

Functional outcome of anterior V/S posterior Approach in hemiarthroplasty and total hip arthroplasty through lateral incision

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Background: The hip joint is one of the most surgically explored joints and can be operated through various approaches. The lateral and posterior approaches are by far the most commonly used approaches. The aim of this study is to compare the functional outcome in patients undergoing arthroplasty of the hip through anterior and posterior approach through lateral incision.

Material and Methods: This study was conducted on patients admitted to orthopaedics ward at MGM Hospital, Kamothe. A total of 30 patients were included for the study and followed for a period of 6 weeks, 2 months and 3 months. Out of these, 15 patients were operated through the anterior approach and 15 through posterior approach. Patients were assessed on the basis of Harris Hip Score.

Result: The mean age was 57.06 years for “anterior” group and 63.33 for “posterior” group. Out of 30, 15 were in the anterior group in which 4 were females and 11 were males. 15 were in the posterior group, 5 were females and 10 were males

Out of the two approaches, harris hip score was calculated preoperatively, at 6weeks, at 2months and 3 months. The harris hip score for “anterior” group was 75.5 , 86 and 89.73 at 6 weeks, 2months, 3months respectively and for “posterior” group was 72, 89.86,93.13 at 6 weeks, 2 months,3 months.

Conclusion: The functional outcome as assessed by harris hip score at 6 weeks, 2 months, 3 months was better in patients undergoing hemiarthroplasty and total hip arthroplasty through posterior approach as compared to anterior approach through lateral incision.

Key words: hiparthroplasty, approaches to the hip, harris hip score

Introduction:

Operations of the hip joint are among the most common procedures in orthopaedics. Surgical exposure of the hip joint is required for treatment of infection, hip fractures hemiarthroplasty as well as primary and revised total hip replacement.¹ The principles of surgical exposure include a thorough knowledge of anatomy of the region and its variations,proper patient positioning and adequate incisions.¹ Dissections through natural cleavage planes helps to minimize bleeding and disruption of important functional structures.⁽¹⁾

A number of surgical approaches to the hip joint exist, each with unique advantages and disadvantages.²The most commonly used approaches include the direct anterior, direct lateral and posterior approaches.²Numerous technical intricacies permit safe and efficacious femoral and acetabular reconstruction when using each approach.² Hip dislocation, abductor insufficiency, fracture and nerve injury are complications of THA, although their relative risk varies by approach.² A number of clinical trials have

be done to elicit differences in patient-reported outcomes, complication rates and return to function among the surgical approaches⁽²⁾

Approaches to the Hip:

1. Anterior Approach
2. Anterolateral Approach
3. Lateral Approach
4. Posterior Approach
5. Medial Approach

However, the most frequently used and studied are the following:

The transtrochanteric approach, the anterolateral approach, and the direct lateral and posterolateral approaches.³ The direct lateral approach was described by Hardinge in 1982.³ Also referred to as lateral, Hardinge's or transgluteal approach, this is a modified Bauer's approach.³ It provides an excellent acetabular cavity and femoral proximal end exposure, enabling an easy insertion of the components of hip prosthesis.³ Additionally, posterior hip structures are preserved, thus turning postoperative prosthesis dislocation difficult.³ It may be performed with the patient lying on his/her back or chest, thus enabling an easier anesthetic procedure.³ Its bigger disadvantage is the release of the anterior third of the gluteus muscle tendon on the great trochanter, which ultimately can lead to the development of limping by abduction failure.⁽³⁾

Posterior approach

Key Steps

Position: Mostly done in lateral position

Incision: standard incision is 10-15 cm long curve-linear extending from posterior superior iliac spine to greater trochanter and extending down in a variable distance along the shaft of the femur.⁴ The modern incisions are shorter than the standard.⁴ As this can be extended if

needed it is sensible to initially make a smaller incision and extend if needed.⁴

Soft tissue dissection: Initially fascia lata and vastuslateralis is cut.⁴ The gluteus maximus fibres are split.⁴ Then the hip is internally rotated and short external rotators are cut after holding them with stay sutures.⁴ Obturatorinternus and piriformis is detached and reflected backwards to protect the sciatic nerve.⁴

Internervous plane: There is no true internervous plane as the fibres of the gluteus maximus are split. Since the nerve enters the muscle medial to the split, muscle denervation rarely occurs.⁴

Capsule is incised with a T shaped incision posteriorly.⁴

Closure: Capsular closure is described but the practicality is an issue mainly following hip arthroplasty procedures.⁴ It is important re-attached the external rotators and obturatorinternus and piriformis.⁴

This approach provides good exposure to the acetabulum as well as the femoral head and neck equally making it easier to surgical procedures well.⁽⁴⁾

The direct lateral approach to the hip was described by Hardinge in 1982.⁵ This approach is based on an observation made by McFarland and Osborne (1954) which suggested that the gluteus medius and vastuslateralis are in functional continuity through the thick tendinous periosteum which covers the greater trochanter.⁵ This approach involves splitting the gluteus medius and retracting a portion of the muscle anteriorly in continuity with part of the vastuslateralis.⁵ The advantage is that it prevents the need for a trochanteric osteotomy however leaving the neurovascular supply of gluteus medius and tensor fascia lata vulnerable to damage.⁵ The function of the abductors may be impaired after operation if there is damage to the superior gluteal nerve or if the muscle flap is reattached inadequately to the trochanter.⁽⁵⁾

However, dislocation is the most unfortunate implant related complication, with a risk persisting decrease in quality of life.⁶ A number of studies have shown that the direct lateral approach is preferable to the posterior approach in terms of minimizing the risk of dislocation.⁶ The patient reported outcome measures of the two different surgical approaches have not however, been fully explored.⁽⁶⁾

The posterolateral approach has been associated with an increased risk of dislocations, with risk of injury to the sciatic nerve.⁷ However the chances of abductor muscles are spared and hence it does not affect the gait.⁷ More recent studies have shown that use of larger femoral head sizes can markedly reduce the dislocation rate⁽⁷⁾

The purpose of the present study is to compare functional outcomes of posterior and lateral approaches in primary arthroplasty of the hip in patients between 35-75 years of age.

Aims & Objectives

1. To undertake a clinical study comparing the results of anterior v/s posterior approach in arthroplasty of the hip in fracture neck femur, trochanteric fractures, AVN Hip
2. Assessment of complications of the two approaches

Material and Methods

This study will be conducted on patients who were admitted and underwent hip arthroplasty by either anterior or posterior approach in MGM medical college and hospital, kamothe, navi Mumbai. Those patients will be assessed preoperatively and post-operatively 6weeks, 2months and 3months.

Study type: Comparative and prospective study

Study duration: June 2017 – June 2018

Method of collection of data

Sample size – 15 patients each undergoing arthroplasty of the hip by anterior or posterior approach through lateral incision.

Cases satisfying the inclusion and exclusion criteria admitted to MGM Hospital Kamothe.

Inclusion Criteria

1. Age 35- 95years
2. patients with diseased hip joint i.e. AVN, non-union
3. Patients with fracture neck femur, Trochanteric fractures
4. They have to be able to understand the informed consent

Exclusion Criteria

1. Infected HIP pathology
2. Inability to fulfill follow-up criteria
3. Significant cardiovascular, renal or hepatic disease, pregnancy, malignancy, severe systemic comorbidities
4. vascular insufficiency eg. DVT

Period of follow up: 6 weeks, 2 months, 3 months

Parameters for evaluation:

Harris Hip Score		Hip ID:
		Study Hip: <input type="checkbox"/> Left <input type="checkbox"/> Right
		Examination Date (MM/DD/YY): / /
		Subject Initials:
		Medical Record Number:
Interval: _____		
Harris Hip Score		
Pain (check one)	<input type="checkbox"/> None or ignores it (44)	Stairs
<input type="checkbox"/> Slight, occasional, no compromise in activities (40)	<input type="checkbox"/> Mild pain, no effect on average activities, rarely moderate pain with unusual activity; may take aspirin (30)	<input type="checkbox"/> Normally without using a railing (4)
<input type="checkbox"/> Moderate Pain, tolerable but makes concession to pain. Some limitation of ordinary activity or work. May require Occasional pain medication stronger than aspirin (20)	<input type="checkbox"/> Marked pain, serious limitation of activities (10)	<input type="checkbox"/> Normally using a railing (2)
<input type="checkbox"/> Totally disabled, crippled, pain in bed, bedridden (0)		<input type="checkbox"/> In any manner (1)
Limp		<input type="checkbox"/> Unable to do stairs (0)
<input type="checkbox"/> None (11)		Put on Shoes and Socks
<input type="checkbox"/> Slight (8)		<input type="checkbox"/> With ease (4)
<input type="checkbox"/> Moderate (5)		<input type="checkbox"/> With difficulty (2)
<input type="checkbox"/> Severe (0)		<input type="checkbox"/> Unable (0)
Support		Absence of Deformity (All yes = 4; Less than 4 = 0)
<input type="checkbox"/> None (11)		Less than 30° fixed flexion contracture <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Cane for long walks (7)		Less than 10° fixed abduction <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Cane most of time (5)		Less than 10° fixed internal rotation in extension <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> One crutch (3)		Limb length discrepancy less than 3.2 cm <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Two canes (2)		Range of Motion (*indicates normal)
<input type="checkbox"/> Two crutches or not able to walk (0)		Flexion ("140") _____
Distance Walked		Abduction ("40") _____
<input type="checkbox"/> Unlimited (11)		Adduction ("40") _____
<input type="checkbox"/> Six blocks (8)		External Rotation ("40") _____
<input type="checkbox"/> Two or three blocks (5)		Internal Rotation ("40") _____
<input type="checkbox"/> Indoors only (2)		Range of Motion Scale
<input type="checkbox"/> Bed and chair only (0)		211° - 300° (5) 81° - 100 (2)
Sitting		161° - 210° (4) 31° - 60° (1)
<input type="checkbox"/> Comfortably in ordinary chair for one hour (5)		101° - 160° (3) 0° - 30° (0)
<input type="checkbox"/> On a high chair for 30 minutes (3)		Range of Motion Score _____
<input type="checkbox"/> Unable to sit comfortably in any chair (0)		Total Harris Hip Score _____
Enter public transportation		
<input type="checkbox"/> Yes (1)		
<input type="checkbox"/> No (0)		

Study site : Department of orthopaedics, MGM Medical college and Hospital, Navi Mumbai.

Stastical analysis : Data will be assessed, tabulated and appropriate statistical methods will be used to obtain meaningful information.

Technique :All operations were performed at the Department of Orthopaedic Surgery of MGM Hospital Anaesthesia – spinal epidural anesthesia.

Outcome assessment done on basis of Harris hip score pre-operatively and post-operatively after 6 weeks, 2months, 3months

Result:

This study was done on patients admitted to orthopaedic ward at MGM hospital kamothe, Navi Mumbai. All patients undergoing arthroplasty of the hip fulfilling the inclusion and exclusion criteria were included. Out of 30 patients, 9 were females and 11 were males. The mean age was 57.06 years for “anterior” group and 63.33 for “posterior” group. Out of 30, 15 were in the anterior group in which 4 were females and 11 were males. 15 were in the posterior group, 5 were females and 10 were males

Out of the two approaches, harris hip score was calculated preoperatively, at 6weeks, at 2months and 3 months. The harris hip score for “anterior” group was 75.5 , 86 and 89.73 at 6 weeks, 2months, 3months respectively and for “posterior” group was 72, 89.86,93.13 at 6 weeks, 2 months,3 months.

Comparing the two approaches, the harris hip score at the end of 3 months was better in patients operated through the posterior approach.

Table 1 : demographic data

	Males	Female	Mean age years
Anterior	11	4	57.06
Posterior	10	5	63.33
Total	21	9	

Table 2 : mean harris hip score

Approach	Preoperative	6 weeks	2months	3 months
Anterior	21.04	75.5	86	89.73
Posterior	33	72	89.86	93.13

Table 3: Harris hip score : males v/s females

	Preop	6 weeks	2months	3months
Males (anterior)	24.81	83	94	90.45
Females (anterior)	12.25	55	63.75	87.75
Males (posterior)	49.5	70.6	90.5	95
Females (posterior)	0	74.8	88.2	89.4

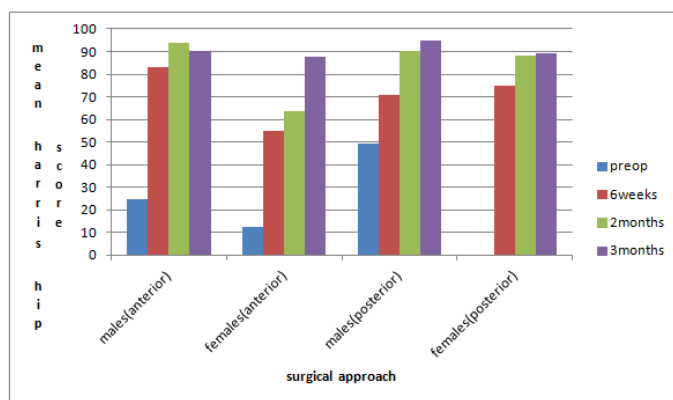
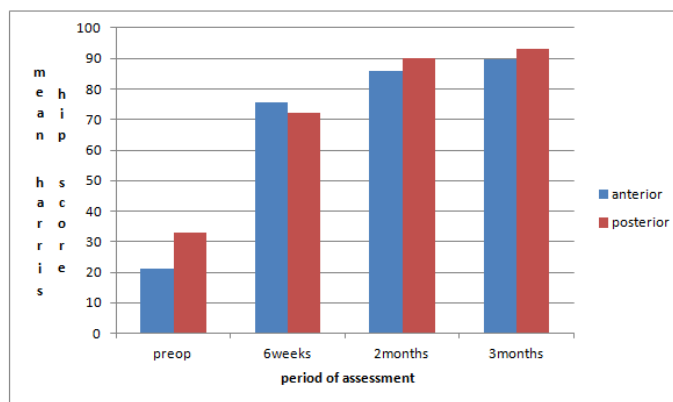


Table 4:Bar diagram showing mean harris hip score (y axis) and period of assessment (x axis)



Discussion: Onyemaechi et al undertook a study comparing various approaches to the hip joint and concluded that the choice of approach should depend on the indication, merits and demerits and a good knowledge about the anatomy and not the surgeons preference.⁽¹⁾

Stephen Petis et al conducted a study on surgical approach in primary total arthroplasty and concluded that the anterior, lateral and posterior approaches have their unique advantages and disadvantages and that surgeons must choose the approach with which they have the most experience.⁽²⁾

Marco Antonio et al concluded that the direct lateral and posterolateral approaches did not show considerable differences with respect to prevalence of Trendelenburg sign and kinematic analysis of motion during gait.⁽³⁾

Leonardson et al in their study on surgical approaches to the hip in hemiarthroplasty concluded that the surgical approach for hemiarthroplasty does not influence patient reported outcome.⁽⁴⁾

Complications: Dislocation was observed in 1 patient operated through posterior approach

Abductor lurch was seen in 1 patient operated through the anterior approach

Limitations: Our study is limited by a small patient population which reduces the statistical analysis. We require extensive study to give an accurate result.

Conclusion: In conclusion, the functional outcome as predicted by calculating the Harris hip score was better in patients operated through the posterior approach as compared to the anterior approach.

Acknowledgement: I would like to thank the head of my unit, colleges for their constant support and helping hand in making this study successful. I would also like to thank my department.

Declarations:

Funding: no funding sources

Conflict of interest : none declared

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

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