

# Comparative Study of Patients Who Underwent Hemiarthroplasty of Hip by Anterolateral and Posterolateral Approach

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## Abstract

**Introduction:** Fracture neck of femur is an extremely common fracture in the geriatric population (>60 years). Bipolar hip replacement can be done by anterolateral or posterolateral approach. Proponents of both approaches say that their approach is better than the other, but there is no consensus reached so far. Hence, we decided to carry out a comparative study of results of patients operated for cemented bipolar hemiarthroplasty by anterolateral and posterolateral approach.

**Material and Methods:** We carried out a retrospective study of patients who underwent bipolar hemiarthroplasty between June 2013 and August 2017 by anterolateral and posterolateral approach. Pre-operative condition, radiographs, operative notes, post-operative complications, and clinical and functional outcome over a period of 1 month, 3 months, 6 months, and 12 months post-surgery were collected for all the cases. Patients in Group 1 were operated by posterolateral approach, and those in Group 2 were operated by anterolateral approach. We collected data of age, sex, trauma to surgery time, blood loss, infection, nerve injury, dislocation, hospital stay, time for returning to activities of daily living, etc.

**Results:** There were significant differences between two groups as regards dislocation rate and operative time and modified Harris Hip Score. Mean operative time in minutes was 20.63 min in anterolateral group and 25.885 min in posterolateral group. Modified Harris Hip Score was 78.077 in anterolateral group and 71.407 in posterolateral group. There were three cases of posterior dislocation in posterolateral approach ( $n = 26$ ) but one in the anterolateral approach ( $n = 27$ ).

**Conclusion:** We conclude that the anterolateral approach is slightly better compared to the posterolateral approach due to low dislocation rate and better functional recovery.

**Key words:** Anterolateral, Bipolar, Dislocation, Posterolateral

## INTRODUCTION

Fracture neck of femur is an extremely common fracture in the geriatric population (>60 years) with an incidence of about 20% of all osteoporotic fractures.<sup>[1]</sup> Treatment options

for fracture neck femur are mostly hemiarthroplasty or total hip replacement as results of osteosynthesis are not great in this age group, mainly due to poor vascularity after fracture.<sup>[1]</sup>

Hemiarthroplasty can be with unipolar or bipolar prosthesis with or without cement. Earlier, unipolar prosthesis was used for partial hip replacements. However, the recent trend is towards cemented bipolar replacement only as in this population osteoporosis is present invariably. Also, unipolar prosthesis has high incidence of protrusio acetabulae after few years as well as poor functional outcome, which is less in bipolar group.<sup>[1]</sup> Total hip replacement for fracture neck femur though quite popular in developed countries is not so

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popular in India due to its high cost of surgery and expertise required along with better operation rooms required for total hip replacement.<sup>[2]</sup> Hence, only bipolar hip replacement is quite often done. Bipolar hip replacement can be done by anterolateral or posterolateral approach. Proponents of both approaches say that their approach is better than the other, but there is no consensus reached so far.<sup>[3,4]</sup> Furthermore, Indian patients have a habit of sitting cross-legged and squatting which is to be avoided, especially in the posterolateral approach.

Hence, we decided to carry out a comparative study of results of patients operated for cemented bipolar hemiarthroplasty by anterolateral and posterolateral approach.

## MATERIALS AND METHODS

We carried out a retrospective study of patients who underwent bipolar hemiarthroplasty between June 2013 and August 2017 by anterolateral and posterolateral approach. We collected data of patients from hospital records. We excluded patients who had open fractures, pathological fractures, and extraarticular (intertrochanteric) fractures, those with neurovascular injury previously, and those patients who were under 60 years of age.

Pre-operative condition, radiographs, operative notes, post-operative complications, and clinical and functional outcome over a period of 1 month, 3 months, 6 months, and 12 months post-surgery were collected for all the cases. Most of the patients were operated about 3–7 days after trauma. Patients in Group 1 were operated by posterolateral approach, and those in Group 2 were operated by anterolateral approach.

Post-operatively, patients were given antibiotics and analgesics. Physiotherapy was begun from next day and weight bearing with walker was allowed. Patients operated by the posterolateral

approach were instructed to avoid squatting and sitting cross-legged as it is given in the literature for this approach.

We collected data on age, sex, trauma to surgery time, blood loss, infection, nerve injury, dislocation, hospital stay, time for returning to activities of daily living, etc.

## RESULTS

Data were represented as a mean and standard deviation for continuous variables or frequency and percentages for discrete variables. Statistical analysis of differences was performed using student paired *t*-test for continuous variables and Chi-square test for discrete variables. We calculated odds ratio and relative risk in posterolateral approach (dislocation). There were no complications such as thrombosis or pulmonary embolism in either group. Only one patient in anterolateral group and one in posterolateral group required blood transfusion and hence were not significant. There was the incidence of post-operative superficial infection in two patients of the posterolateral group, who had serious discharge. They responded to treatment with intravenous antibiotics alone.

A total of 53 patients were included, out of which 9 females and 18 males were operated by the Anterolateral approach and 9 females and 17 males were operated by the Posterolateral approach ( Table 1 ).

There were three cases of posterior dislocation in posterolateral approach (*n* = 26), but one in the anterolateral approach (*n* = 27) odds ratio was 3.39.

As prevalence of dislocation is low, we used the odds ratio to estimate the relative risk of dislocation occurring in the posterolateral approach. We found that the relative risk that a patient with hemiarthroplasty with the posterolateral approach has dislocation is 3.39 times more than the patient with non-posterolateral (anterolateral in our study) approach as odds ratio is 3.39.

## DISCUSSION

Table 2 and 4 cited – page 4 line 1 - From the results of our study, we note that there was no difference between the

**Table 1: Number of Female and Male patients operated by Anterolateral or Posterolateral Approach**

Sex	Anterolateral	Posterolateral	P value
Female	9	9	P=0.922
Male	18	7	
Total	27	26	

**Table 2: Trauma to Surgery Time (in Days )**

Anterolateral	Posterolateral	P value
4.333	3.769	P=0.432

**Table 3: Mean Operative Time (in minutes )**

Anterolateral	Posterolateral	P value
20.630	25.885	P=0.000

**Table 4: Mean Duration of Hospitalisation (in Days )**

Anterolateral	Posterolateral	P value
9 (7–14)	9.185 (5–22)	P>0.05

**Table 5: Modified Harris Hip Score**

Anterolateral	Posterolateral	P value
78.077 (72–80)	71.407 (60–78)	P<0.05

two groups as regards sex, trauma to surgery time (Table 2), infection, thrombosis, blood transfusions or duration of hospitalisation (Table 4). However, there were significant differences between two groups as regards dislocation rate and operative time and modified Harris Hip Score.

There were less dislocations in the anterolateral group. Also, operative time was less in anterolateral group (Table 3) and the Harris Hip Score was better in the anterolateral group (Table 5). Furthermore, operative time was less in anterolateral group, and the Harris Hip Score was better in the anterolateral group. Hence, functional results are better after anterolateral approach was used for hemiarthroplasty of the hip.

The direct lateral approach to the hip was described by Hardinge in 1982.<sup>[5]</sup> This approach provides adequate exposure of hip joint. A very low dislocation rate has also been reported in clinical follow-up.<sup>[6,7]</sup> The posterior approach to hip was popularized by Moore in 1950.

A recent survey of surgeons around the world suggests that it is more popular than the anterior or anterolateral approach.<sup>[8,9]</sup> It provides extensible exposure to the hip and spares adductor muscles during exposure. However, during this approach, the sciatic nerve has to be protected, and short external rotators and posterior capsule, which are cut, have to be repaired if necessary, through transosseous bony tunnels in the proximal femur.<sup>[10]</sup>

Many studies reported low dislocation rates in non-posterior approaches as static stabilizers of hip, such as posterior joint capsule and posterior soft tissue envelope, are preserved.<sup>[9,11]</sup> Our results are similar.

The risk of sciatic nerve injury is greater (1.3%) during the posterior approach.<sup>[12]</sup> However, femoral nerve injury due to anterior retractor placement can occur in both the approaches.<sup>[13]</sup> Superior gluteal nerve palsy can occur during the direct lateral approach to hip as it is about 5 cm proximal to the greater trochanter.<sup>[14]</sup> However, in our study, no nerve injury was observed.

Reduced blood loss and shorter stay in the hospital have been described with the anterior approach due to muscle sparing properties of this approach.<sup>[15]</sup> However, in modified Hardinge or anterolateral approach which we followed, this influence is not there as compared to posterior approach in literature.<sup>[10]</sup> Our study confirms this finding. Furthermore, incisions are of almost similar length.

Special precautions such as avoiding sitting cross-legged and squatting are mainly for the posterior approach but are generally followed even for the anterolateral approach.

## CONCLUSION

There is a significant difference between the anterolateral (modified Hardinge) approach and posterolateral approach to the hip joint as dislocation rate and operative time are less in the anterolateral approach. Furthermore, functional recovery is better after the anterolateral approach. However, there is no difference between the two approaches as regards other complications such as infection, thrombosis, blood loss, nerve injury, or duration of hospitalization. Hence, we conclude that the anterolateral approach is slightly better compared to the posterolateral approach due to low dislocation rate and better functional recovery. However, our sample size is small and duration of follow-up is less, and either of the approaches could be used as per the surgeon's choice and patient parameters.

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