Synopsis

INTRODUCTION

Though the fracture of hip were known since the time of Hippocrates, but it was Sir, Astley Cooper who first of all differentiated the intracapsular fracture from extracapsular fracture neck femur (Cooper, 1822), as nonunion is common in Intracapsular fracture as compared to extracapsular where malunion is more common.

Elderly population suffers hip fracture due to senile osteoporosis, in which a trivial fall is cause of 90% of hip fractures (Alffram, 1964). It is a devastating injury, incidence of which has increased because of increased life expectancy (Melton, 1996) and by year 2050 there will be an increase of 135% from year 2000 (Sayana et al, 2008).

In post-menopausal woman, due to lack of protective effect of oestrogen, hip fracture is more common as compared to males in ratio of male to female 1: 4, to that of simple senile osteoporosis (Hamid et al, 1994). Femur neck fracture represents epidemically in elderly people (Melton, 1993), as this fracture is relatively rare in young people.

Anatomic factors

Anatomically proximal femur consists of the femoral head, femoral neck and the trochanteric region of a large multiaxial ball-and-socket synovial joint, enclosed by a thick articular capsule which permits free movement of the hip joint. The round head of the femur articulates with the cup- like acetabulum. The fibrous capsule attaches distally to the neck of the femur only anteriorly at the intertrochanteric line and root of the greater trochanter. Posteriorly, the fibrous capsule crosses without attaching to it and thickens to form 3 ligaments of the hip joint: the Y-shaped iliofemoral ligament

(of Bigelow), the pubofemoral ligament, and the ischiofemoral ligament.

Blood supply to femoral head and neck:

The profunda femoris artery (a branch of artery of ligamentum teres) arising from the femoral artery, gives off medial circumflex femoral artery. This gives off lateral epiphyseal and superior and inferior metaphyseal arteries. The lateral epiphyseal arteries supply the lateral 2/3 of femoral Head. The superior metaphyseal arteries supply the superior aspect of femoral neck and the medial epiphyseal artery supplies the circumfoveal sector of head. Ambrose Pare, a French scientist was the first one to recognize hip fractures in late 1500s (Baumgaertner and Higgins, 2001). Sir, Astley Cooper on the basis of capsular attachment, was the first to classify these fractures in treatise of 1822 (Bick, 1976) as intracapsular and extracapsular.

- INTRACAPSULAR : That is within the capsular attachment
- EXTRACAPSULAR: That is outside the attachment of the capsule.

Intracapsular Fracture:-

This is divided according to level of fracture line in the neck as follows:

1. Subcapital
2. Transcervical
3. Basal

Classification:-

Garden's Classification:-

This is based upon the appearance of hip on the AP radiograph and used to determine the appropriate treatment.

- Stage I : Incomplete fracture of neck (called abducted or

impacted)

- Stage II: Complete without displacement
- Stage III: Complete with partial displacement:fragments are still connected by posterior retinacular attachment: there is malalignment of femoral trabeculae.
- Stage IV: This is a complete femoral neck fracture with full displacement: the proximal fragment is free and lies correctly in a acetabulum so that the trabeculae appear normally aligned.

Subcapital fractures are classified as The Pauwels and Linton

Pauwel's Classification:

Type I: has an obliquity ranging from 0 to 30 degrees

Type II: Has an obliquity ranging from 30 to 50 degrees

Type III: Has an obliquity of 70 to more degrees.

Linton's Classification:

- Stage I : Incomplete fracture
- Stage II: Complete but undisplaced fracture
- Stage III: Complete, partially displaced fracture
- Stage IV: Displaced and totally free fracture

A.O Classification:

The fracture of femoral neck are classified as "B", which are further classified as B1, B2, B3

Type B1: Subcapital fracture with no or minimal displacement. These have further 03 types:

B1: 1: Subcapital fracture in valgus of 15 degree or more.

B1:2: Impacted in valgus of less than 15 degree

B1:3: Non impacted

Type B2: Transcervical Fracture. They have 03 types

B2: 1: Basicervical

B2:2: Midcervical with adduction

B2:3: Mid Cervical with shear

Type B3: Displaced subcapital fracture:

B3: 1: Moderately displaced in varus and external rotation

B3:2: Moderately displaced with vertical translation and external rotation

B3:3: Markedly displaced

Primary aim of treatment should be to perform a surgery that provides to an individual greatest opportunity for early ambulation (Stern and Goldstein, 1977). This requirement is fulfilled to a great extent by use of a primary prosthetic replacement implant with or without cement.

Arthroplasty of the hip may be categorized as a total hip arthroplasty, in which, articular surface of both the acetabulum and femur are replaced.

Hemiarthroplasty involves replacement of the femoral head and neck (unipolar hemiarthroplasty) and replacement of the femoral head and neck with an additional acetabular cup that is not attached to the pelvis (bipolar hemiarthroplasty) or replacement of the surface of the femoral head (resurfacing hemiarthroplasty).

REVIEW OF LITERATURE

Dorr et al (1986) in randomized, controlled trials that have compared internal fixation, with either total hip replacement or hemiarthroplasty have demonstrated inferior results for internal fixation, with reoperation rates ranging from 18% to 47%. The reported rates of acetabular erosion have ranged from 0% to 26% for bipolar designs and from 2.2% to 36% for unipolar designs. The major early complication of total hip arthroplasty is dislocation. At the time of the final follow-

up, the hemiarthroplasty group had significantly greater hip disability, than the total hip arthroplasty group.

Parker (2000) studied of 3154 consecutive patients with fracture neck of femur, 908 patients were treated by hemiarthroplasty; 4.8% required revision surgery within the first year for dislocation, periprosthetic fracture (1.2%), loosening (0.8%) and infections (1.2%). Pain and mobility in patients who undergo hemiarthroplasty are inferior to total hip replacement in short term and long term. A meta-analysis reported a mean dislocation rate of 6.9% following total hip replacement for a fracture neck femur.

Ravikumar and Marsh (2000) in a randomized, prospective study of octogenarians, who had sustained a displaced fracture of the femoral neck, reported that the rate of acetabular erosion at two years postoperatively was 2.2% for hips that had been treated with a unipolar prosthesis and 0% for hips that had been treated with a bipolar prosthesis. The lowest dislocation rates (2%) were reported for total hip replacement, using the transgulteal approach in patients who had sustained a displaced intracapsular fracture of the femoral neck. These findings suggest that total hip arthroplasty is superior to hemiarthroplasty for the treatment of mentally competent, independent, and active patients.

Aharonoff et al (2004) compared the outcome of the total hip replacement with hemiarthroplasty in the mobile and socially independent patient with displaced fractures of femoral neck and made note of caution, that there is a higher rate of dislocation, when using the total hip arthroplasty. Of patients walking independently before injury, 30.8% of patients had a good outcome as compared to only 14.2 % of patients who had to rely on aided ambulation. So pre-fracture mobility is often a predictor for short term complications.

Baker et al (2006) in their prospectively randomized study, 81 patientswho had been mobile and lived independently before they hadsustained a displaced fracture of the femoral neck

were randomizedto receive either a total hip arthroplasty or a hemiarthroplasty.The mean age of the patients was 75 years. Outcomewas assessed with use of the Oxford hip score, and final radiographswere assessed.After a mean duration of follow-up of three years, the author proved that, total hip arthroplasty group had a good Oxford hip score as compared to hemiarthroplasty group.

Narayan and George (2006) in his study of 61 patients of endoprosthetic replacement, for fracture neck of femur between May 1997and Dec. 2002 were followed–up prospectively. 29 patients were treated with total hip replacement and 32 were treated with bipolar arthroplasty. The period of follow up ranged from 24 months to 90 months, with a mean of 58.5 months. The mean Harris Hip Score for the bipolar group was 86.93 and for the total hip group was 83.82.

Blomfeldt et al (2007) studied120 patients with a mean age of 81 years (70 to 90) with anacute displaced intracapsular fracture of the femoral neck.They were randomly allocated to be treated with either a bipolarhemiarthroplasty or total hip replacement. The duration of surgery was longer in the total hip replacementgroup (102 minutes (70 to 151) versus 78 minutes (43 to 131)($p < 0.001$), and the intra-operative blood loss was increased460 ml (100 to 1100) versus 320 ml (50 to 850) ($p < 0.001$),but there were no differences between the groups regarding anycomplications or mortality. There were no dislocations in eithergroup. Hip function measured by the Harris hip score was significantlybetter in the total hip replacement group at both follow-upperiods ($p = 0.011$ and $p < 0.001$, respectively).

AIMS AND OBJECTIVES

We intend to study the result of 50 cases of intra capsular fracture neck femur in elderly patients treated with primary cemented bipolar arthroplasty or total hip replacement arthroplasty, 25 cases each, with following objectives:

1. To compare duration of surgical procedure.
2. To compare the time required for unprotected weight bearing.
3. To compare cost of surgeries.
4. To compare the relief of pain, so that the patient is able to carry out the activities of daily life.
5. Operative related complications.
6. To compare functional status of the patient.
7. Any need for secondary surgeries.

The assessment of patient in relief of pain, functional status, and range of movements at hip i.e. 3,4,5 has been evaluated using Merle'D Aubigne and Postal hip rating system, described by Salvati et al (77) and stability of hip has been assessed in terms of dislocation.

MATERIAL AND METHODS

The present study will be conducted on 50 cases of intracapsular fractures of neck femur above the age of 50 years admitted in the department of Orthopaedics, Government Medical College, and Patiala. Out of 50 cases, 25 cemented bipolar prosthesis and 25 total hip replacements will be done.Patients will be given first aid in the form of skin traction, analgesics and antibiotics. Patients will be immunized against tetanus, and shock if present, will be treated. Radiographic examination will be done to assess the type of fracture and displacement. History will be recorded on the proforma attached. General

physical and local examination will be noted. Patient will be investigated for operative and anaesthesia purposes. Any associated medical problems will be taken care of before the patient is taken up for surgery.

Pre-operation preparation

Preoperative counselling of patient and his relatives will be done. Local preparation of part will be done by shaving and preparing the part. Appropriate broad-spectrum antibiotics will be given pre-operatively and continued for 3-5 days after operation.

Operative management:

Surgery will be done under general or spinal/epidural anaesthesia depending upon the choice of anesthesiologist. Patient will be subjected to either hemiarthroplasty, with cemented bipolar prosthesis, or total hip arthroplasty, through postero-lateral approach depending upon bone quality, personality of fracture, co-morbid medical and requirement of patient.

Postoperative

1. Antibiotics and Anti-inflammatory analgesics will be given.
2. Suction drain removal with post-operative blood loss measured and Ist dressing will be done after 48 hours.
3. Suction drain tip will be sent for culture and sensitivity.
4. Physiotherapy will be started 24 hours after the operation.

The patient will be discharged from the hospital within two weeks of operation and partial weight bearing be started before discharge with the help of walker.

FOLLOW UP

- 1 month interval for 6 months
- 6 months interval for 2 years

CRITERIA FOR EVALUATION OF RESULTS

Method Merle 'd Aubigne and Postal hip rating system, described by Salvati et al (1972) will be used for evaluation for the results as below:

(a) **Pain:**

(0) All the time, unbearable, strong medication

(2) All the time but bearable, strong medication occasionally.

(4) None or little at rest. Pain with activities.

(6) When starting, then better; or after a certain activity.

(8) Occasional and slight pain.

(10) No pain.

(b) Walking:

0 Bed ridden

2 Wheel Chair, transfer activities with walker

4 No Support –house bound

One support –less than one block

Bilateral support less than three blocks

(Markedly restricted)

6 No Support less than one block

One support-up to five blocks

Bilateral support –unrestricted limitedly.

(Moderately restricted)

8 No support-limp

One support – no limp

(Mildly restricted)

10 No Support or appreciable limp

(Unrestricted)

(c) Muscle Power and motion

0 Ankylosis with deformity

2 Ankylosis with good functional position

4 Muscle power-poor to fair, are of flexion less than 60°, restricted lateral and rotational movements.

6. Muscle power fair to good, are of flexion upto 90° fair lateral and rotatory movements. (Fair lateral movement: Both abduction and adduction 10° each. Fair rotatory movement: Internal rotation 10° and External rotation 20°)

8. Muscle power good or normal, are of flexion over 90°, good lateral and rotatory movements, (Good lateral movement: 20° each. Good rotatory movement: Internal rotation 20° and External rotation 40°)

10 Muscle power normal, motion normal or almost normal.

(d) Function

0 Completely dependent and confined.

2 Partially dependent

4 Independent Limited Housework, shops limitedly.

6. Most house work, shops freely, desk type work.

8 Very little restriction can work on feet.

10 Normal activities.

Based upon the sum total of scores of above four evaluation a the results will be assessed as :

Excellent	:	Score 32 or more
Good	:	24 to 31
Fair	:	16t o 23
Poor	:	15 or less

Bibliography

- Aharonoff GB, Immerman I, Zuckernman JD. Outcomes after hip fracture. Techniques in Orthopaedics 2004; 19(3): 229-34.
- Alffram PA. An epidemiologyc study of cervical and trochanteric fractures of the femur in an urban population with special reference to etiologic factors. Acta Orthop Scand 1964;65: 9-109.
- Baker RP, Squires B, Gargan MF, Bannister GC. Total Hip Arthroplasty and Hemiarthroplasty in Mobile, Independent Patients with a Displaced Intracapsular Fracture of the Femoral Neck. The Journal of Bone and Joint Surgery (American) 2006; 88: 2583-89.
- Baumgaertner MR, Higgins TF.: Femoral Neck Fractures. Fractures in adults, 5thedition. Edited by Robert Bucholz, Rockwood & Green, Philadelphia, PA.2001. 3.
- Bick EM. Fractures of the neck of the thigh bone. In: Classics of Orthopaedics. Philadelphia, Pa: Lippincott Williams; & Wilkins. 1976:434-36.
- Blomfeldt R, Tornkvist H, Eriksson K, Soderqvist A, Ponzer S, Tidermark J. A randomised controlled trial comparing bipolar hemiarthroplasty with total hip replacement for displaced intracapsular fractures of the femoral neck in elderly patients. Journal of Bone and Joint Surgery– British Volume, 2007;89-B(2):160-65.
- Cooper A. A Treatise on Dislocations and Fractures of the Joints. London, England: Longman, Hurst, Rees, Orme and Brown; 1822.
- Dorr LD, Glousman R, Hoy AL, Vanis R, Chandler R. Treatment of femoral neck fractures with total hip replacement

versus cemented and noncemented hemiarthroplasty. J Arthroplasty. 1986;1:21-8.

• Hamid AKA, Jamaluddin M. Proximal Femoral Fracture; A preliminary epidemiological study based on hospital admission Malaysian J Surg 1994; 9:22-8.

• Melton LJ, 3rd. Hip fractures: a worldwide problem today and tomorrow. Bone 1993;14 Suppl 1:S1-8.

• Melton LJ. 3rd. Epidemiology of hip fractures: Implications of the exponential increase with age. Bone 1996;18:121S-125S.

• Narayan KK, George T. Functional outcome of fracture neck of femur treated with total hip replacement versus bipolar arthroplasty in a South Asian population. Arch Orthop Trauma Surg. 2006; 126 (8): 545-8 (ISSN: 0936-8051).

• Parker MJ. The Management of intracapsular fractures of the proximal femur. J Bone Joint Surg 2000;82-B :937-41.

• Ravikumar KJ, Marsh G. Internal fixation versus hemiarthroplasty versus total hip arthroplasty for displaced sub capital fractures of femur – 13 year results of a prospective randomised study. Injury 2000; 31 : 793-97.

• Sayana MK, Lakshmanan P, Peehal JP, Wynn-Jones C, Maffuli N. Total hip replacement for acute femoral neck fracture. Acta Orthop Beig 2008;74:54-58.

• Stern MB, Goldstein TB. The use of Leinbach prosthesis in intertrochantric fractures of hip. Clin Orthop 1977; 128; 325-9.