

## Original Research Article

# A comparative study between anterior and posterior approach for bipolar hemiarthroplasty in intracapsular fracture neck of femur

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## ABSTRACT

**Background:** The present study was undertaken to compare the efficacy of treatment of intracapsular neck of femur fracture operated by anterior and posterior approaches.

**Methods:** A total 100 patients of either sex, aged >65 years with intracapsular neck femur fracture were operated with hemiarthroplasty. The patients were divided into two equal groups and patients were operated alternatively one with anterior approach and the second with posterior approach. Functional outcomes were compared using Harris hip score and range of movements assessed clinically. Hip function and final outcome measures were noted and compared between two groups.

**Results:** The mean age of patients was 63.1±5.3 years in group A and 65.8±5.4 years in group B with female to male ratio was 1.7:1 for group A and 1.8:1 for group B. Operating time for group A and for group B was 65 and 78 minutes respectively. Mean intraoperative blood loss was 120 ml in group A and 150 ml in group B. The most common complication in both the groups were infection and rate in group A was 9.70% and in group B was 13.50%. Posterior approach carried an increased risk of prosthetic dislocation as compared to anterior approach. There was no intraoperative mortality seen in follow up period.

**Conclusions:** Anterior approach for hip hemiarthroplasty in elderly population with intracapsular femoral neck fractures provided significant benefit in early postoperative period when compared to the posterior approach in terms of duration of surgery, intraoperative blood loss, time of recovery, hip dislocation rate.

**Keywords:** Intracapsular neck femur fracture, Hemiarthroplasty posterior approach, Anterior approach, Harris hip score

## INTRODUCTION

Hip fractures are common and comprise about 20% of the operative workload of an orthopaedic trauma unit.<sup>1</sup> Intracapsular femoral neck fractures account for about 50% of all hip fractures. The lifetime risk of sustaining a hip fracture is high and lies within the range of 40% to 50% in women and 13% to 22% in men. Life expectancy is increasing worldwide, and these demographic changes can be expected to cause the number of hip fractures occurring worldwide to increase from 1.66 million in 1990 to 6.26 million in 2050.<sup>2</sup>

The femoral neck fracture is one of the most common fractures in the elderly. Younger patients are also frequently affected due to accidents. During the past decade, there has been a change in the treatment of femoral neck fractures from internal fixation to more use of hemiarthroplasty (HA) in many countries. HA has many advantages since it allows the immediate return to daily activities and avoids bed rest complications. This procedure carries a relatively short duration of operation and reasonable clinical outcomes. One important issue when treating patients with HA is the type of surgical approach. Two different surgical approaches have

predominated. In transluteal direct lateral approach, as described by Hardinge in 1982, the anterior portion of the gluteus medius and minimus muscles is divided.<sup>8</sup> The posterior approach, as described by Moore in 1957, involves division of the piriformis, obturator internus muscle, and gemelli tendons.<sup>9</sup> It is still unclear whether one approach may be advantageous. The methods are often chosen independently of scientific studies and often depend on the local economic and social conditions and/or preferences of surgeons. This study was designed to compare the efficacy of treatment of intracapsular neck of femur fracture operated by anterior and posterior approaches.

### Aims and objectives

Aims and objectives were to compare the efficacy of treatment of intracapsular neck of femur fracture operated by anterior and posterior approaches of HA.

### METHODS

The prospective study was done on 100 patients aged >65 years with intracapsular fracture neck of femur treated with bipolar HA by anterior or posterior approach in the department of orthopedics, RNT Medical College, Rajasthan from March 2020 to March 2021. Study was started, after obtaining institutional ethical committee approval and written informed consent from all the patients. Those patients aged >65 years, with closed unilateral intracapsular neck of femur fractures with no history of neuromuscular disorders who are fit and willing to go for surgery were included in the study. Exclusion criteria consisted of patients <65 years, patients with compound fractures, bilateral or other associated fractures, extracapsular neck of femur fractures and patients with prior history of neuromuscular disorders. The patients were divided into two equal groups and were assigned alternatively one for anterior approach and the second for posterior approach.

### Surgical technique

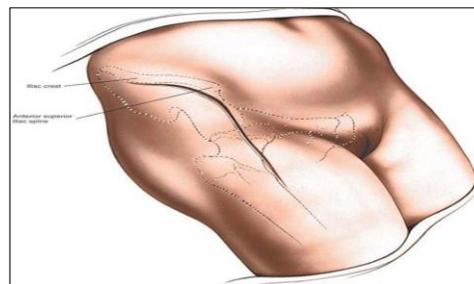
#### Anterior/Smith Peterson approach

Patient was positioned in supine position. Incision is made from anterior half of iliac crest to anterior superior iliac spine, then curved the incision and ran vertically over shaft of femur. Superficial inter nervous plane between sartorius and tensor fasciae latae and deep plane between rectus femoris and gluteus medius were approached. Joint capsule was incised and hip dislocated by external rotation.

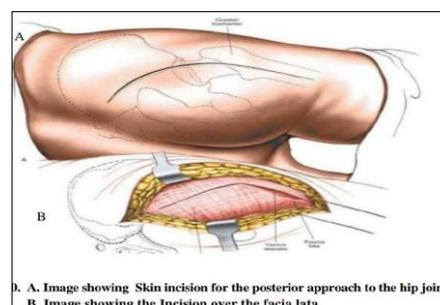
#### Posterior/Moore's/southern approach

Patient positioned laterally. Incision was 10-15 cm curved centered over greater trochanter and continued along the shaft of femur. There is no internervous plane. Gluteus maximus is split and short external rotators detached close

to insertion and reflected along with sciatic nerve. Upper part of quadratus femoris divided and posterior joint capsule incised and hip is dislocated by internal rotation.



**Figure 1: Anterior/Smith Peterson approach.**



**Figure 2: Posterior/Moore's/southern approach.**

This was followed by prosthesis insertion and cementing.

An immediate postoperative check-up X-ray was done to confirm proper positioning of the prosthesis. The patients were allowed to sit on first postoperative day and immediate weight bearing was allowed as tolerated by the patient. Intravenous antibiotics were continued postoperatively and given for five days and analgesics were added as per need. Suture removal was done on outpatient basis on 14th day. Then regular follow up was done at 3, 6, and 12 months. Patients were evaluated for surgical complications like dislocation, infection, post-operative bleeding or hematoma, periprosthetic fractures at each follow up visit, also the active range of motion, assessment of Harris hip score was done.

### Statistical methods

The data was expressed in terms of percentages. The continuous variables were handled by calculating the mean and standard deviation. Students' t test was used for calculating significance of difference between two continuous variables. The categorical variables were handled by using Chi square test and fisher exact test to find association between the variables

### RESULTS

Hundred patients were selected for the study, divided into group 'A' and group 'B' the mean age of patients was

63.1±5.3 years in group a and 65.8±5.4 years in group B with female to male ratio was 1.7:1 for group a and 1.8:1 for group B.

The involvement of right side was commoner than left side in both surgical groups. The most common type of fracture was subcapital followed by transcervical and basicervical. One patient in both surgical groups had associated ipsilateral distal end radius fracture which was managed conservatively by closed reduction and below elbow cast. One patient in posterior surgical group had ipsilateral proximal humerus fracture which was managed conservatively by universal shoulder immobilizer.

Operating time for group A and for group B was 65 and 78 minutes respectively (p value 0.532) (Table 1). Mean intraoperative blood loss was 120 ml in group A and 150 ml in group B.

**Table 1: Different types of parameter.**

| Parameter                      | Anterior approach | Posterior approach |
|--------------------------------|-------------------|--------------------|
| Mean operative time (min)      | 65                | 78                 |
| Intraoperative blood loss (ml) | 120               | 150                |
| Infection rate (%)             | 9.7               | 13.50              |
| Postoperative stay (days)      | 6                 | 8                  |

The most common complication in both the groups were infection and rate in group A was 9.70% and in group B was 13.50%. Posterior approach carried an increased risk of prosthetic dislocation (5 cases) as compared to anterior approach. There was no intraoperative mortality seen in follow up period. No cases of abductor weakness, sciatic nerve injury, periprosthetic fracture, aseptic loosening, deep vein thrombosis (DVT) were noted.

**Table 2: Complications.**

| Complication            | Anterior approach | Posterior approach |
|-------------------------|-------------------|--------------------|
| Sciatic nerve injury    | 0                 | 0                  |
| Hip dislocation         | 0                 | 5                  |
| Abductor weakness       | 0                 | 0                  |
| Periprosthetic fracture | 0                 | 0                  |
| Aseptic loosening       | 0                 | 0                  |
| Deep vein thrombosis    | 0                 | 0                  |

Average Harris hip scores were almost equal between the two groups (80.62% in group A and 83.40% in group B).

**Table 3: Average Harris hip score at follow up.**

| Harris hip score | Group A    | Group B    | P value |
|------------------|------------|------------|---------|
| 3 months         | 67.22±7.61 | 65.01±7.35 | 0.191   |
| 6 months         | 76.45±6.31 | 74.06±6.81 | 0.108   |
| 1 year           | 80.62±6.04 | 83.40±5.09 | 0.094   |

**Table 4: Functional results.**

| Functional results | Anterior approach | Posterior approach |
|--------------------|-------------------|--------------------|
| Excellent (>90)    | 1                 | 1                  |
| Good (80-89)       | 2                 | 2                  |
| Fair (70-79)       | 2                 | 2                  |
| Poor (<69)         | 0                 | 0                  |

**DISCUSSION**

The mean age of patients for posterior approach was 63.1±5.3 years for anterior approach and 65.8±5.4 years for posterior approach and the difference was found statistically insignificant (p>0.05) indicating that there was no age bias while selecting patients for the two approaches. The age group in our study was comparable to previous studies.<sup>11-13</sup> Females formed majority of patients in this series which was comparable to the series of Barber et al and Mukka et al.<sup>12,14</sup> The female preponderance in the series can be attributed to the fact that the estrogen level decreases after menopause which in turn predisposes elderly females to osteoporosis. The neck femur fracture was classified according to their anatomic location. The most type of intracapsular neck femur fracture was subcapital. Transcervical was the second most common type. The distribution of patients in our study was almost similar to a study of Tolani et al.<sup>17</sup>

Operating time for anterior approach was 65 minutes and for posterior approach was 78 minutes respectively. Mean intraoperative blood loss was 120 ml in anterior and 150 ml in posterior approach. Intraoperative blood loss was calculated by number of mops used and blood collected in suction machine before the wash is given. Hence intraoperative blood loss was comparatively higher in posterior approach.

The most common complication in both the groups were infection and rate in anterior approach was 9.70% and in posterior approach was 13.50%. There are many risk factors predisposing to infection such as comorbidities of patients, poor patient hygiene, and low sterile conditions. This was comparable with studies done by Barber et al and Mukka et al.<sup>12,14</sup> In current study 5 patients operated by posterior approach suffered dislocation while dislocation was not seen in any patients of anterior surgical approach. There was no other postoperative complications observed like sciatic nerve injury, periprosthetic fracture, mortality aseptic loosening of prosthesis, acetabularerosion, deep vein thrombosis, pulmonary embolism in both surgical groups.

In most studies on intracapsular neck femur fracture the functional outcome was assessed by Harris hip score. In our study the average Harris hip score at 1 year follow up was 80.62% in anterior surgical approach and 83.40% in posterior approach. Patients in both groups had good average Harris hip score and difference was statically

insignificant. The distribution in our study was comparable to studies performed by other authors.<sup>14,15</sup>

## CONCLUSION

Anterior approach for hip hemiarthroplasty in elderly population with intracapsular femoral neck fractures provided significant benefit in early postoperative period when compared to the posterior approach in terms of duration of surgery, intraoperative blood loss, time of recovery, hip dislocation rate even though it requires different instrumentation and acquaintance to the surgeon as it is relatively a newer approach.

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*Ethical approval: The study was approved by the institutional ethics committee*

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