming to the hospital, was due to either the ignorance, lack of transport facilities or to the indigenous treatment suggested by quacks, as was observed after asking leading questions with the patients.

TREATMENT RECEIVED BEFORE REPORTING TO HOSPITAL

Only 10 patients who had reported after 24 hours had received proper first aid before reporting to this hospital. While three cases had manipulation and massage done by the quacks. These observations highlight the gross need of proper orthopaedic care at peripheral level which is so obviously, lacking in our country.

MODE OF INJURY

Commonest mode of injury was road traffic accidents (67%) followed by domestic accidents (25%) and rest by sports injury (8%).

Maximum number of cases reported by Burwell and Charnley (1965) were due to slipping or stumbling (46%) followed by road traffic accidents (15%) and fall from stool or steps (15%). Thus, as contradictory in present series we rather had maximum number of injuries by road traffic accidents because of over crowded roads, low standard of living, poor
maintenance of vehicles, bad conditions of roads and mixed traffic.

ASSOCIATED INJURIES

Out of 40 patients 10 patients (25%) had associated injuries while Burwell and Charnley (1965) reported this only in four of their 135 cases. Higher incidence of associated trauma in this series is due to high velocity road traffic accidents.

COMPOUND INJURIES

In this series nine patients (22.5%) out of 40 cases, had compound ankle fractures. Klowner (1962) observed (27%) and Burwell and Charnley reported (52%) incidence of compound ankle fractures.

In present series 33% of all the compound injuries had grade I compounding, 56% had grade II compounding and 11% had grade IIIA compounding. Chapman and Mohanty (1976) found 60% of grade I compounding and 10% had grade III compounding.

Compound fractures in ankle are common because the bones around the ankle are subcutaneous.

CLASSIFICATION ACCORDING TO THE NUMBER OF MALLEOLI FRACTURED

In the present series 50% had unimalleolar fractures and 50% had bimalleolar fractures. Burwell and Charnley (1965)
reported 18% of unimalleolar, 49% of bimalleolar and 32% of trimalleolar fractures.

The difference is due to the fact that in the present series the majority of cases had injuries in stage I or II only.

**TREATMENT OF FRACTURES**

Out of 40 cases, 19 cases (47.5%) were treated by operative means and 21 cases (52.5%) were treated by conservative means. Burwell and Charnley (1965) operated 15.8% cases and managed 84.2% cases by conservative means. Brodie and Denham treated 15% of their cases by operation and 85% cases by conservative means. Danis and Jansen (1971) emphasized the operative treatment, as only this can make anatomically satisfactory reconstruction of a malleolar fracture.

**(A) CONSERVATIVE TREATMENT**

Conservative treatment was undertaken in all the 19 cases of undisplaced fractures and two cases of displaced fractures. In the present series a below knee plaster immobilization was given in all 19 cases of undisplaced fractures. In displaced fracture above knee cast applied after closed reduction, in these immobilization was done for 6-12 weeks.

Yablon and Wasilewski (1981) advised repeat check X-ray to see any displacement, as sometimes, the fracture may displace in the cast.
(B) OPERATIVE TREATMENT

In 19 cases of displaced fractures, operative treatment was done. The operation was done in potentially unstable injuries as in cases where medial malleolar fragment was at joint level or there is diastasis of inferior tibiofibular joint or in cases where closed reduction fails. AO group surgeons (1966) aim at a totally stable joint reconstruction.

OPERATIVE PROCEDURES

Medial malleolar fractures were exposed through a longitudinal incision. Chapman (1992) also exposed through a straight incision midway between its anterior and posterior borders of tibia. Similar approach was suggested by Brodie and Denham (1974), Segal (1979).

In the present series most of the medial malleolar fractures were fixed by two cancellous screws. Burwell and Charnley (1965) fixed medial malleolus by one screw in 76.4% cases, by two screws in 11.38% cases and pins in 7.3% cases. so, the commonest method for fixation of medial malleolus is screw fixation but small fragments can either be fixed by tension band wiring or k-wires.

Lateral malleolus or lower 1/4th of fibula were approached by a laterally placed longitudinal incision. In the present series most of the fractures of lateral malleolus were fixed by Rush pin. Five cases with fibular fractures were not fixed. AO
surgeons described the internal fixation of fibula according to configuration of fracture.

Burwell and Charnley (1965) used plate and screws in 23% cases and screws in 51.7% cases and in 20.6% no fixation was done.

Syndesmosis was fixed by a horizontally placed cortical screw. Burwell and Charnley hold the opinion that trans syndesmotic fixation is not essential when the associated fracture have been fixed. Bonnin (1950), Mayer (1956), Vasli (1957), Colton (1968), AO surgeons and Chissell & Jones (1995), suggested syndesmotic fixation if it is unstable.

**TIME OF OPERATION**

15 cases (78.94%) were operated within seven days of injury, three cases (15.78%) were operated after 7-14 days of injury and one cases after 15 days of injury. Burwell and Charnley (1965) operated majority of cases on the same day. Klossner (1979) also suggested that surgery should be done within few hours.

In the present series delay was in majority of cases, due to late reporting to the hospital and in others due to some ailment during pre-anaesthetic period.

**POST OPERATIVE IMMOBILIZATION**

Below knee plaster cast immobilization was done in all the cases for varying periods depending upon type of fracture and associated fractures.
When rigid internal fixation was done then post operative immobilization was done for about 6-10 weeks. This was followed by non weight bearing active physiotherapy of ankle and foot joints. Similar regime was advocated by Mast and Trigher (1980), Mayer and Kumbler (1980).

Burwell and Charnley also advocated more then eight weeks immobilization in cases where limited internal fixation was done. Muller et al (1969) advised non-weight-bearing crutches after internal fixation and active range of movements.

**PERIOD OF FOLLOW-UP**

Thirty nine patients were followed for a period of six weeks to 12 weeks after the treatment given. In Bruwell and Charnley (1965) series cases were followed up for a average of 34 months. In Meyer and Kumbler's study average follow up period was 38 months. Because the period of follow up in this series is shorter for the late complications to develop like arthritis, so few good results may deteriorate with time.

**END RESULTS**

End results in all the cases that could be followed up were assessed and graded according to criteria suggested by Klossner (1962), Olerud and Molander (1984).

**(A) END RESULTS IN CONSERVATIVELY TREATED PATIENTS**

Out of 21 cases that were followed up, 16 cases (76.19%) had good results, three cases (14.28%) had fair results and two cases (9.52%) had poor results. In three cases who had fair
results, there was restriction of movement especially dorsiflexion, swelling and pain while walking. In all three cases immobilization was for longer period as they had associated fracture both bone leg. One patient developed non-union of medial malleolus with limping and another patent had both limping and deformity of leg with swelling and restriction of movements. They both were kept in poor results.

Burwell and Charnley (1965) stated that joint stiffness is common problem after closed method of treatment and chances of stiffness are more with longer period of immobilization and poor quality of reduction.

**(B) END RESULTS IN FRACTURES TREATED BY OPERATIVE METHODS**

Out of 18 patients that were followed up 15 patients (83.33%) had good results, 2 patients (11.11%) had fair results and one patient (5.5%) had poor result.

Patients who had fair results where having compound fractures and both were fixed by K-wires. Out of two cases, one case had deep wound infection for which later on K-wires were removed. Both had restriction of movements and moderate amount of swelling as they were immobilized for longer periods.

One case had poor result who had compound fracture grade IIIA for which K-wire fixation done. Fracture reduction
was lost and patient developed swelling, limp and obvious deformity.

<table>
<thead>
<tr>
<th></th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Conservative</td>
<td>76.19%</td>
</tr>
<tr>
<td>Operative</td>
<td>83.33%</td>
</tr>
</tbody>
</table>

Better results were obtained following operative treatment in the present series. Operative treatment was done in most of unstable and compound ankle injuries. This is in accordance with the findings of most authors like Danis (1949), Hobmann (1950), Vasli (1957), Willeneggar and Weber (1963), Denham (1964), Burwell and Charnley (1965).

Rowley, Norris and Duckworth (1986) reported that if a good reduction can be achieved and maintained then closed treatment is as good as operative treatment.

**Complications**

**Swelling:**

Persistent or recurrent oedema around the ankle, specially after use during the day was found in 15 cases. This problem was observed in 37.5% of cases in both groups whether they are treated by conservative methods or operative methods. This is not in accordance with the observation of Burwell and
Charnley (1965), CL Colton (1971). They have observed this complication more in conservatively treated patients. In most of the cases this was overcome by application of elastic crepe bandage, elevation of the limb during the night and active physiotherapy.

**Stiffness:**

Joint stiffness was found in cases where initial displacement was more, cases that were immobilized for longer time and in compound fractures. Dorsiflexion was limited more than plantar flexion in majority of cases. More than 50% limitation of movement was observed in 17.9% cases in both groups whether they are treated by operative or conservative method. Brannstein and Wade (1955), Watson Jones (1959), Burwell and Charnley (1965) reported that it is more common in conservatively treated patients because of improper reduction and immobilization for longer period.

**Non-union:**

Non union medial malleolus was seen in one case (2.5%) who was treated conservatively. This patient was not ready for operation initially at the time of injury as the fracture line was transverse and displaced. Similar incidence was observed by various authors in conservatively treated patients. Non union occurs either because of interposition of periosteum, infection or improper reduction.
Joes and Neal (1962) - 7%
Klossner (1962) - 10%
Sneppen (1969) - 9.1%

Malunion:

Out of 39 cases who had ankle fractures two cases (5.1%) developed malunion. One case was treated conservatively and one case was treated operatively.

Cedell and Wiberg (1962), Wilson and Skilbred (1966) also noted the external rotational deformity of lateral malleolus.

Infection:

Deep infection occurred in one case (2.5%) which was compound grade III A fracture fixed by K-wires. The reported incidence varies from 1% to 18% in closed fracture treated surgically. In four cases (10.25%) there was superficial infection which improved with change of antibiotics and regular cleaning and dressing. The incidence of infection is high because the most cases were treated in emergency O.T. with limited resources, and patients having unhealthy skin.

* * * * *