

**Osteosynthesis Of
Intracapsular Fracture
Of Neck Of Femur
With Cancellous Screw
And Fibular Graft**

Samin Arbab*, M.B.,B.S., F.R.C.S.
and
Shahab-ud-Din,** M.B.,B.S.,
M.C.P.S., F.C.P.S.,
Postgraduate Medical Institute,
Lady Reading Hospital,
Peshawar, Pakistan.

Summary

Twenty two patients with fracture of neck of femur, 6 fresh and 16 old cases, were managed by open reduction, cancellous screw fixation and free fibular graft. The patients were between 20-50 years of age. Follow-up of all cases was done upto one year. All cases had good clinical and radiological union except one case who developed avascular necrosis due to technical error and early weight bearing.

Introduction

Intracapsular fracture of neck of femur is still an "unsolved" problem despite modern bio-chemical and technical advances. In the older age group (above 50 years) this fracture is managed with replacement arthroplasty⁵ or with different fixation devices depending on the grade of fracture and time of presentation². The best treatment of this fracture in younger patients (below 50 years) is still not satisfactory and the prognosis is worse when they present late as this is a common practice in this part of the world.

We conducted a study to manage the younger age group patients presenting with either fresh or old intracapsular fracture of neck of femur by open reduction, cancellous screw and fibular graft fixation. This was tried in the past by Inflan and Patrick with less encouraging results^{6,9}.

* Asstt. Professor of Orthopaedics, Postgraduate Medical Institute.
** Senior Registrar, Deptt. of Orthopaedics, Lady Reading Hospital.

Later in 1986 Nagi, Gautam and Marys conducted the same series with good and encouraging results⁸.

Material and Methods

Twenty two patients were included in the study from June 1986 to May 1988; they were operated in the Department of Orthopaedics, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar.

All patients between 20-50 years age group were selected irrespective of the displacement and time of injury. All cases less than three weeks duration were labelled as "fresh cases" and the rest were labelled as "old cases".

- There were 6 fresh and 16 old cases.
- Age incidence is shown in Table-I.
- Sex ratio was male 8 (36%) and female 14 (64%).
- Side involvement incidence was left side 16 (73%) and right side 6 (27%).
- The incidence in relation to radiological type of fracture was:-

Garden I	-	2 (9.1%)
Garden II	-	3 (13.6%)
Garden III	-	7 (31.7%)
Garden IV	-	10 (45.5%)

- The time between injury and operation in relation to the number of cases is shown in Table-II.

- Follow-up of all cases was done upto one year.

**TABLE - I
AGE INCIDENCE**

Age range	No. of cases with percentage
20 - 30 years	8 (36.3%)
31 - 40 years	5 (27.7%)
41 - 50 years	9 (41.0%)

**TABLE-II
TIME DURATION BETWEEN INJURY AND OPERATION
IN RELATION TO NO. OF CASES**

Duration	No. of cases
0 - 3 weeks	6 (27.2%)
3 - 6 weeks	2 (9.1%)
6 - 12 weeks	2 (9.1%)
12 - 24 weeks	6 (27.2%)
24 - 36 weeks	6 (27.2%)

Operative Procedure

The operation was performed with the patient lying on a standard orthopaedic table with image intensifier. The hip was approached through a Watson Jones approach in all cases.

Capsular incision was made anteriorly in the centre and fracture exposed. The fibrous tissue was scrapped and the fracture was reduced and temporarily fixed with a guide wire under image intensifier. Then an A.O. 6.5m cancellous large screw was inserted first below and parallel to the guide wire. Meanwhile the assistant removed 10 cm length of fibula from the same leg and prepared it: the interosseous border nibbled to expose

the medullary cavity along its whole length. 5-6 holes were made on both sides of the fibula as shown in Fig. 1.

A second guide wire was drilled in under image intensifier parallel to and below the cancellous screw. The bed for the fibular graft was prepared by a DHS triple drill over the second guide wire. Then the length measured for the fibular graft which was hammered over the guide wire. The guide wire was removed and the wound was closed in layers.

Post-operatively the leg was kept in Thomas splint for 2 weeks, after which the stitches were removed and a single spica cast applied. The cast was removed after 6 weeks and the patient was allowed mobilisation on crutches non-weight bearing. Partial weight bearing was allowed gradually after one month when some radiological union was seen. Full weight bearing was allowed when there was good radiological union.

Results

All fresh cases united within the duration of 14-24 weeks (mean 19 weeks). All old cases, except one, united within the duration of 36-52 weeks (mean 44 weeks). The 'one case' developed non-union and avascular necrosis: X-ray and bone scan shown in Fig. 2 and Fig. 3.

Complications

In early complications, 2 cases developed superficial infection treated with appropriate antibiotics.

In late complications, 2 cases presented with fracture of fibular graft which was treated with bed rest and non-weight bearing till the fracture was united.

One case developed non-union and avascular necrosis which was managed with a Mc Murrays osteotomy.

Discussion

In 1939 King of Australia treated these fractures with a nail and bone graft. The failure of his cases was due to metal incompatibility and because of less advances at that time in medical bio-engineering.

Later Inclin⁶ and Patrick⁹ published their results of SP nail with fibular graft reporting a 10-15% non-union and avascular necrosis. The cause of their high incidence of non-union was loosening of metal as the metal used was ionisable and not completely inert.

Cancellous screw provides good rigid fixation and occupies less space than SP nail. If this fixation in young patients is supplemented with bone graft, it will facilitate the union⁷. Moreover at the end of three to four weeks a fibular graft if properly prepared provides a biological fixation by beginning to incorporate with the parent bone thus helping to reduce the loosening of implant. Results of our series are comparable to similar series in which the fixation was conducted by series and fibular graft^{1,8}.

Two cases (9.1%) had fibular graft fracture; they reported on time and were managed successfully with non-weight bearing; the reasons for this complication were due to parallel holes in the fibular graft at the same level as shown in Fig. I, and early weight bearing. Due to the above complication, we started making staggered holes in fibular graft as shown in Fig. 4.

One case (4.5%) out of twenty two cases developed avascular necrosis in our series. This was due to technical error because the screw used was cortical and the patient started early weight bearing himself and reported late to us after 6 months.

Previously we used to treat these types of patients with Mc Murrays osteotomy which has the disadvantage of longer period of immobilisation in plaster and later less range of movement than this procedure, but had the advantage of being cheaper than different fixation devices.

We conclude from our study that this technique is an ideal treatment for patients with intracapsular fracture of neck of femur in younger age group, in this part of the world. Firstly our results were very encouraging and secondly this procedure is cheaper than other procedures for fixation.

References

1. Baksi, D.P. Treatment of post-traumatic avascular necrosis of the

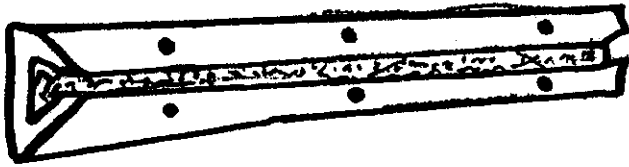


Fig. 1. Fibular graft with parallel holes.

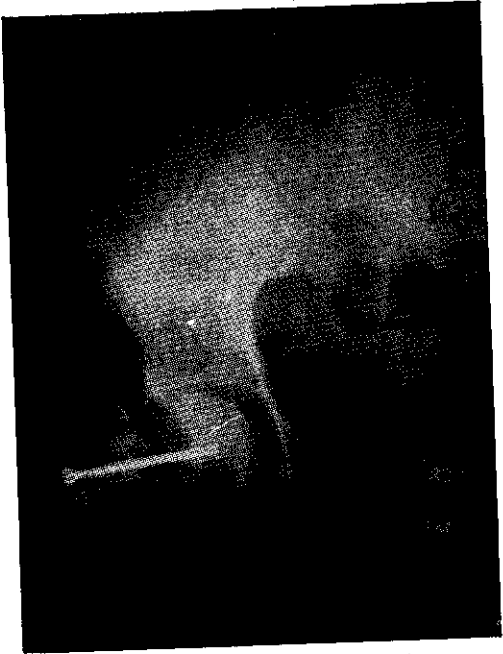


Fig. 2. Non-union and avascular necrosis.

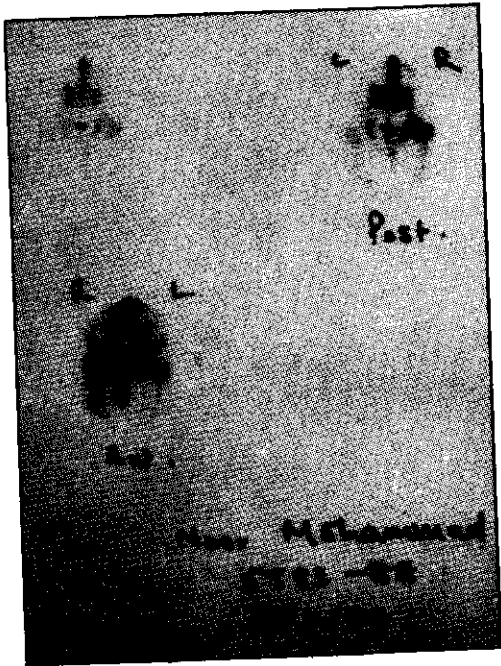


Fig. 3. Bone scan, decrease uptake on right side.

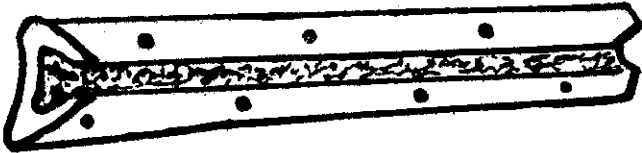


Fig. 4. Fibular graft with staggered holes.



Fig. 5. a. Early post-operative x-ray of the hip.



b. After 6 months, good union.



c. After 1 year consolidation.



Fig. 6. Squating position of the patient 1 year after surgery.

femoral head by multiple drilling and muscle pedicle bone grafting: a preliminary report. *J. Bone Joint Surgery, (Br)*, (1983): 65B., 268-73.

2. Barnes, R., Brown, J.T., Garden, R.S., Nicoll, E.A., Subcapital fractures of the femur: a prospective review. *J. Bone Joint Surg. (Br)*, (1976): 58B: 2:24.

3. Boyd, I, B, George, 11., Complications of fractures of the neck of the femur. *J. Bone Joint Surg.* (1947): 29:13-8.

4. Boyd, I, B, Slavatore, J.F., Acute fracture of the femoral neck: internal fixation or prosthesis? *J. Bone Joint Surg. (Am)*, (1964): 16A: 1066-8.

5. Cartlidge, I.J. Primary total hip replacement for displaced subcapital femoral fractures. *Injury*, (1981): 13: 249-53.

6. Inclan, A. Late complications in fracture of the neck of the femur treated by nailing, bone grafting or both. *J. Int. Coll. Surg.* (1946): 9: 36-50.

7. Meyer, M.H., Harvey, J.P. Jr. and Moore, I.M., Treatment of displaced subcapital and transcervical fractures of the femoral neck by muscle pedicle bone graft and internal fixation: a preliminary report on one hundred and fifty cases. *J. Bone Joint Surg. (Am)*, (1973): 55A: 257-74.

8. Nagi, O.N., Gautam, V.K., Marya, S.K.S., Treatment of femoral neck fractures with a cancellous screw and fibular graft. *J. Bone Joint Surgery*, (1986): 68B: 387-391.

9. Patrick, J. Intracapsular fractures of the femur treated with a combined Smith-Petersen nail and fibular graft. *J. Bone Joint Surg. (Am)*, (1949): 31A: 67-80.

10. Smith-Petersen, M.N., Cave, F.F., Vangorder, C.W., Intracapsular fracture of the neck of the femur: treatment by internal fixation. *Arch. Surgery*, (1931): 23: 715-59.