



INCIDENCE OF POSTERIOR DISLOCATION OF HIP IN POSTEROLATERAL (MOORE) APPROACH VS ANTEROLATERAL (HARDINGE) APPROACH IN HIP ARTHROPLASTY AFTER FRACTURE NECK OF FEMUR

¹ Dr. Muhammad Khizer Hayat Makki, ² Dr. Kashif Siddiq, ³ Dr. Muhammad Nasir Ali,
⁴ Dr. Shahid Mahmood, ⁵ Dr. Shujat Hussain, ⁶ Dr. Aisha Ajmal
¹Senior Registrar Orthopedic Surgery Civil Hospital Bahawalpur
²Senior Registrar Orthopedic Surgery Civil Hospital Bahawalpur
³Professor of Orthopedic Surgery, QAMC/BVH Bahawalpur
⁴Assistant Professor Orthopedic Surgery, QAMC/BVH Bahawalpur
⁵Professor of Orthopedic Surgery, QAMC/BVH Bahawalpur
⁶WMO Civil Hospital Bahawalpur

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Abstract:

Objective: To compare the incidence of posterior dislocation of hip joint in Moore and Hardinge approach in hip arthroplasty for the treatment of fracture neck of femur during 12 weeks follow-up after surgery

Materials & Methods: This multicenter randomized controlled was conducted at Department of Orthopedic Surgery, Bahawal Victoria Hospital, Bahawalpur, Civil Hospital Bahawalpur and Shahid Surgical Hospital Bahawalpur from July 2016 To July 2019. A total of 300 patients, 65 to 85 years of age with Garden type IV fracture of neck of femur were included in the study. Patients were divided into two age groups A (Moore approach) & B (Hardinge approach) randomly. Posterior Dislocation of hip joint was compared between the both groups.

Results: In present study, mean age of patients was 78.59 ± 4.48 years. The mean age of patients in group A was 79.92 ± 4.38 years and in group B was 78.58 ± 5.27 years. In study group A, posterior dislocation was found in 15 (10%) patients while in study group B posterior dislocation was found in 4 (2.67%) patients. Significantly ($P = 0.013$) higher posterior dislocation was found in study group A as compared to study group B.

Conclusion: This study concluded that incidence of posterior dislocation of hip joint was less after Hardinge approach compared to Moore approach in hip arthroplasty for the treatment of fracture neck of femur.

Keywords: Hip fractures, hip arthroplasty, approaches, dislocation.

Corresponding author:

Dr. Muhammad Khizer Hayat Makki,

Senior Registrar Orthopedic Surgery Civil Hospital Bahawalpur

QR code



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INTRODUCTION:

Fractured proximal end of femur is known as hip fracture. Intracapsular (neck and head femoral fractures) and extracapsular (including subtrochanteric, intertrochanteric, trochanteric fractures) are classifications of hip fractures.¹ The pre-existing physical condition and morbidity of the patient have a big impact due to the amount of angulation and comminution and fractured location.²⁻³ Individuals and population are globally concerned about hip fractures, it may reach 6 million cases till year 2050.⁴ The health care system and elders are highly affected by such destructive hip fractures. Most hip fractures are managed by implanting an orthosis.⁴

Kocher approach, Southern exposure, Smith–Petersen approach, Gibson approach are used manage the hip fracture including various lateral approaches. The distinctive line between various approaches is not necessary, whatever capsulotomy (anterior or posterior) is used respectively in moore and Hardinge approaches for prosthetic insertion.⁵⁻⁹

The Moore approach takes off piriformis muscle and short external rotators from the femur accessing the capsule and joint from the back. The abductor dysfunction is minimized and hip abductors are preserved due to excellent access to acetabulum and femur by such approach. It can become more extensile approach if required. The risk can be reduced by using modern large diameter head balls to repair the capsule, piriformis and short external rotators.¹⁰

For the last 40 years, the Hardinge approach is mostly used for total hip replacement globally. The Hardinge approach usually does not show hip dislocation due to its safe and excellent access to hip. Hindring approach allows any type of prosthesis to be used virtually. A limp can last for 3 to 4 weeks and longer period to obtain abduction strength due to the retraction of abductors in this approach. Stable hip, superior limb-length symmetry are advantages of this approach and is considerably versatile among many implants.¹¹⁻¹²

Because little randomized prospective data exist in this context, so, we have conducted this prospective randomized controlled trial to establish which surgical approach is better in terms of posterior dislocation, so that a standard approach could be developed in the treatment of fracture neck of femur in the elderly patients.

OPERATIONAL DEFINITIONS:

- **Posterior Dislocation of hip joint:** It was defined as the displacement of prosthetic head of the femur out of the acetabulum to any extent from its normal anatomical position on the post-operative X-ray of the

hip joint in Antero-Posterior view during 12 week follow-up after surgery.

- **Moore Approach:** The curved incision was given centered over greater trochanter and hip was approached posteriorly by division of capsule and short external rotators.
- **Harding Approach:** The lateral incision was given over greater trochanter and hip was approached anteriorly by division of anterior 1/3 of abductors.

MATERIAL AND METHODS:

This multicenter randomized controlled was conducted at Department of Orthopedic Surgery, Bahawal Victoria Hospital, Bahawalpur, Civil Hospital Bahawalpur and Shahid Surgical Hospital Bahawalpur from July 2016 To July 2019. Total 300 patients Garden type IV (completely displaced fragments on X-Rays) fracture of neck of femur within two weeks having age 65-85 years either male or female and fit for anesthesia were selected for this study.

Patients with previous hip surgery, patients with co-morbid diseases like spastic diseases, Parkinsonism and bowel in-continance, patients with pathological fractures and patients of open fracture of the neck of the femur were excluded.

Study is approved by the ethical committee and written informed consent was taken from every patient.

Demographic profile of all the patients was entered in pre-designed proforma. X-ray pelvis AP view with both hip joints was carried out. Two equal groups (A & B) were made randomly. Routine investigations of all the patients were done. Lateral and antero-posterior x-ray of all the patients was taken.

Moore approach was used in patients of study group A and Hardinge approach was used in patients of study group B.

In Moore approach, capsule and joint was accessed through back, taking piriformis muscle and the short external rotators off the femur. This approach gave excellent access to the acetabulum and femur and preserved the hip abductors and thus minimized the risk of post operative dysfunction of abductor.

In Hardinge approach, the patients were placed on operating table on supine position or on lateral position if desired. A straight lateral incision was made, and dissection down to the fascia lata followed. The interval between the vastus lateralis and abductor muscles was developed. The abductor

was released and repaired later with the closure. The hip capsule was identified and opened, and the hip was dislocated by traction and external rotation. The femoral head was then removed, allowing direct access to the acetabulum. The femur was placed into a figure-of-four position for broaching.

All patients in Group A were operated by Moore approach. In this approach, the joint and capsule was accessed through the back, taking piriformis muscle and the short external rotators off the femur. This approach gave excellent access to the acetabulum and femur and preserved the hip abductors and thus minimized the risk of abductor dysfunction post operatively. While all patients in Group B were operated by Hardinge approach, in which the patient was placed in a supine or, if desired, a lateral position on the operating table. A straight lateral incision was made, and dissection down to the fascia lata followed. The interval between the vastus lateralis and abductor muscles was developed. The abductor was released and repaired later with the closure. The hip capsule was identified and opened, and the hip was dislocated by traction and external rotation. The femoral head was then removed, allowing direct access to the acetabulum. The femur was placed into a figure-of-four position for broaching.

Patients were mobilized on the next post-op day with walker and partial weight bearing started on operated side. Patients were advised not to sit down beyond 90 degrees on knee and hip joint. Patients were called after two weeks for stitch removal. Clinical examination for operated hip was done during 12 weeks follow-up to see its dislocation clinically and confirmed on X-ray of the Hip Joint. All this information was collected through a special designed proforma.

All the collected data was entered in SPSS version 18 and analyzed. Age of the patients was presented as mean and standard deviation. The qualitative variables (gender and dislocation of hip joint) were evaluated and presented as frequency distribution table. The incidence of posterior dislocation of hip joint of two groups was compared with chi-square test. The level of significance was ≤ 0.05 . Effect modifiers like age, gender, duration of fracture and co-morbid condition i.e. diabetes mellitus, were controlled through stratification and post-stratification chi square was applied to see their effect on outcome. P-value ≤ 0.05 was considered as significant.

RESULTS:

In present study, mean age of patients was 78.59 ± 4.48 years. The mean age of patients in group A was 79.92 ± 4.38 years and in group B was $78.58 \pm$

5.27 years. In study group A, posterior dislocation was found in 15 (10%) patients while in study group B posterior dislocation was found in 4 (2.67%) patients. Significantly ($P = 0.013$) higher posterior dislocation was found in study group A as compared to study group B. (Table 1)

Stratification in relation to age was done and two groups were made age group 65-75 years and age group 76-85 years. In age group 65-75 years, total 56 (37.33%) patients belonged to study group A while 58 (38.67%) patients belonged to study group B. Posterior dislocation was found in 05 (8.93%) patients of study group A while no patient of study group B was found with posterior dislocation. Difference of posterior dislocation between the both groups was statistically significant with p value 0.026. In age group 76-85 years, total 94 (62.67%) patients belonged to study group A while 92 (61.33%) patients belonged to study group B. Posterior dislocation was noted in 10 (10.64%) patients and 04 (4.35%) patients respectively in study group A & B. But the difference was not statistically significant with p value 0.163. (Table 2)

Out of 63 (42%) male patients of study group A and 61 (40.67%) male patients of study group B, posterior dislocation was found in 05 (7.94%) patients and in 03 (4.92%) patients of study group A & B respectively. Difference of posterior dislocation between the male patients of both study groups was statistically insignificant with p value 0.717. Out of 87 (58%) female patients of study group A, posterior dislocation was seen in 10 (11.49%) patients. Out of 89 (59.33%) female patients of study group B, posterior dislocation was found in 01 (1.12%) patient. Difference of posterior dislocation between the female patients of both groups was statistically significant with p value 0.004. (Table 3)

Patients were divided into two groups according to duration of fracture i.e. < 7 days duration of fracture and ≥ 7 days duration of fracture. In < 7 days duration of fracture group, posterior dislocation was seen in 12 (11.21%) patients of study group A while in 03 (2.73%) patients of study group B. Difference was statistically significant with p value 0.016. In ≥ 7 days duration of fracture group, posterior dislocation was found in 03 (6.98%) patients of study group A while in 01 (2.5%) patient of study group B. But the difference was not statistically significant with p value 0.616. (Table 4)

Posterior dislocation was found in 05 (9.43%) diabetic patients of study group A while in 03 (5.56%) diabetic patients of study group B and the difference was statistically insignificant with p

value 0.488. Total 10 (10.31%) non-diabetic patients of study group A and 01 (1.04%) non-diabetic patient of study group B found with posterior dislocation. Difference of posterior

dislocation between the both groups was statistically significant with p value 00.009. (Table 5)

Table 1: Comparison of posterior dislocation between the both groups

Group	Posterior Dislocation		Total	P value
	Yes (%)	No (%)		
A (Moore approach)	15 (10%)	135 (90%)	150	0.015
B (Hardinge approach)	4 (2.67%)	146 (97.33%)	150	

Table 2: Comparison of posterior dislocation between the both groups for age

Group	Posterior Dislocation		Total	P value
	Yes (%)	No (%)		
Age group 65-75 years				
A	05 (8.93%)	51 (91.07%)	56 (37.33%)	0.026
B	00 (0.0%)	58 (100.0%)	58 (38.67%)	
Age group 76-85 years				
A	10 (10.64%)	84 (89.36%)	94 (62.67%)	0.163
B	04 (4.35%)	88 (95.65%)	92 (61.33%)	

Table 3: Comparison of posterior dislocation between the both groups for gender

Group	Posterior Dislocation		Total	P value
	Yes (%)	No (%)		
Male Patients				
A	05 (7.94%)	58 (92.06%)	63 (42%)	0.717
B	03 (4.92%)	58 (95.08%)	61 (40.67%)	
Female Patients				
A	10 (11.49%)	77 (88.51%)	87 (58%)	0.004
B	01 (1.12%)	88 (98.88%)	89 (59.33%)	

Table 4: Comparison of posterior dislocation between the both groups for duration of fracture

Group	Posterior Dislocation		Total	P value
	Yes (%)	No (%)		
< 7 days duration of fracture				
A	12 (11.21%)	95 (88.79%)	107 (71.33%)	0.016
B	03 (2.73%)	107 (97.27%)	110 (73.33%)	
≥7 days duration of fracture				
A	03 (6.98%)	40 (93.02%)	43 (28.67%)	0.616
B	01 (2.5%)	39 (97.5%)	40 (26.67%)	

Table 5: Comparison of posterior dislocation between the both groups for diabetes mellitus

Group	Posterior Dislocation		Total	P value
	Yes (%)	No (%)		
Diabetic				
A	05 (9.43%)	48 (90.57%)	53 (35.33%)	0.488
B	03 (5.56%)	51 (94.44%)	54 (36%)	
Non-diabetic				
A	10 (10.31%)	87 (89.69%)	97 (64.67%)	0.009
B	01 (1.04%)	95 (98.96%)	96 (64%)	

DISCUSSION:

In our study, in study group A, posterior dislocation was found in 15 (10%) patients while in study group B posterior dislocation was found in 4 (2.67%) patients. Significantly ($P = 0.013$) higher posterior dislocation was found in study group A as compared to study group B.

Wang G et al¹³ in his study has found this incidence rate of posterior dislocation after anterolateral approach as 0% and 5% after posterolateral approach in hip arthroplasty. Masonis et al¹⁴ reported this posterior dislocation rate after posterolateral approach in primary hip arthroplasty as 3.95% and after anterolateral approach as 2.18% which is not statistically significant. Wood¹⁵ reported increased dislocation rates after posterior approaches compared with anterior approaches, though this difference was not significant.

In another randomized controlled trials done by Martinez AA et al¹⁶, incidence of posterior dislocation was found in 7.4% in Moore approach while it was 1.1% in Hardinge approach.

Post-operative dislocation rates was also found to be three times more after posterior approaches compared to anterior approaches.¹⁷ Bush JB et al¹⁸ in his randomized trial of anterior versus posterior

approach in hip hemiarthroplasty has shown 0% post-operative dislocation after Hardinge approach and 4.5% after Moore approach which was statistically significant. Keene and Parker¹⁹ reported a 4.3% dislocation rate after posterior capsular approaches.

Enocson A et al²⁰ found the lower rate of posterior dislocation after anterolateral surgical approach than the posterolateral approach (2% versus 12%) which was statistically significant.

Another study done by similar author has reported that anterolateral approach has less risk of dislocation as compared to posterolateral approach after hemiarthroplasty (HA) in cases of femoral neck fractures.²¹

Skoldenberg O et al²² in his study has also recommended that the anterolateral approach in hip arthroplasty for femoral neck fractures is effective and associated with less dislocation rates compared to posterolateral approach. He found the dislocation rate as 9% and 1% for posterolateral and anterolateral approach respectively.

In one study, anterolateral approach found with less dislocation rate as compared to posterolateral approach in cases of femoral neck fractures.²³

Contrary to results of our study and all studies described above i.e. the posterior approach with an increased risk of dislocation, Palan J et al²⁴ and Hedlundh U et al²⁵ found no significant difference in dislocation rates between the anterolateral and posterior approaches. On the whole it is concluded that incidence of posterior dislocation of hip in Hardinge approach is less than in Moore approach in hip arthroplasty

CONCLUSION:

This study concluded that incidence of posterior dislocation of hip joint was less after anterolateral (Hardinge) approach compared to posterior (Moore) approach in hip arthroplasty for the treatment of fracture neck of femur in elderly patients. So, we recommend that anterolateral (Hardinge) approach is preferable surgical approach in hip arthroplasty for femoral neck fractures in order to avoid posterior dislocation of hip joint post-operatively.

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