MATERIAL
AND
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The study was conducted in the department of Orthopaedics, M.L.B. Medical College & Hospital, Jhansi.

The patients for this were selected from those attending the outpatient department and Emergency of M.L.B. Medical college & Hospital, Jhansi.

All patients were subjected to detailed history, clinical examination and necessary radiological and pathological investigations.

METHOD

PREOPERATIVE EVALUATION OF PATIENTS

History
Name, age, sex, site of fracture, duration of injury, mode of injury, any other associated injury, concurrent or past history of illness.

Clinical assessment of patients
General condition, pulse, blood pressure, examination of cardiovascular system and respiratory system of patients for fitness for anesthesia.

Local Examination
Examination for associated neurovascular involvement and associated injuries.

Radiological Examination
To assess the type of fracture and type of bone quality.
**Routine investigations**

It included blood Hb gram%, TLC, DLC, ESR, blood sugar, Serum creatinine, ECG and X-ray Chest PA view in relevant cases.

**Initial Management**

First aid was given to the patient. The hemorrhagic shock if any, was managed and the loss of blood volume was replaced by whole blood. If compound fractures, surgical toilet and debridement was performed in all cases under anesthesia as early as possible. Fracture stabilized with wooden splint and X-ray of affected was done in antero-posterior and lateral views. After that injured limb was placed in traction either skin or skeletal. Prophylactic broad spectrum antibiotics, antiinflammatory and analgesic drugs were prescribed. Immunization against tetanus and gas gangrene was done.

**Implants and Instruments**

For internal fixation of distal femur fractures with Dynamic condylar screw, following instrument were used.

**A) Implants**

a) **Barrel plate**: Its length depends upon the number of holes (distance between two holes being 16 mm. Tube length 25; diameter 12.5 mm; plate width 16 mm; and the plate thickness 5.4 mm. Angle between plate and tube 95.

b) **Condylar screw with compression screw**: Length of condylar lag screw varies from 55 mm to 75 mm; threaded length 22 mm or 16 mm.
c) **Cortical DCP screw and cancellous screw**: 4.5 mm DCP cortical screw length 28 mm to 52 mm, 4.5 mm cancellous screw 40 to 80 mm.

**B) Special Instruments**

- Calibrated guide wires 3 in number and K wires.
- $95^\circ$ angle guide or adjustable angle guide.
- Adjustable combination calibrated triple reamer.
- Calibrated tap.
- Barrel guide.
- Standard T wrench.
- T-handle with Coupling device.
- Plate impactor.

**C) General Instruments**

- Instrument for DCP
- Femoral distractor
- Instruments for bone grafting.

**Preoperative Planning**

Preoperative planning was done in all cases by fracture tracing from the radiograph, subsequently the fracture was reduced and fractured
segments were aligned with the help of these tracings. Then the condylar screw with appropriate length and barrel directly proportional to length of plates, was traced on the tracing of reduced fracture. It gave an accurate (near about) idea about the reduction of fracture, the proper size of barrel plate, condylar screw, approximate length of cortical and cancellous screw, as well as proper placement of the implant in all the cases. For grossly comminuted fractures, fractures were reduced on tracing paper with the help of X-ray of normal limb.

**Surgical Technique**

➤ Spinal or general anaesthesia was given to the patients.

➤ Patients were placed on operation table in supine position & knee in semiflexed position.

➤ Part was cleaned, painted and draped.

➤ Make a lateral incision parallel to the shaft of femur, beginning at the Gerdy tubercle and extending proximally for enough length to permit application of DCS plate with at least four holes above the most proximal fracture line.

➤ Reduction of the articular fracture and preliminary fixation with K-wires.

➤ The articular fracture is stabilized by replacing the K-wires by cancellous screws.

➤ Placement of Guide pins.
1\textsuperscript{st} Guide pin placed transversely through knee joint parallel to surface of the tibial condyles.

2\textsuperscript{nd} Guide pin placed transversely posterior to the center of patella.

3\textsuperscript{rd} Guide pin placed 2 cm above the articular surface of the lateral femoral condyle parallel to 1\textsuperscript{st} and 2\textsuperscript{nd} guide pins. The 3\textsuperscript{rd} Guide pin should be inserted as far as but not through the medial cortex.

- The inserted length of guide wire is measured by direct measuring device. In this position one might check positions with x-ray or image intensifier.

- 10 mm length is subtracted from the measured length for the length of DCS and the triple reamer set to the desired depth is passed over the guide wire and the drill hole is made.

- In hard cancellous bone, there would be precut done for the screw thread with tap.

- Dynamic condylar screw 5 mm shorter than the reamer hole is chosen. Assembled guide shaft and screw are inserted into the special T wrench. The whole assembly is now slid over the guide wire and insertion of screw is now begun by turning the T- wrench clockwise and kept on insertion 5 mm deep to the lateral cortex.

- Approximate DCS barrel plate is slid over the barrel guide and over the inserted screw and guide wire with drawn.
With the impactor, the DCS plate is seated against the shaft of the femur. The plate is locked to the condylar screw with the compression screw.

Two cancellous screws are then inserted into distal condylar complex.

The DCS plate is fixed to the proximal segment by 4.5 mm cortical screws.

Bone grafting done (if required)

Wound washed with normal saline and closed in layers over suction drain.

Post Operative Care

In post operative period, limb was elevated with the help of pillow.

The antibiotics and analgesics were continued parenterally for 3-4 days after operation and then switched over to oral antibiotics.

Suction drain removed after 48 hours.

Active physiotherapy

Range of motion exercises were started 2 days after the surgery if fixation was stable. Active quadriceps and hamstring exercises were also started.

Skin sutures were removed on 12th to 14th day of surgery

Ambulation

Touch down, weight bearing only was allowed until fracture consolidation.
Analysis
The results were evaluated clinically and radiologically.

i) Clinical evaluation.
Following criteria were taken into account.

➢ Assessment of pain.
➢ Tenderness
➢ Movement of knee.
➢ Squatting posture.
➢ Gait
➢ Deformity.

After six months patients were graded as excellent, good and poor as per following criteria.

Excellent
No pain, minimum limp, normal range of motion can walk without support, can squat, good alignment and good amount of callus at fracture site on x-ray.

Good
Mild pain, noticeable limp, normal range of motion, can walk with help of cane, can squat. Acceptable alignment and fair amount of callus at fracture site on X-ray.

Poor
Moderate pain, marked limp, limited range of motion, cannot walk, cannot squat, poor alignment and poor amount of callus or no callus at fracture site on x-ray.
PHOTOGRAPH SHOWING SPECIAL INSTRUMENTS FOR DCS
PHOTOGRAPH SHOWING GENERAL INSTRUMENTS
PHOTOGRAPH SHOWING POSITION OF GUIDE WIRES

PHOTOGRAPH SHOWING FIXATION OF DCS PLATE