



## FUNCTIONAL OUTCOME OF LATERAL VERSUS POSTERIOR APPROACH FOR HIP HEMIARTHROPLASTY IN FRACTURE NECK OF FEMUR

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**ABSTRACT** **Background:** Fractures of the femoral neck are prevalent more among the elderly. Hemiarthroplasty are performed to avoid the poor outcome of internal fixation and to allow for early mobilization. However, there is insufficient evidence to support the choice between a posterior or lateral hip approach. The goal of this study was to compare the functional and radiological outcomes of hemiarthroplasty using posterior versus lateral approach. **Methods:** Cohort study was conducted among the cases with acute or chronic displaced femoral neck fractures who underwent hemiarthroplasty through a posterior (Group P) or lateral (Group L) approach in our institute. Patients functional outcome was analyzed using Harris hip score, as well as the complications concerned with the various surgical approaches and all of the patients were followed for 6 months. **Results:** Preoperative mean Harris score among lateral and posterior approach hemiarthroplasty was statistically insignificant. However postoperative Harris Hip score was found to be  $77.5 \pm 11.8$  and  $68.5 \pm 10.9$  among lateral and posterior group respectively with significantly better outcome in lateral approach group. Also both these groups had similar outcomes in terms of complications. **Conclusion:** When compared to the posterior approach for hemiarthroplasty, the use of the lateral approach for hemiarthroplasty has shown good results without any dislocation rates, making it the preferable approach in our study.

**KEYWORDS :** Lateral approach, posterior approach, hemiarthroplasty, functional outcome

### INTRODUCTION

For displaced fragile hip fractures, hemiarthroplasty (HA) is a typical therapeutic option. HA allows for immediate complete weight-bearing without the risk of avascular necrosis or nonunion, which are common consequences of internal fixation. Furthermore, when compared to internal fixation, HA leads in fewer reoperations in individuals over the age of 60<sup>1,2</sup>. Furthermore, despite an increased risk of hip dislocation, total hip arthroplasty (THA) is regarded a superior alternative for previously independent and healthy individuals because to the functional benefits<sup>3,4</sup>. However, the ideal strategy for hip joint arthroplasty is still up for debate. Because anterior, antero-lateral, lateral, and posterior approaches were all regularly used.

Moore et al<sup>5</sup> initially suggested inserting his prosthesis using a posterior surgical technique. After that, different approaches to the hip were used, most prominently the anterior and anterolateral approaches. In recent years, Hardinge et al<sup>6</sup> described a direct lateral approach to the hip joint followed by McFarland and Osborne's 1954 description of a similar method<sup>7</sup>. In lateral approach there is a separation of the gluteus medius and vastus lateralis insertions from the greater trochanter, which are reattached following prosthesis insertion in their anatomical position<sup>6</sup>. The gluteus medius is divided and afterwards repaired in all variants of the lateral approach. In posterior approach following the release of external rotators from the femoral insertion, the gluteus maximus muscle is separated<sup>8</sup>. Each method has its own set of benefits as well as its own set of drawbacks. In comparison to the lateral approach, investigations of hip fracture patients treated with HA have found that the posterior approach increases the likelihood of hip dislocation and resurgery<sup>9-11</sup>. The lateral technique, on the other hand, may increase the risk of hematoma formation. Both techniques had equal rates of infection, seroma, and perioperative fractures<sup>11</sup>.

The lateral<sup>6</sup> and posterior<sup>9</sup> methods are currently the two most widely used procedures for hemiarthroplasty of the hip. The posterior approach is said to result in improved function since the hip muscles are less damaged<sup>12</sup>, although the anterior and lateral techniques have a

lesser chance of dislocation<sup>13</sup>. Despite the popularity of this technique, there are few current randomized trials comparing the lateral and posterior approaches for hip hemiarthroplasty. With these in view this study was conducted to assess the functional outcome and complications associated with the lateral approach and posterior approaches of hemiarthroplasty.

### METHODOLOGY

The study was conducted from January 2021 to January 2022 in our hospital based on the cohort of patients above 50 years of age with acute or chronic femoral neck fractures who underwent hemiarthroplasty through a posterior or lateral approach were included in this study. Patients below the age of 50 and who had ipsilateral limb injury were excluded from this study. The study included 30 patients, 15 of whom had lateral hemiarthroplasty (Group L) and 15 of whom had posterior hemiarthroplasty (Group P), with cases assigned to each group using computer generated random numbers.

Before beginning the study, the participants signed a written informed consent form. The patient's medical history was obtained, and they were clinically examined; the primary outcome was assessed functionally using Harris hip score and the complications concerned with the surgical approaches were also analyzed. All of the patients were followed for 6 months, with the Harris Hip Score assessment at that time determining the post-operative functional outcome.

Version 20 of the statistical package for social sciences was used to conduct the analysis. The Chi square test and Mann-Whitney test were employed appropriately, as was the student t test. Significant was defined as a P value of less than 0.05.

### RESULTS

In this study among patients with femoral neck fracture most of the participants belonged to 61 -70 years of age group were 53.3% and 66.7% of the participants were from Group L and Group P respectively. There was no significant statistical association noted between both the groups based on the age (p value =0.7165). The mean age among

Group L was 63.3±6.8 and Group P patients was 62.4±8.1 with no significant difference in mean age (p value =0.7442). Lateral hemiarthroplasty participants consisted of 86.7% males and 13.3% females while posterior hemiarthroplasty group 80% of the cases were males and 20% of the cases were females.

Based on the BMI 66.7% participants were found to be overweight and 20% of the participants were obese under Group L, likewise 60% and 33.3% of the participants were overweight and obese in Group P respectively. Smoking habit was recorded among 26.7% and 33.3% of the patients from Group L and Group P respectively. Habit of Alcohol consumption was present among 40% and 33.3% of the patients from Group L and Group P respectively. But there was no statistical association recorded between Group L and Group P for gender, BMI, smoking and Alcohol consumption.

**Table 1: Socio demographic factors of the study participants**

Variable	Group L	Group P	P value
<b>Age group</b>			
51-60 years	05 (33.3)	04 (26.7)	0.7165
61-70 years	08 (53.3)	10 (66.7)	
> 70 years	02 (13.3)	01 (6.7)	
<b>Gender</b>			
Male	13 (86.7)	12 (80)	0.6242
Female	02 (13.3)	03 (20)	
<b>BMI</b>			
Normal	02 (13.3)	01 (6.7)	0.6421
Overweight	10 (66.7)	09 (60)	
Obese	03 (20)	05 (33.3)	
<b>Habit of Smoking</b>			
Present	04 (26.7)	05 (33.3)	0.5903
Absent	11 (73.3)	10 (66.7)	
<b>Habit of alcohol consumption</b>			
Present	06 (40)	05 (33.3)	0.7047
Absent	09 (60)	10 (66.7)	

On assessing the associated chronic disorders Diabetes mellitus was found among 20% and 33.3% of the patients from Group L and Group P respectively, hypertension was seen among 26.7% participants in Group L and Group P each. Cardiovascular disease was seen among 6.7% of the cases in both Group L and Group P while cognitive impairment was present among 13.3% of the cases from Group L and 6.7% of the cases from Group P. There was no significant difference statistically between Group L and Group P based on associated disorders in this present study.

**Table 2: Associated disorders among the study participants**

Associated disorders	Group L	Group P	P value
<b>Diabetes mellitus</b>			
Present	03 (20)	05 (33.3)	0.4089
Absent	12 (80)	10 (66.7)	
<b>Hypertension</b>			
Present	04 (26.7)	04 (26.7)	1.000
Absent	11 (73.3)	11 (73.3)	
<b>Cardiovascular diseases</b>			
Present	01 (6.7)	01 (6.7)	1.000
Absent	14 (93.3)	14 (93.3)	
<b>Cognitive impairment</b>			
Present	02 (13.3)	01 (6.7)	0.5428
Absent	13 (86.7)	14 (93.3)	

Preoperative mean Harris score among Group L cases was 58.2±13.4 whereas in Group P cases 56.7±13.5. The difference between mean Harris score between Group L and P was statistically insignificant preoperatively. However postoperative Harris Hip score was found to be 77.5±11.8 and 68.5±10.9 among Group L and Group P respectively. The difference between mean Harris score between Group L and Group P was statistically significant postoperative with better outcome in lateral approach group.

**Table 3: Mean Harris Hip score among the study participants**

Harris Hip Score	Group L	Group P	P value
Preoperatively	58.2±13.4	56.7±13.5	0.7623
Postoperatively	77.5±11.8	68.5±10.9	0.0387*

\*Significant

Complications like Prosthetic dislocation were noted among 13.3% of the cases and surgical site infection among 6.7% of the cases in Group P. In Group L no complications were recorded in our study. The difference between Group L and Group P based on prosthetic dislocation and surgical site infection was not significant.

**Table 4: Complications related to hemiarthroplasty among the cases**

Complications	Group L	Group P	P value
Prosthetic dislocation	0% (0/15)	13.3% (2/15)	0.1506
Limb length discrepancy	0% (0/15)	0% (0/15)	-
Abductor lurch	0% (0/15)	0% (0/15)	-
Surgical site infection	0% (0/15)	6.7% (1/15)	0.3161

**Hardinge Lateral Approach**



**Southern Moore Posterior Approach**



**DISCUSSION**

In a study conducted by Witzleb WC et al<sup>14</sup> reported that there was no substantial difference in Harris Hip Score improvement between the lateral and posterior methods at preoperative and 3 months' postoperative assessments. In patients implanted via the posterior route, however, Harris Hip scores and most functioning and psychometric secondary endpoints exhibited a persistent trend of a somewhat superior three-month result.

In another study, Petis S et al<sup>15</sup> analysed ten cases each, who underwent anterior, posterior, and lateral approaches. In terms of age, BMI, and Charlson Comorbidity Index score, they found that all three groups were identical. The lateral cohort demonstrated higher pelvic tilt on stance on the afflicted leg than the anterior cohort at six weeks. At 6 and 12 weeks, the lateral group had more impacted leg ipsilateral trunk pull during stance than the other groups. When compared to the lateral group, the anterior and posterior groups had more external rotation at 6 and 12 weeks. Berstock JR et al<sup>16</sup> found that the posterior approach was correlated with a decrease in the risk of Trendelenburg gait and stem malposition, as well as a non-significant reductions in dislocation and heterotopic ossification when compared to the lateral approach. Neither method provided a functional benefit.

According to Jolles BM et al<sup>17</sup>, there was no significant difference between the posterior and direct lateral surgical approaches. There was no substantial difference in the presence of postoperative Trendelenburg gait between these surgical methods. The direct lateral methods have a much higher risk of nerve palsy or damage. In a study of 393 hemiarthroplasty cases, Hongisto MT et al<sup>18</sup> found that one year following hip fracture, more patients receiving hemiarthroplasty with the posterior route survived without mobility assistance than those undergoing hemiarthroplasty with the lateral method. The usage of mobility assistance before to the fracture, age 85 years, male sex, and lateral approach were also significant predictors of the need for mobility aids one year after the fracture. The posterior technique resulted in four (3.4%) dislocated hips, whereas the lateral approach resulted in none. Survival, mobility, discomfort in the operated hip, and living arrangements were not significantly different across groups one year after surgery. According to Unwin AJ et al<sup>19</sup>, the posterior technique had a 9.0 percent dislocation rate, while the direct lateral approach had a 3.3 percent dislocation rate. The distinction is

statistically significant. In addition, we looked at the dislocation rate for each method in each of the three surgical trainee groups. There was no statistical difference in the dislocation rate between senior registrars and junior registrars. However, there were statistically significant variations in dislocation rate for posterior and lateral procedures for registrar and senior residents.

In another investigation, Ji HM et al<sup>20</sup> found that 3% of the lateral group was dislocated, while none of the posterior group was displaced. The Harris hip score and limping were similar in both groups at the last follow-up. When compared to the stability achieved by the lateral approach group, the joint stability achieved by the posterior soft tissue regeneration in the posterior approach group looked to generate a more favorable result. According to Parker MJ et al<sup>21</sup>, no significant difference was observed with respect to either lateral or posterior approaches, in any of the outcome assessments, including mortality, residual pain, and regained walking capacity. The lateral technique was chosen in a subjective assessment of operation ease. In conclusion, both surgical methods appear to generate functional outcomes that are equivalent. Svenoy S et al<sup>22</sup> conducted a study and discovered that among patients who had hemiarthroplasty, the posterior group had a larger chance of prosthesis dislocation than the lateral group, both as a one-time occurrence and as a risk of repeated dislocations. The majority of patients with dislocations had recurring dislocations, and those who had more than one dislocation required additional open surgery. There was no additional risk factor for dislocation other than surgical technique.

In a study of hemiarthroplasty cases, Kristensen TB et al<sup>23</sup> discovered significant differences in cases reported outcome measures after surgery using the posterior method versus the direct lateral approach, with less pain, higher satisfaction, and higher quality of life. Between the techniques, the risk of revision surgery was similar. They came to the conclusion that hemiarthroplasty for hip fractures performed using a posterior method rather than a direct lateral approach causes reduced discomfort, improved patient satisfaction, and improved quality of life. Both treatments had a similar risk of reoperation. According to a study by de Vries EN et al<sup>24</sup>, the posterior technique was employed in 51.1 percent of patients. Surgical site infection and post-operative fracture rates were not different. In the posterior approach, there was a trend toward greater dislocations. In 62.7 percent of patients, an uncemented prosthesis was employed. The uncemented group had a higher rate of deep surgical site infections and post-operative fractures. They came to the conclusion that there were no differences in bad outcomes between the two ways. The relatively high prevalence of post-operative problems in uncemented prostheses was confirmed in this investigation. As a result, the cemented prostheses should be the preferred treatment, with the technique chosen based on the surgeon's preference and experience.

## CONCLUSION

We conclude that the functional outcome after 6 months of lateral approach hemiarthroplasty is found to be significantly better than the posterior approach hemiarthroplasty. However, on assessing the complications associated both lateral and posterior approaches were found to be similar. Hence we recommend lateral approach hemiarthroplasty for better functional outcome compared to posterior approach hemiarthroplasty.

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