Material and Methods
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The study was conducted in the department of Orthopaedics, M.L.B. Medical College, Jhansi. The study included patients admitted after presenting at OPD or emergency. The cases of undisplaced fractures were treated as out patients while the patients who required operative treatment were admitted to the hospital.

All the patient of ankle injuries were studied as per proforma enclosed between May 2000 to July 2002. On arrival of patients to hospital, patients was resuscitated from shock, bleeding, if present and POP slab. Any compounding was managed by irrigation and debridement.

In cases with some delay specially with marked swelling, the presence of any blisters or skin necrosis was looked for. Neurological examination, examination of peripheral pulses and nail bed circulation was done in all the cases to exclude any neurological deficit.

Anterior posterior and lateral skiagrams of the injured ankle were taken in all the cases. Routine investigations such as hemoglobin, total and differential leukocyte count, ESR, blood sugar, blood urea and routine urine examination was done in the mean time.

[42]
After thorough study of X-ray, patient fitness to anaesthesia, economic condition of patient decision was taken whether he or she is to be operated or not.

**Management**

In unimalleolar fractures a below knee plaster cast was given in all cases. Immobilization was continued for a period of 6-8 weeks. Plaster immobilization was discontinued only when there was clinical and radiological evidence of fracture union. Many patients who complained of recurrent oedema around ankle after the removal of cast were advised to used a crepe bandage during the day and elevation of the extremity during the night.

**Fractures with displacement**

All the displaced fractures were treated either by manipulative reduction and plaster immobilization or by open reduction and internal fixation.

If the radiograph showed unsatisfactory reduction, an open reduction and internal fixation was taken. In unstable fresh fracture open reduction and internal fixation was done. All operations were performed under general anaesthesia, spinal anaesthesia or epidural block with tourniquet.

**Medial Malleolus**

After exposing the fracture site by antero medial or postero medial approach, two K-wires were drilled at right angles to the plane of the fracture. Each K-wire was then [43]
removed and replaced with 4.5mm malleolar or cancellous screw.

**Lateral Malleolus**

After exposing the fracture site by anterolateral or postero lateral approach, oblique and spiral fracture were fixed by interfragmentary screw and one third tubular plate along the lateral border of fibula.

The transverse fractures were fixed by AO tension band wire technique.

**Posterior Malleolus**

Was reduced by the same incision given to expose fibula and fixed by means of compression lag screw from anterior to posterior.

**Syndesmosis**

Syndesmosis separation that were unstable were fixed by cortical screw after fixing the fibula fracture first.

**Post Operative Management**

After fixing the fracture the limb was kept in below knee slab and limb elevated with active toe movement.

The stitches were removed after twelve days and slab was replaced by below knee cast and patients were advised non-weight bearing walking for 6-8 weeks. Plaster immobilization was discontinued when there was clinical and radiological incidence of fracture union. Thereafter the patients were
instructed to do active physiotherapy and to bear weight within the limits to discomfort gradually resuming full weight bearing.

**TREATMENT OF COMPOUND FRACTURES**

In compound injuries meticulous debridement, copius irrigation, and the systemic and local antibiotics were used and in most cases the fractures were fixed with K-wire, tension band wiring or rush nail.

**FOLLOW-UP**

Patients were followed up according to plan given in the proforma. While grading the results of treatment of these injuries the criteria suggested by Klossmer (1962), Olerud and Molander (1984) and D.Seagal (1985) were used.

**CLINICAL CRITERIA**

**(a) Subjective criteria**

**Good results:** Complete recovery slight discomfort or aching after use.

**Fair results:** aching during use, slight stiffness not enough to interfere with normal activity. Ability to walk, not seriously impaired.

**Poor results:** Considerable permanent handicap. serious impairment or ability to walk, pain.

[45]
(b) **Objective criteria**

**Good results:** Normal gait, slight swelling and ankle and foot movement at least $\frac{3}{4}$th of the normal range.

**Fair results:** Normal gait, no deformity, some swelling, ankle and foot movements at least half of the normal range.

**Poor results:** Obvious limp, visible deformity of ankle or foot, movement of ankle and foot less than half of the normal range.

(c) **Radiologic criteria**

**Good results:**

- **Lateral malleolus:** Anatomic alignment or up to 1mm displacement in any direction, minimal mortise widening (less than 0.5mm).

- **Medial malleolus:** Less than 2mm displacement in any direction. Mortise widening less than 0.3mm.

- **Posterior malleolus:** Less than 2mm displacement.

- **Talus:** Less than 0.5mm displacement in any direction.

**Early mild arthritic changes were graded in this group.**

**Fair results:** When the above mentioned displacement ranged between 2.5mm or widening of [46]
tibiofibular syndesmosis less than 2mm
patients with mild arthritis changes are
included in this category.

Poor results: Above mentioned displacement being more
than 5mm. Mortise widening of more than
2mm. Residual talar displacement cases with
severe arthritic changes were included in this
group.
**PROFORMA FOR THESIS**

Name  
M.R.D. No.

Age/Sex  
Ward/Bed

Occupation  
Diagnosis

Address  
C/I

Date of injury

Date of attending to injury

Mode of injury- Sport injury

   Slipping and twisting injury
   Road traffic accident
   Fall from height
   Others

Present history

Treatment history

(Patient had taken any treatment before reporting to the hospital)

Personal history

Past history

Family history

[48]
Initial status of patients

Vitals

Pulse rate
Blood pressure
Respiration
Temperature

General examination

Systemic examination

Local examination

Deformity
Swelling
Closed / open

Tenderness

Movements at the ankle joint
Abnormal mobility and stress examination
Stability of ankle joint
Neurovascular status
Other associated injuries

[49]
Radiological examination
   Anterior posterior view
   Lateral view
   Mortise view
   Stress view

Routine investigation
   Blood Hb, TLC, DLC, ESR
   Urine (Routine and Microscopic)

Classification of injury according to Lauge-Hansen.

1. Adduction injuries (Supination-adduction)
   Stage I
   Stage II

2. Supination—External rotation injuries
   Stage I
   Stage II
   Stage III
   Stage IV

3. Abduction injuries (Pronation-abduction)
   Stage I
   Stage II
   Stage III

[50]
4. Pronation-external rotation injuries

Stage I
Stage II
Stage III
Stage IV

5. Vertical compression (Pronation-Dorsiflexion)


Diagnosis

Treatment

  Conservative

  Operative

Post operative X-ray

Follow up

First week - Swelling

  Infection

  Neuro vascular status

  Pain

Second week - only in operative cases

Six week - Discomfort

  Pain

  Swelling

[51]
Recurrent edema
Gait
Movement at ankle joint

Twelve weeks-
Muscle atrophy
Non union
Delayed union
Mal union
Other complications

Results :

* * * * *