"A ONE YEAR HOSPITAL BASED COMPARITIVE STUDY ON OUTCOME OF POSTERIOR AND APPROACH IN HEMIARTHROPLASTY OF HIP JOINT"

BY

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Dissertation

Submitted to the KAHER, Belagavi, Karnataka
In partial fulfillment
of the requirements for the degree of

MASTER OF SURGERY
In
ORTHOPAEDICS

JAWAHARLAL NEHRU MEDICAL COLLEGE

BELAGAVI - 590010, KARNATAKA.

APRIL - 2022

KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH, BELAGAVI, KARNATAKA

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ABBREVIATIONS

ACL	:	Anterior cruciate ligament
AP	:	Anteroposterior
CI	:	Confidence Intervals
CRP	:	C-reactive protein
CXR	:	Chest x-ray
DLC	:	Differential Leukocyte Count
DVT	:	Deep vein thrombosis
ECG	:	Electrocardiography
ESR	:	Erythrocyte Sedimentation Rate
FBS	:	Fasting Blood Sugar
GT	:	Greater Trochanter
HA	:	Hemiarthroplasty
PA	:	Pulmonary Artery
RBS	:	Random Blood Sugar
THA	:	Total Hip Arthroplasty
TLC	:	Total Leukocyte Count
VAS	:	Visual Analog Scale

ABSTRACT

Background:

The purpose of the study is to evaluate the comparative outcome of posterior approach and lateral approach of hemiarthroplasty of hip joint with respect to duration of hospital stay, need for mobility aids, mobility level, living arrangements, pain, sciatic nerve injury, hip dislocation, and femoral stem position.

Methods:

A hospital based Prospective Study was conducted among 42 Patients undergoing Hemiarthroplasty of hip joint in Department of Orthopaedics at the KLE's Dr. Prabhakar Kore Hospital and Medical Research Centre and Charitable Hospital, Belagavi for a period of One year [1st January 2020 to 31st December 2020]. 42 patients were divided in to two groups by randomization. One group underwent lateral approach (22 patients) and other group underwent posterior approach (20 patients) for Hemiarthroplasty of hip joint. Questionnaire was used to collect date. Institutional Ethical clearance & Informed consent was obtained prior to the start of the study

Statistical Methods:

Categorical data was represented in the form of Frequencies and proportions. Chi-square test will be used as test of significance for qualitative data. Continuous data was represented as mean and standard deviation. Independent t test or Mann Whitney U test were used as test of significance to identify the mean difference between two quantitative variables and qualitative variables respectively. p value <0.05 was considered as statistically significant.

Results:

In Lateral group, mean age of subjects was 72.45 ± 5.990 years and 59.1% were males and 40.9% were females in posterior group, mean age of subjects was 71.90 ± 6.585 years and 55% were males and 45% females. Mean duration of surgery in Lateral group, 68.64 ± 9.409 min and in posterior group was 70.50 ± 8.870 min. Mean Amount of Blood loss in Lateral group, 232.27 ± 79.22 ml and in posterior group was 224.50 ± 93.83 ml. Mean Drain Output in Lateral group, 59.55 ± 9.50 ml and in posterior group was 57.50 ± 8.51 ml. In lateral group, 0% had nerve injury and in posterior group, 5% had nerve injury. In Lateral group, 68.2% were mobilized on 2nd day and 31.8% were mobilized on 3rd day and in Posterior group, 50% were mobilized on 2nd day and 50% were mobilized on 3rd day. In Lateral group, 0% had dislocation and in Posterior group, 5% had dislocation. In lateral group, 4.5% had infection and in posterior group, 15% had infection. Median duration of hospital stay in lateral group was 12 days and in posterior group, was 12 days. In Lateral group, 90.9% had neutral, 9.1% had Valgus and 0% had Varus stem position and in Posterior group, 85% had neutral and 15% had Varus stem position.

Conclusion:

From the study it can be concluded that both Lateral approach and Posterior approach for Hemiarthroplasty of hip joint had no statistically significant difference in Functional outcome. However clinically Lateral approach had no incidence of Nerve injury, early mobilization was observed on 2nd day in majority, no incidence of dislocation, mild pain, lesser duration of hospital day compared to posterior approach.

Keywords: Hemiarthroplasty, Lateral approach, Posterior approach

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INTRODUCTION

Femoral neck fractures are one of the commonest injuries sustained by the elderly population. The incidence is growing rapidly due to increase in ageing of human population and lifestyle modifications.

Moore and Bohlman were the first to introduce hemiarthroplasty of the hip in 1940, followed by the Austin-Moore endoprosthesis. In 1954, Thompson introduced a comparable endoprosthesis. Moore first advised inserting his prosthetic using a posterior surgical technique. After that, different techniques to the hip were used, most notably the anterior and anterolateral approaches. In recent years, Hardinge's description of a direct lateral approach to the hip joint has popularised McFarland and Osborne's 1954 description of a similar method.

For fracture neck of femur intracapsular, hemiarthroplasty (HA) of hip joint is a typical therapeutic option. HA allows for immediate complete weight-bearing without the risk of avascular necrosis or non-union, which are common consequences of internal fixation. Furthermore, when compared to internal fixation, HA results in a fewer reoperations in patients above 60 years old[1,2].

Furthermore, despite an increased risk of hip dislocation, total hip arthroplasty (THA) is regarded a preferable alternative for previously independent and healthy patients because ofthe functional results[3,4,5]. However, the ideal strategy for hip joint arthroplasty is still up for debate.

Need for the study:

The goal of this study is to compare the outcomes of a posterior approach hemiarthroplasty vs a lateral approach hemiarthroplasty of hip joint in terms of hospital stay, requirement for mobility aids, mobility level, living arrangements, pain, hip dislocation, sciatic nerve injury, femoral stem position and survival 12 months following hip fracture.

AIM AND OBJECTIVES

AIM:

To evaluate the outcome of posterior approach and lateral approach among patients undergoing Hemiarthroplasty of hip joint.

OBJECTIVES:

1. To determine efficiency of treatment, in terms of duration of hospital stay, reduction in pain score
2. To compare the Functional outcome between two procedures
3. To compare postoperative complications between two procedures

REVIEW OF LITERATURE

ANATOMY OF HIP JOINT

The hip joint is a ball-and-socket articulation produced by the receipt of the femur head into the Acetabulum's cup-shaped fossa. The acetabulum's articular surface is horseshoe-shaped and lacking inferiorly at the acetabular notch. Hyaline cartilage is used to cover the articular surfaces[6]. The presence of a fibrocartilaginous rim termed the acetabular labrum deepens the cavity of the acetabulum. It has a triangle cross-section, with the base adhering to the acetabulum's border and the apex corresponding to the labrum's free margin; the latter is in- turned to restrict the rim of the acetabular cavity, which closely embraces the head of the femur and aids in keeping it in place.

A capsule surrounds the hip joint and is linked to the acetabular labrum medially. It is attached to the intertrochanteric line of the femur in front and halfway along the posterior portion of the femur's neck on the lateral side. The capsular ligament is thicker in the upper and foreparts of the joint, where the most resistance is needed; behind and below, it is weak and just loosely attached to the bone. The iliofemoral, pubofemoral, ligament of the head of the femur, ischiofemoral, and transverse acetabular ligaments make up the joint.

The iliofemoral ligament is an inverted Y-shaped ligament with a lot of strength. Its base is superiorly linked to the anterior inferior iliac spine. The Y's two limbs are linked to the upper and lower sections of the femur's intertrochanteric line, respectively. During standing, this highly strong ligament avoids over-extension[6].

The pubofemoral ligament is shaped like a triangle. The apex of the ligament is attached to the lower half of the intertrochanteric line, while the base is attached to the superior ramus of the pubis. Extension and abduction are restricted by this ligament. The ischiofemoral ligament is a spiral ligament that connects the ischium's body to the acetabular border. The fibres are linked to the greater trochanter and pass upward and laterally. This ligament prevents you from going too far.

The acetabular notch forms the transverse acetabular ligament. The ligament transforms the notch into a tunnel where blood vessels and nerves enter the joint. The head of the femur's ligament is triangular in shape and flat. Its apex is attached to the pit on the head of the femur, while its base is attached to the transverse ligament and the acetabular notch borders. It is encased by the synovial membrane and is found within the joint.

The straight head of the rectus femoris, the iliacus, and the psoas major (separated from the capsule by a bursa) and the pectineus are in front of the joint; above, the rectus femoris reflected head and the implantation of gluteus minimus, the latter being tightly adhering to the capsule; below, the obturator externus and pectineus; behind, the rectus femoris reflected head and the insertion of gluteus minimus, the latter being closely adhering to the capsule; The obturator, medial circumflex femoral, and superior and inferior gluteal arteries all supply the joint with blood.

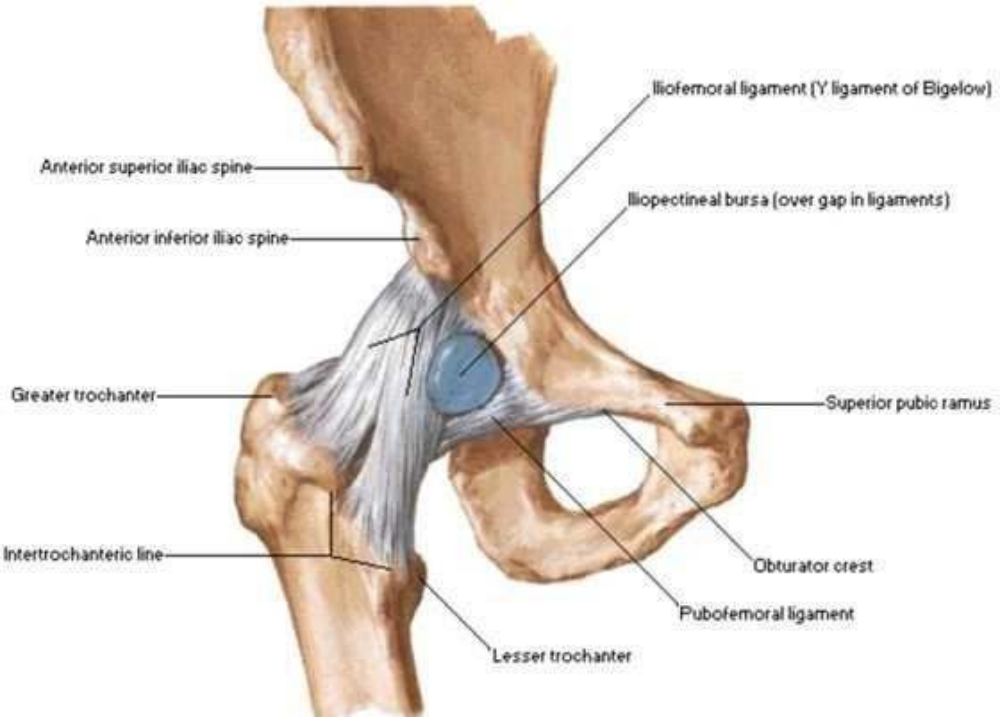


Fig. 1 Hip joint Anterior View

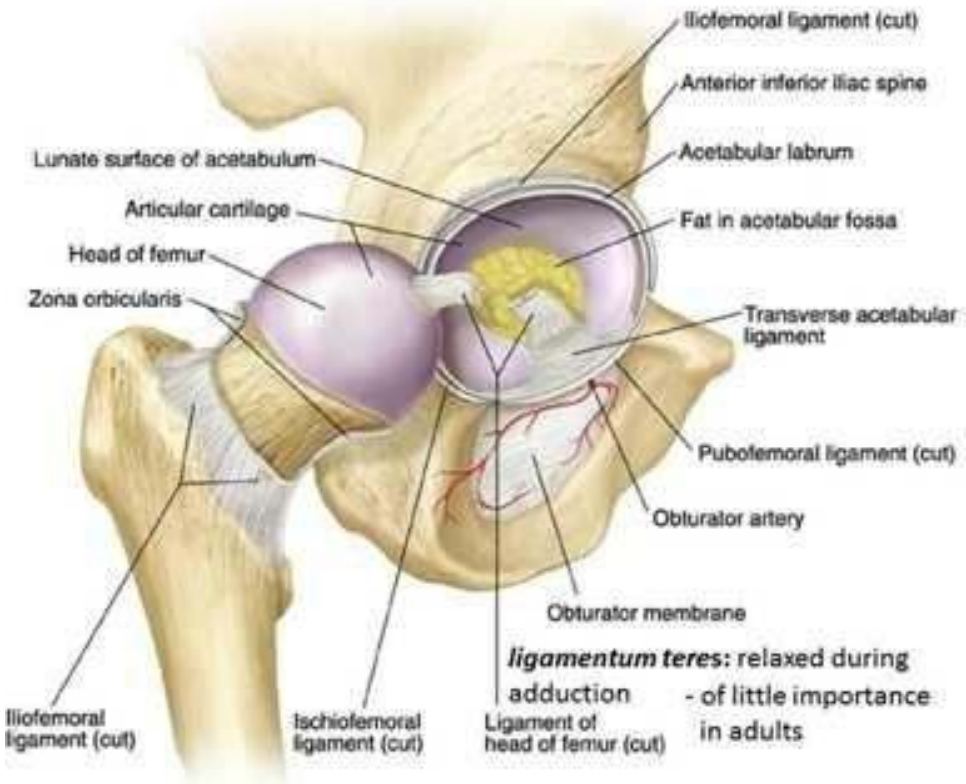


Fig. 2 Hip joint (opened) Lateral View

The nerves are the sciatic, obturator, and axiliary obturator nerves, a branch from the nerve to the quadratus femoris, and a filament from the femoral nerve branch supplying the rectus femoris. The muscles that cause the movements are:

1. Flexion - Psoas major, Iliacus, Pectineus, Rectus femoris, Sartorius, Adductors.
2. Extension - Gluteus maximus, Biceps femoris, Semitendinosus, Semi-membranous.
3. Abduction - Gluteus medius, Gluteus minimus, Sartorius, Tensor fascia latae.
4. Adduction - Adductors longus, brevis and magnus, Pectineus, Gracilis.
5. Medial rotation - Gluteus medius and minimus (anterior fibers), Tensor fascia latae.
6. Lateral rotation - Piriformis, Obturators, Gaemelli, Quadratus femoris, Adductors,Sartorius.

Because of the length of the femur's neck and its inclination to the body of the bone, the angular motions of flexion, extension, adduction, and abduction are partially translated into rotator movements in the joint. The head of the femur rotates along a transverse axis within the acetabulum when the thigh is flexed or extended. The thigh is rotated not only by gliding but also by rotating the head of the femur in the acetabulum. The axis of the movement is a vertical line that passes through the femur's head and the intercondylar notch. In the hip-joint, the head of the femur is tightly fitted to the acetabulum for an area spanning nearly half a sphere, and it is even more closely embraced by the acetabular labrum at the margin of the bony cup, so that the head of the femur is held in place by that ligament even when the capsule fibres have been quite divided[6].

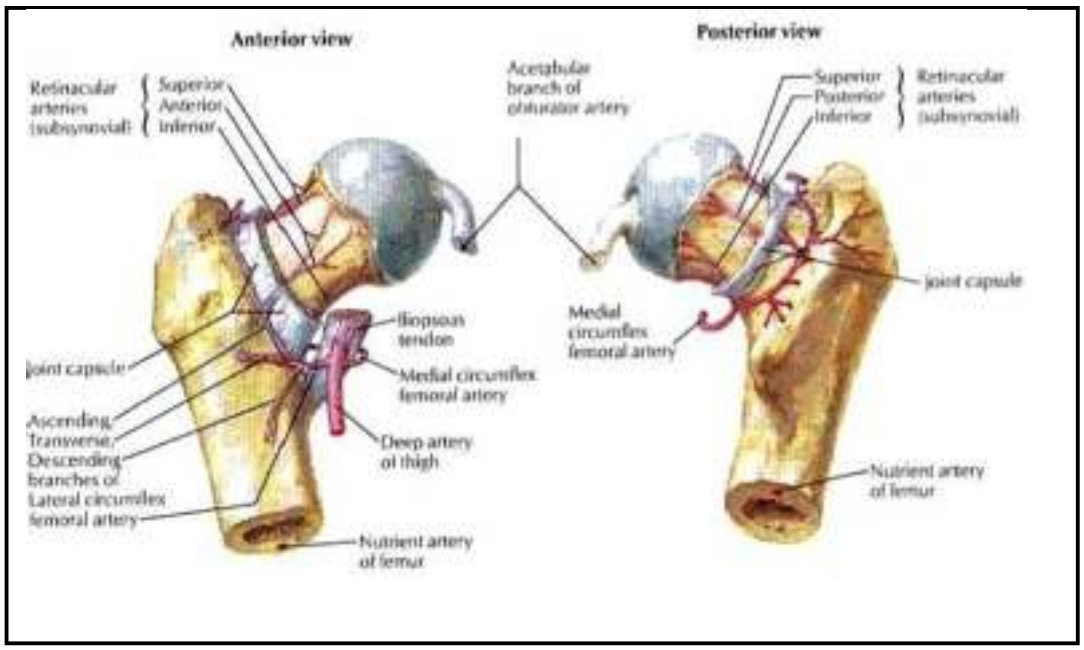
BLOOD SUPPLY 7

When it comes to intracapsular hip fractures, the blood supply to the joint is especially important. The anatomy is well-documented6. Capsular vessels, intramedullary vessels, and a contribution from the ligamentum teres are the three sources. Capsular vessels are the most important source of femoral head blood flow in adults. The medial and lateral circumflex femoral arteries give birth to these veins. In 79 percent of patients, these are branches of the profunda femoris. In 20% of individuals, one or both vessels emerge from the femoral artery, and in 1% of patients, both vessels emerge from the femoral artery. The ascending cervical capsular vessels develop from an extracapsular circular anastomosis formed by the medial and lateral femoral circumflex arteries at the base of the femoral neck. They pierce the anterior capsule at the level of the intertrochanteric line at the base of the neck. They pass beneath the orbicular fibres of the capsule on the posterior portion of the neck and run up the neck under the synovial reflection to reach the articular surface.

These are known as retinacular vessels within the capsule. There are four primary groups (anterior, medial, lateral, and posterior), with the lateral group providing the most blood flow to the femoral head. The deep branch of the medial femoral circumflex artery gives rise to the most significant retinal arteries. The main weight-bearing portion of the femoral head is supplied by these veins. By comparison, the lateral femoral circumflex artery and metaphyseal arteries make a significantly less contribution. A second ring anastomosis called the subsynovial intra-articular ring connects the articular surface of the head to the femoral neck. On its postero-superior aspect, the terminal branches of the deep branch of the medial femoral circumflex artery penetrate the femoral head 2 to 4 mm proximal to the articular surface.

In displaced subcapital fractures, these capsular veins are subject to injury. Just below the articular edge, they enter the femoral head. If the femoral head is displaced due to a fracture in this location, these vessels will be damaged, putting the femoral head's blood supply in jeopardy and increasing the chance of avascular necrosis if the head is kept. Claffey discovered that if the key lateral retinacular arteries are destroyed, the risk of avascular necrosis is considerably enhanced.

The ligamentum teres artery is a branch of the obturator, often known as the medial femoral circumflex artery. The medullary bone in the neck provides increased blood supply to the adult's neck. These veins, like the retinacular vessels, are clearly sensitive to rupture in misplaced fractures. Although the arteries that reach the head through the ligamentum teres help to give blood to the femoral head, they are usually insufficient to maintain complete vascularity of the entire head [7]. Re-vascularization of the femoral head occurs after a displaced fracture via re-vascularization from parts of the head with residual blood supply and in the development of arteries from the metaphysis. The cambial layer in the fibrous covering of the femoral neck within the hip joint capsule does not participate in callus production during fracture healing. Fracture union is solely dependent on endosteal healing, which is one of the reasons why these fractures have such extended union times.



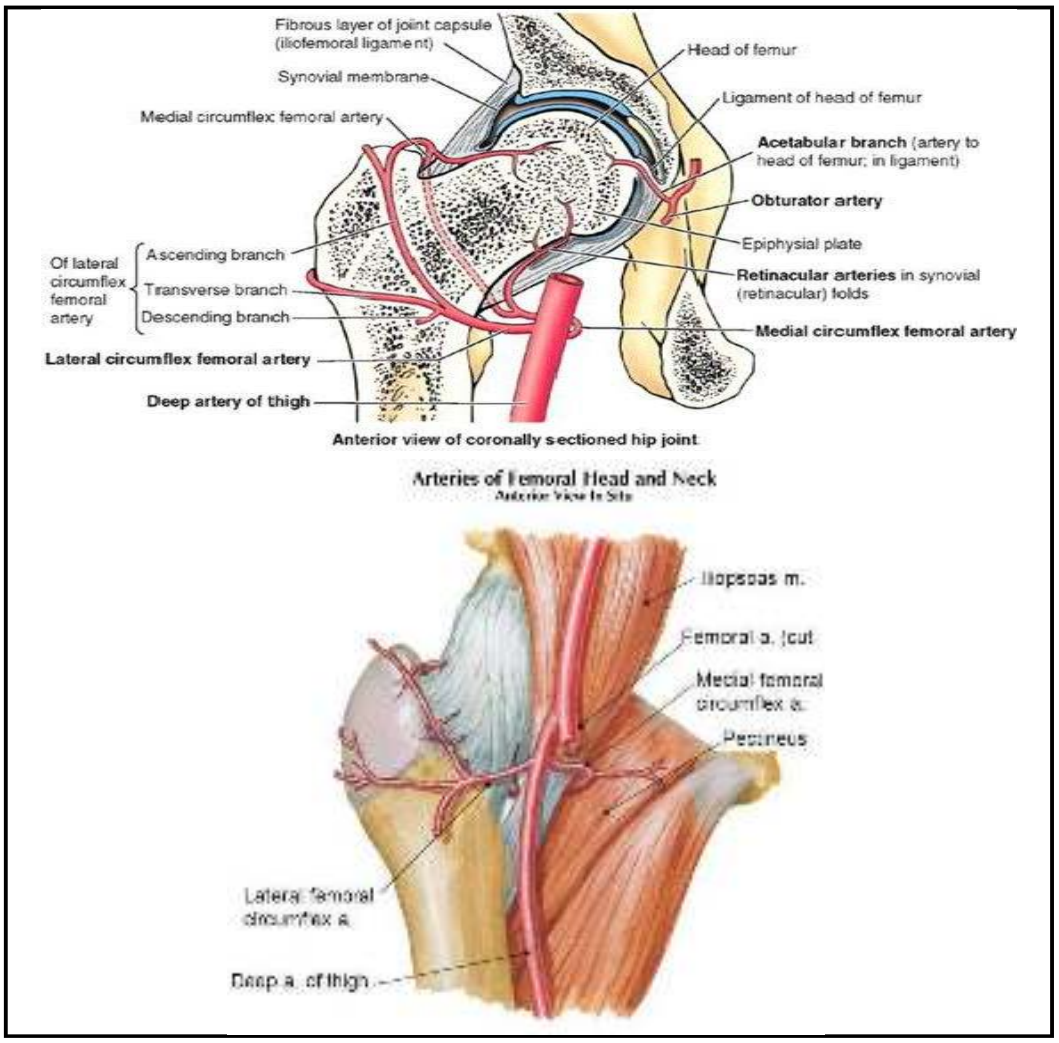


Fig. 3 Femur's head and neck blood supply

FEMORAL NECK FRACTURES

Fractures of the neck of the femur are more common in the elderly, and they're usually caused by low-energy falls. They're also linked to osteoporosis. Fractures of the femoral neck in children are a separate injury that requires specialised treatment. Young patients' femoral neck fractures are usually caused by a high-energy mechanism, and injuries are common. The majority of femoral neck fractures are intracapsular, putting the femoral head's blood supply at risk. Extracapsular femoral neck fractures are known as basicervical femoral neck fracturesand are frequently associated with intertrochanteric femoral fractures.

Anatomical Classification

The anatomical classification is based on the fractural line's placement, which might be subcapital (just beneath the head of the femur) or transcervical (inside the neck of the femur). The fractural line at the base of the femur's neck is known as basicervical.

Subcapital ***Transcervical*** ***Basicervical***

Fig. 4 The site of femoral neck fractures is classified anatomically.

Garden's classification:

The degree of valgus displacement determines the Garden classification.

Type I: Incomplete fracture/valgus affected.

Type II: Complete fracture and un displaced.

Type III: Complete fracture with partial displacement.

Type IV: Complete fracture and complete displacement

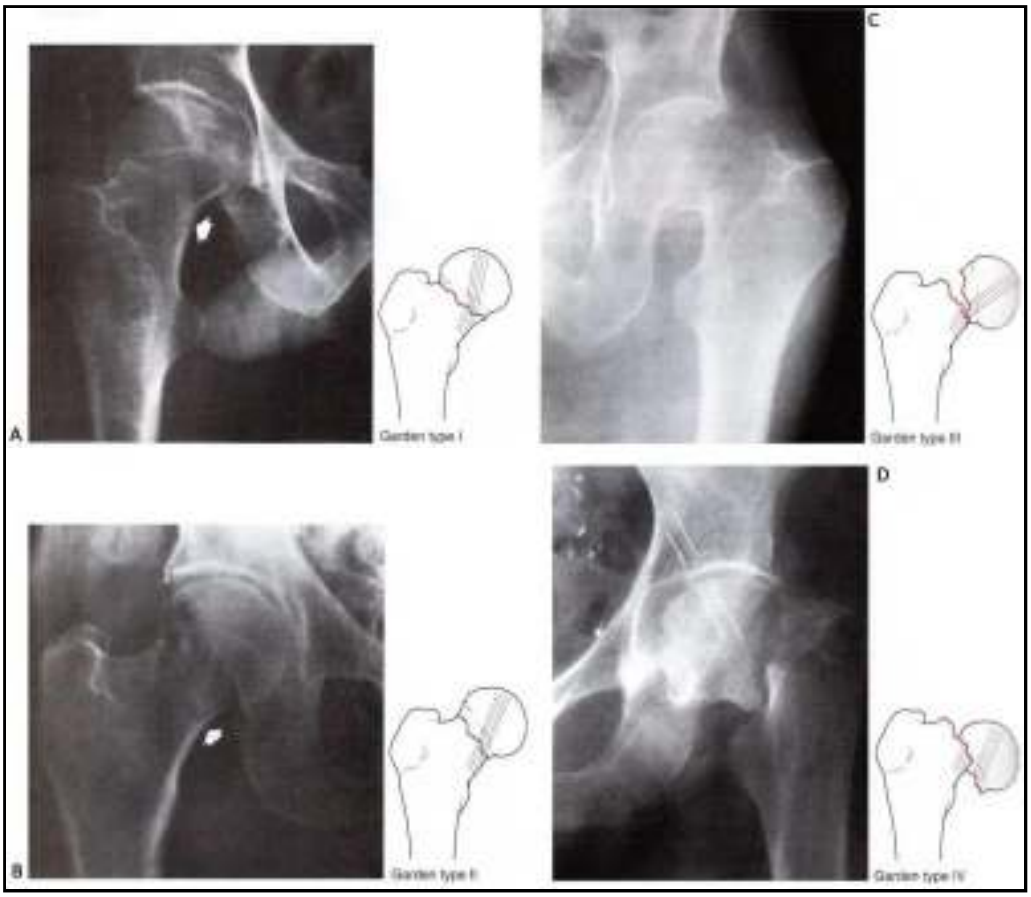


Fig. 5 Garden's femoral neck fracture classification.

Type I fractures can be partial, but they're more likely to cause valgus and retroversion (A). The fractures of type II are complete but not displaced. There is a break in the trabeculations but no shift in alignment in these uncommon fractures (B). Type III fractures have pronounced angulation but little to no proximal shaft translation (C). There is total displacement between fragments in the Garden type IV fracture, and the shaft translates proximally (D). The head is free to realign within the acetabulum, and the head and acetabulum's major compressive trabeculae realign (white lines)[8].

The Pauwels classification:

The angle of fracture from the horizontal determines the Pauwels classification

- Type I: <30 degrees
- Type II: 31 to 70 degrees
- Type III: > 70 degrees

Increasing shear forces with increasing angle leads to more fracture inability

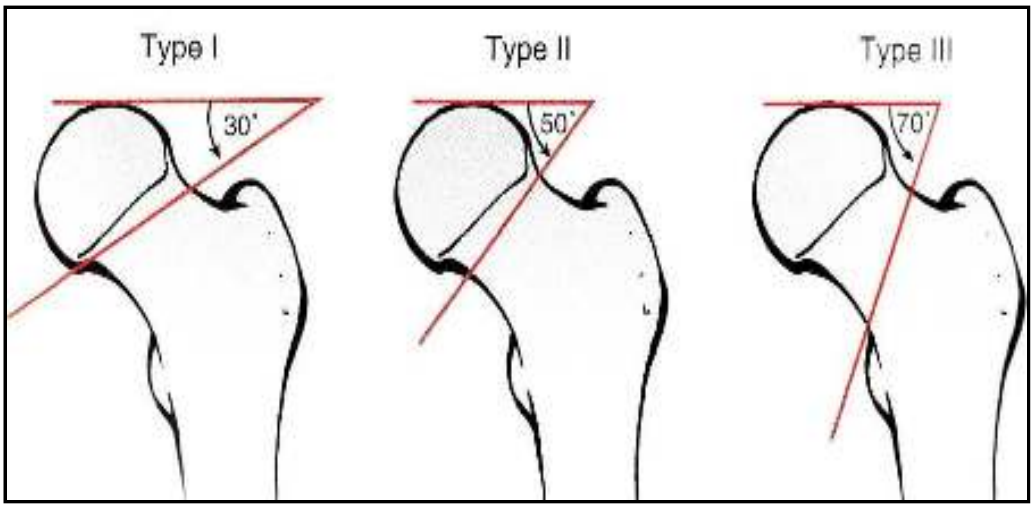


Fig. 6 Femoral neck fractures are classified by Pauwel.

The angle the fracture forms with the horizontal plane determines the Pauwel classification of femoral neck fractures. The obliquity of the fracture line increases as the fracture type proceeds from type I to type III, and the shear forces at the fracture site theoretically increase as well.

APPLIED BIO MECHANICS

With a fulcrum, lever arm, and power arm, the hip joint works on the Bio-engineering principle of moment force. The adductor muscles act on one end, the body weight on the other,and the head itself is the fulcrum of the hip joint, which has a semi-spherical head that articulates within the acetabular cup. The 1st order lever can be compared to this.

FORCES ACTING ON THE HIP[8]

The body weight can be represented as a load delivered to a lever arm extending from the body's centre of gravity to the centre of the femoral head to describe the forces operating on the hip joint.

When in a one-legged stance, the abductor musculature must exert an equal moment to keep the pelvis level, and a greater ‘moment to tilt the pelvis to the same side when walking or running, acting on a lever arm extending from the lateral aspect of the greater trochanter to the centre of the femoral head. Because the length of the body weight's lever arm is around 2.5 times that of the abductor musculature, the abductor muscles must exert about 2.5 times the body weight to keep the pelvis level when standing on one leg

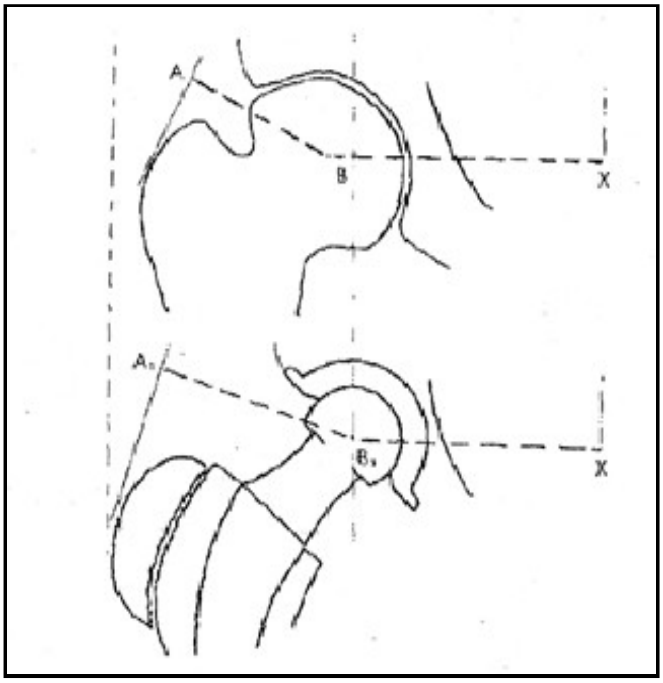


Fig. 7 Forces acting on the hip

The moment created by the body's weight, X, acting on the lever arm, B - X, must becounterbalanced by the moment produced by the abductors. A shorter lever arm is used to act. A – B In arthritic hips, the lever arms A-B may be shorter than normal. The centralization of the head shortens the B-X lever arm, while the lateral reattachment of the trochanter lengthens the A-B lever arm. When lifting, sprinting, or jumping, the burden could be ten times your body weight. As a result, increasing physical activity and extra body weight considerably increase the forces that work to loosen, bend, or shatter the stem of a femoral component[8].

Because the body's centre of gravity (at the midline, prior to the body of S2) is posterior to the axis of the joint, the forces on the joint work not only in the coronal plane but also in the saggital plane to bend the stem posteriorly. The stem is torsioned as a result of these two forcescombining. Fractures of the stem commonly

begin on the anterolateral side because half of the body weight acts medially and posterior to the axis of the hip joint. Boost the width of the proximal section of the stem to better fill the metaphysis and increase torsional stability. It can also be accomplished by keeping the neck portion in place.

It is obvious from the preceding discussion that we can minimise the forces travelling through the hip joint by

1. shortening the body lever arm.

2. Extending the abductor lever arm's length.

The osteotomized greater trochanter can be reattached laterally to achieve this.

Extending the distance between the femoral head and the stem.

Reattachment of the osteotomized side The abductor lever arm will be longer if the trochanter is larger. Because the weakness of the abductors induced by surgical trauma, infection, nonunion, and proximal displacement of the trochanter not only makes the hip unstable, but also increases the risk of loosening and failure of the prosthetic stem, this surgery is not employed in every instance. Because enough exposure can be accomplished without trochanteric osteotomy, osteotomy of the greater trochanter is no longer performed to avoid difficulties caused by reattachment.

PLANE OF FORCES ON HIP JOINT

The centre of gravity of a standing person is posterior to the axis of the hip joint. From the upper edge of the symphysis pubis to the level of the sacral ala, a view of the pelvis is taken. The acetabulum is delineated, and the centre of gravity is located at X. Although the centre of gravity, X, is anterior to the S2 vertebrae, it is not

fixed and fluctuates with movement of the upper body in relation to the pelvis. Because hip joints are distal and anterior to X, rotatory and posterior bending pressures, in addition to coronal plane stresses, are exerted, and the prosthetic stem tends to rotate bend.

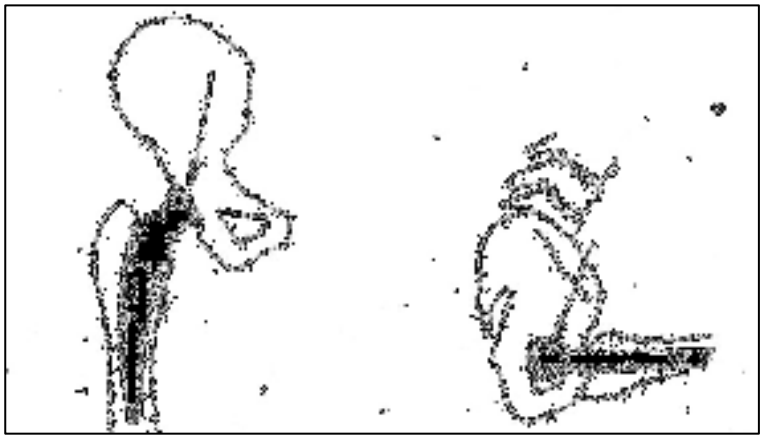


Fig. 8 Torsion of the stem is caused by a force.

1. In the coronal plane, forces operating on the hip tend to deflect the stem medially.

2. When forces acting in the saggital plane, particularly when the hip is flexed (or) when liftingtends to fault the stem posteriorly, they cause a stem torsion.

Femoral Head and the Femoral Offset

The greater the length I, of the neck segment of the femoral component, the bigger the lever arm or the moment of force that tends to bend or break the component at a certain angle between the neck and femoral shaft.

SURGICAL APPROACHES:

The commonly used approaches in hemiarthroplasty are:

1. Posterior approach
2. Lateral approach

Posterior approach[8]

Moore popularised the strategy, which is also known as the southern approach. The patient is positioned in the true lateral position, with the afflicted limb raised above the rest of the body. On the posterior portion of the greater trochanter, make a 10 to 15 cm curving incision. Starting 6 to 8 cm above and posterior to the posterior part of the greater trochanter, make an incision. The gluteus maximus fibres are in line with the section of the incision that goes from this point to the posterior aspect of the trochanter. Curve the incision across the buttock, cutting over the trochanter's posterior aspect, and continue down the femur shaft. To expose the vastus lateralis, incise the fascia lata on the lateral surface of the femur. To reveal the vastus lateralis, lengthen the fascial aspect of the femur.

Longen the fascial incision superiorly in line with the skin incision, then use blunt dissection to split the gluteus maximus fibres. Retract the divided gluteus maximus fibres and the thigh's deep fascia. The hip joint's posterolateral portion is still hidden beneath the short external rotator muscles. Internally rotate the hip to stretch the external rotator muscles. Just before the piriformis and obturator internus tendons insert into the greater trochanter, place stay sutures in them. Detach the muscles near the insertion of the femur and reflect them backward. The hip joint capsule's posterior portion is now totally revealed.

A longitudinal or T-shaped incision is made in the hip joint capsule. Flexion, internal rotation, and adduction are used to dislocate the hip. The femoral head and neck are now removed.

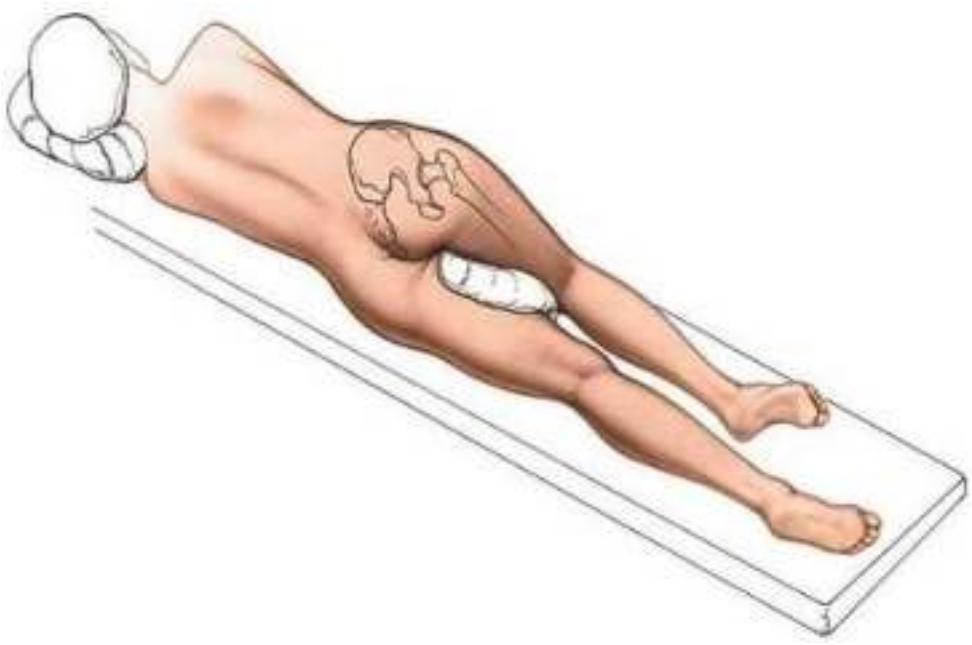


Fig. 9 The patient is positioned on the operating table in preparation for a posteriorapproach to the hip joint.

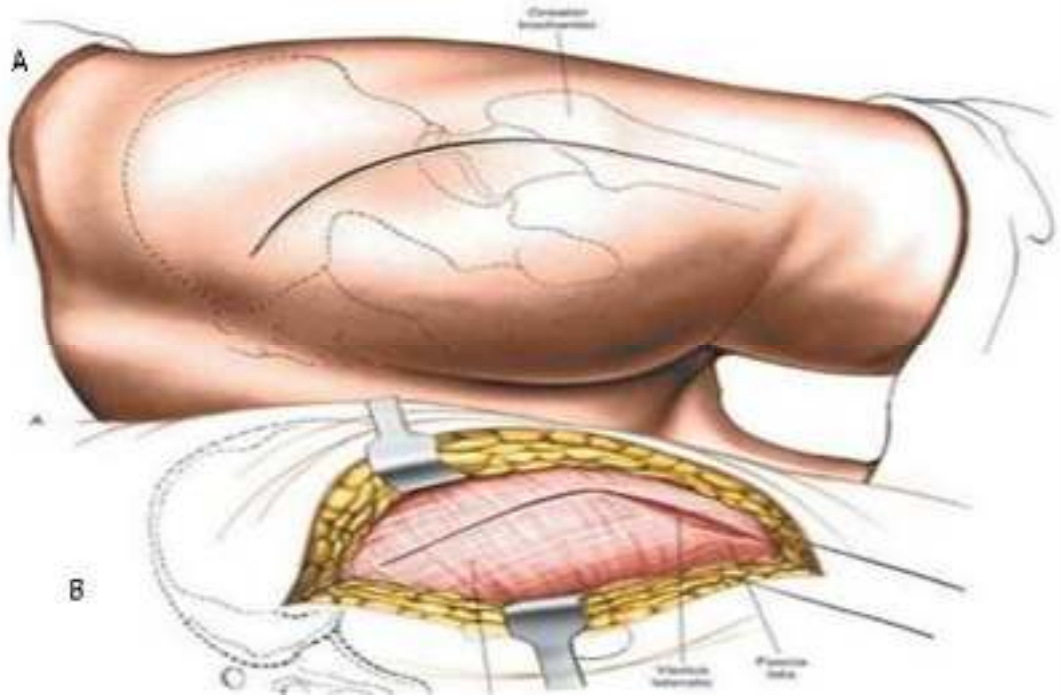


Fig. 10 A. Skin incision for the posterior access to the hip joint; B. Incision over the facialata.

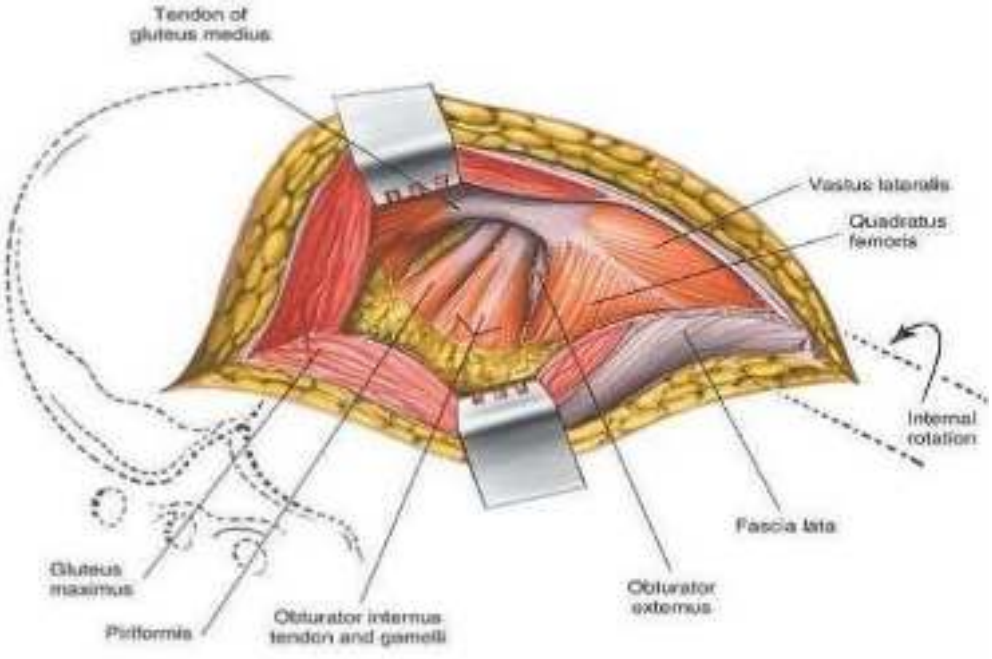


Fig. 11 To reveal the insertions of the short rotators, push the fat posteriomedially. The sciatic nerve is not visible since it is hidden within the fatty tissue's composition. Place your retractors in the gluteus maximus material, just above the fatty tissue.

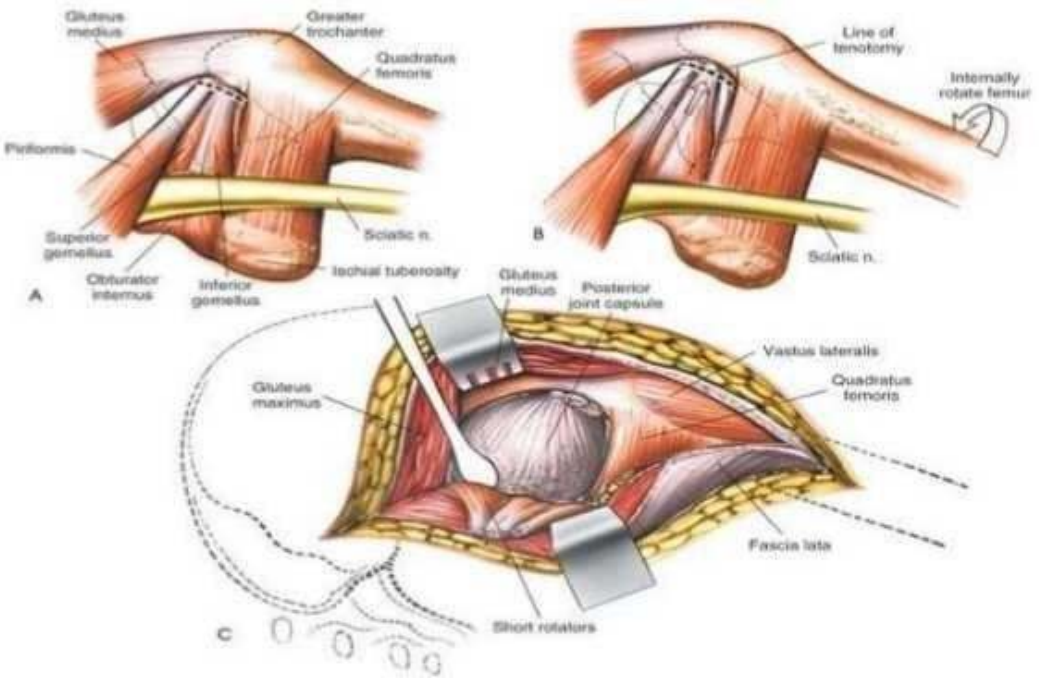


Fig. 12 (A,B). Internally rotate the femur to move the short rotators' attachment as far lateral to the sciatic nerve as possible. (C). Close to the femoral insertion, detach the shortrotator muscles and reflect them backward, putting them over the sciatic nerve to protectit.

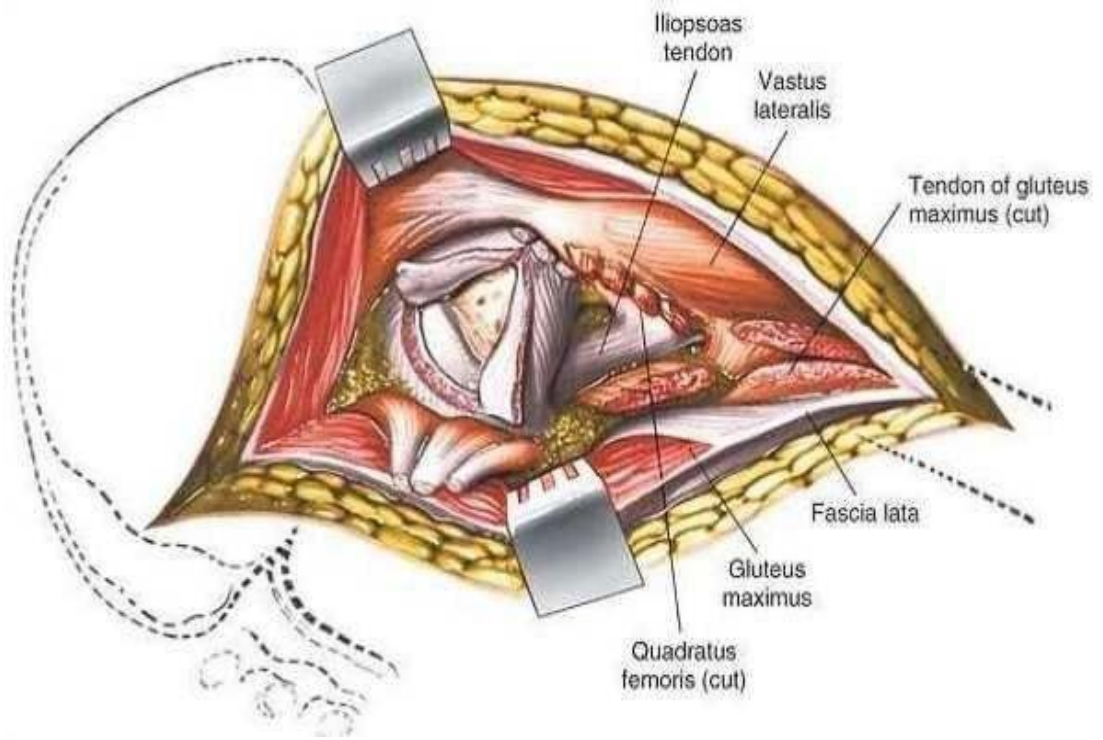


Fig. 13 Cut the quadratus femoris and the gluteus maximus tendinous insertion to achieve more exposure.

Lateral Approach[8]

This is also a popular technique. Begin a longitudinal incision 5cm proximal to tip of greater trochanter centered over the tip of greater trochanter and extends roughly down the line of the femur 8cm.The fascia lata is incised along the posterior edge of the greater trochanter and continues proximally and distally in the line of the skin incision. The gluteus medius, as well as its insertion into the greater trochanter, are identified. Internal hip rotation can help with this. The muscle is split in the direction of its fibres at the intersection of the anterior and middle thirds. This division is 4cm proximal to the posterosuperior tip of the greater trochanter. An incision is then made down to the bone above the trochanter, slightly anteriorly,and then distally into the vastus lateralis along the femur's anterolateral side for 5cms.

The gluteus medius attachment to the trochanter, as well as the periosteum and fascia of the vastus lateralis, are lifted as a single layer from the anterior region of the trochanter with a sharp chisel. The connecting muscles' bulk is moved forward.

The gluteus minimus tendon is then separated, exposing the hip joint capsule. A retractor is put over the pelvic brim, deep to the rectus femoris, and the anterior capsule is dissected off the acetabular margin after the anterior capsule has been exposed. After removing the femoral head and neck, a large capsular T-shaped incision can be used to dislocate the hip anteriorly with considerable ease.

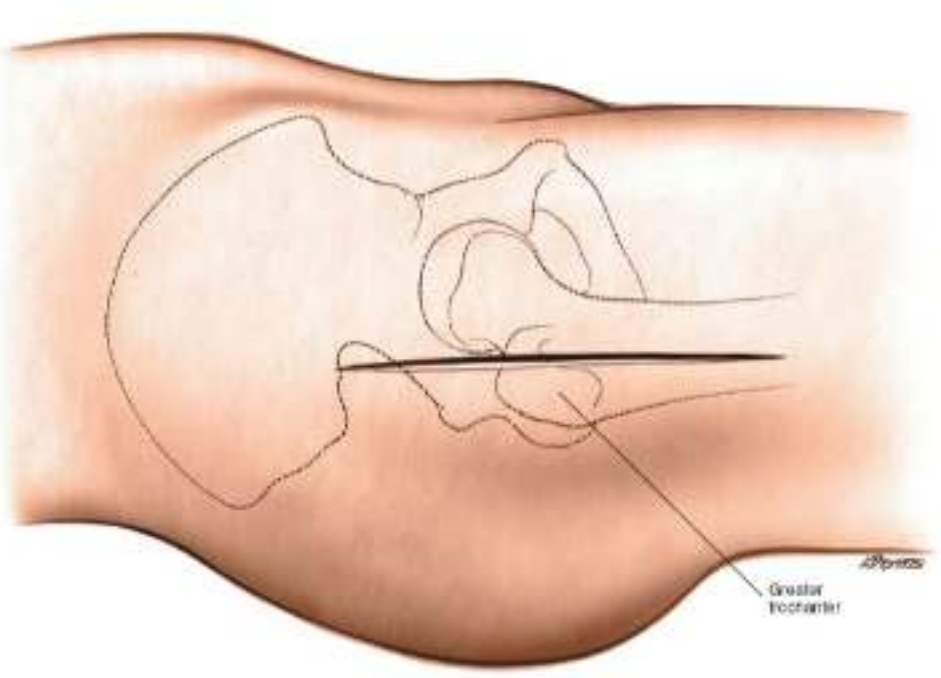


Figure14: **Make a longitudinal incision centered over the tip of the greater trochanter in the line of the femoral shaft.**

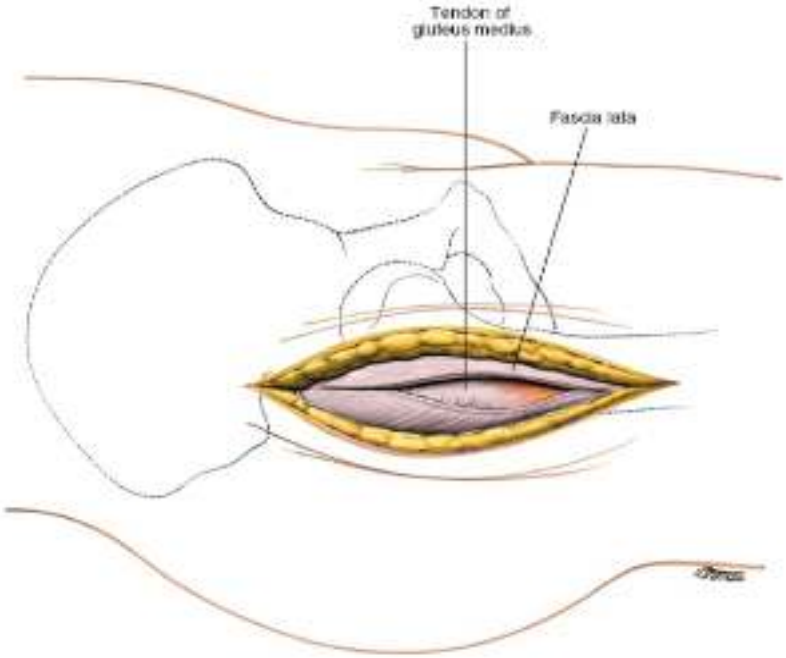


Figure 15: Divide the deep fascia in the line of the skin incision, retracting the fascial edges to pull the tensor fasciae latae anteriorly

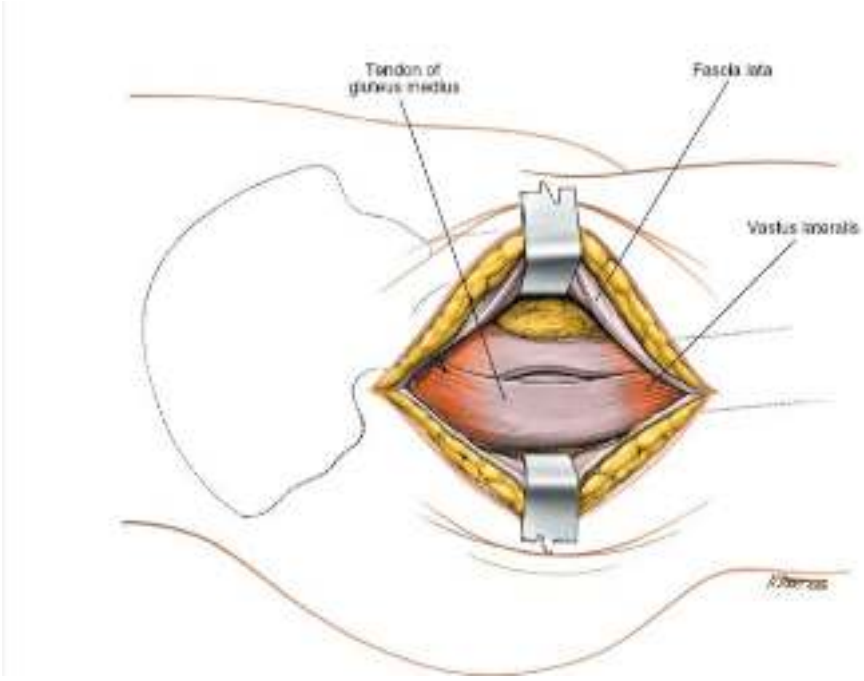


Figure16: **Split the fibers of gluteus medius above the tip of the greater trochanter and extend this incision distally on the lateral aspect of the trochanter until 2 cm of the vastus lateralis is also split**

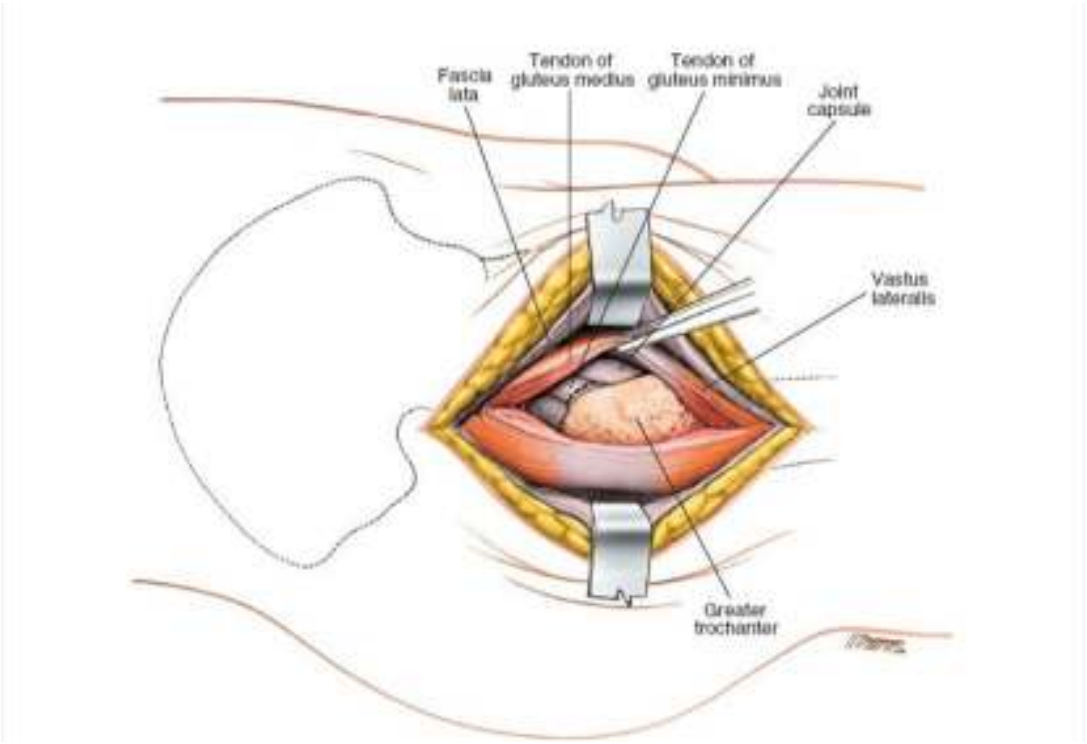


Figure 17: **Develop this anterior flap and divide the tendon of the gluteus minimus muscle to reveal the anterior aspect of the hip joint capsule.**

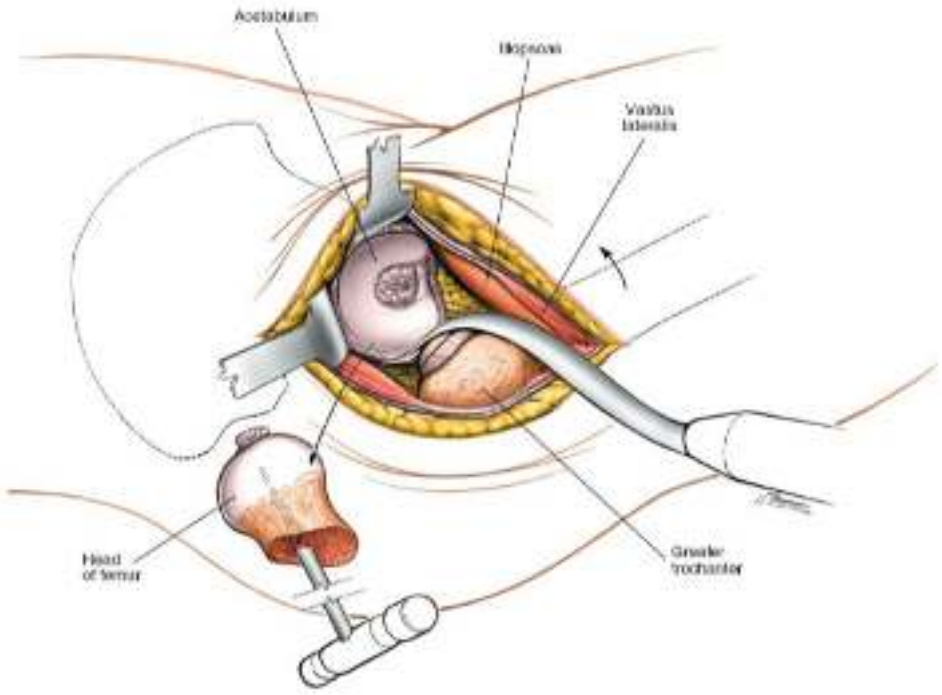


Figure 18: **Extract the femoral head. Insert appropriate retractors to reveal the acetabulum**.

IMPLANTATION OF CEMENTED FEMORAL COMPONENT[8]

Cement fixation is recommended in patients who are physiologically older than 65 years old and whose femoral cortex is weak or osteoporotic, making a secure press-fit fixation impossible.

Place the broaches in place. In regard to the axis of the knee, approximately 15 degrees of anteversion. Maintain proper axial alignment while inserting the broach. To aid passage, alternately impact and remove the broach. Because the broach will be fixed using cement, the requirements for absolute broach stability will be less stringent than with non-cement approaches. When inserting the broach, if resistance is encountered, the impingement is most likely distally within the diaphysis. In the diaphysis, the broach cannot be used to prepare cortical bone. If you continue to impact the broach, you risk a femoral fracture or the broach becoming imprisoned.

To assess the limb length, perform a trial reduction with the prosthesis without cement. The depth of insertion of the component is predetermined at this stage since the stem will be fastened with cement. Dislocate the hip and remove the experimental implant once final component sizes have been chosen and limb length and stability have been tested.

Remove any leftover loose cancellous bone from the medial portion of the proximal femur with straight and angled curettes. After implantation, avoid touching the stem or allowing blood or debris to contaminate it, as this may compromise the cement-implant interface. Start prepping the cement by changing your outer gloves. Combine two packages of cement to make a standard femoral stem. The cement is shaped into a sausage and held in the palm of one hand or in an open plastic container. Because a medullary stopper would trap air and blood at the canal's distal end, it is not used. The cement is inserted into the canal with the index finger or thumb of the

opposite hand. The tip of the finger is extended as far as it will go. It's critical to keep the cement bolus intact and avoid mixing blood with it. Once the cavity has been filled, the cement is squeezed with the thumb. It's possible to use a plunger or a mechanical impactor. While the cement is being placed, a small plastic suction tube can be inserted into the femoral canal to let air and blood to exit and reduce hydrostatic pressure.

Have the femoral component ready for insertion right away. Before inserting the stem, determine the appropriate amount of anteversion and the medial/lateral position of the stem. At first, physically insert the stem by holding it by the head. Insert the tip of the stem into the cement mantle's centre. Insert the stem with firm, steady pressure. To finish seating the stem, have a plastic-tipped head impactor and a mallet on hand right away. Remove the cement from the collar area to ensure that the stem is fully inserted, and if it isn't, impact it again.

As the cement solidifies, keep a firm grip on the component's head. Cut the cement around the borders of the prosthesis and carefully remove it from the surgical region as the cement becomes doughy. If you take the cement from beneath the component, you risk losing the proximal support. Examine the anterior portion of the femoral neck for any cement that may protrude and cause impingement or dislocation. Check the femoral component's placement and stability again. It is unstable and must be replaced if there is any visible motion or if fluid extrudes in the bone-cement contact with movement. Reduce the hip and verify the stability of the hemiarthroplasty if it looks to be good.

IMPLANTATION OF CEMENTLESS (UNCEMENTED) FEMORAL COMPONENT[8]

Insert the reamer into the piriformis fossa at a location that corresponds to the piriformis fossa. On the cut surface of the femoral neck, the insertion point is slightly posterior and lateral. An incorrect insertion site prevents access to the medullary canal's centre. Direct the handle laterally towards the greater trochanter after the reamer tip has been placed. Aim the reamer towards the medial femoral condyle as you go along the femur. If this is not possible, remove more bone from the medial portion of the greater trochanter, or the femoral component will be positioned varus. For this, use a rongeur, a box chisel, or a specialist trochanter reamer. To allow adequate axial reaming of the canal, a groove must be created in the medial portion of the greater trochanter. Place the reamer at a specific location. Then figure out how deep the reamer should be inserted.

Examine the axial reamer's stability within the canal. There should be no deviation of the reamer's tip in any plane. The proximal section of the femur should now be prepared. Broaches are used to remove the remaining cancellous bone along the medial region of the neck. Place the broach in the same exact spot as the axial reamers. To control anteversion, rotate the broach. Seat the final such that it is axially stable within the canal and won't progress any farther.

After you've achieved complete muscular relaxation, perform this manoeuvre. Remove any debris from the acetabulum using a hose. Replace the femoral component with the correct size. Hand-insert the stem until it's just a few centimetres away from complete seating. Make sure to replicate the exact degree of anteversion determined by the system's driving mechanism or a plastic-tipped pusher. Blow with the same amount of force as the component is seated. With each blow of the mallet,

the component will advance in smaller amounts as it gets closer to final seating. As the stem approaches final seating, an audible change in pitch is frequently detectable. Reduce the hip once more after removing any debris from the acetabulum. Check to see whether any soft tissues have been pushed into the joint. Confirm the hemiarthroplasty's stability by moving it through its full range of motion.

A small plastic suction tube can be introduced into the femoral canal to let air and blood to escape and minimise hydrostatic pressure while the cement is being put. Have the femoral component ready for insertion right away. Before inserting the stem, determine the appropriate amount of anteversion and the medial/lateral position of the stem. At first, physically insert the stem by holding it by the head. Insert the tip of the stem into the cement mantle's centre. Insert the stem with firm, steady pressure. To finish seating the stem, have a plastic-tipped head impactor and a mallet on hand right away. Remove the cement from the collar area to ensure that the stem is fully inserted, and if it isn't, impact it again.

As the cement solidifies, keep a firm grip on the component's head. Cut the cement around the borders of the prosthesis and carefully remove it from the surgical region as the cement becomes doughy. If you take the cement from beneath the component, you risk losing the proximal support. Examine the anterior portion of the femoral neck for any cement that may protrude and cause impingement or dislocation. Check the femoral component's placement and stability again. It is unstable and must be replaced if there is any visible motion or if fluid extrudes in the bone-cement contact with movement. Reduce the hip and verify the stability of the hemiarthroplasty if it looks to be good.

After the hip has been reduced, repair the posterior soft tissue envelope. Repair the capsule using thick non-absorbable sutures if it has been preserved. Reattaching the previously tagged tendons of the short external rotators to the posterior portion of the greater trochanter, as well as reconstructing the posterior soft tissue envelope, may aid in postoperative hip stabilisation. Two closed suction drainage tubes should be inserted, one deep into the fascia lata and the other in the subcutaneous plane, and brought out by different stab holes. Close the fascial incision with closely approximated sutures while abducting the hip 10 degrees. Interrupt absorbable sutures are used to close the subcutaneous layer. Close the skin in a regular manner.

COMPLICATIONS

- Any major surgical surgery carries with it some complications.
- Those who are aged. Others have a direct connection to the procedure.

NERVE INJURIES[8]

Sciatic Nerve

- The most commonly damaged nerve. Subclinical injury is the exception rather than the rule.
- Improper retraction can result in a stretch injury or a direct contusion.
- Injured during a 4 to 5 cm lengthening.
- Pain, tight swelling, and soreness are all symptoms of a subgluteal hematoma. Early diagnosis and surgical decompression, as well as anticoagulant reversal, are critical.
- Dislocation in the postoperative phase • Prior to surgery, the state of the sciatic nerve should always be noted.

VASCULAR INJURIES

It's uncommon, yet it can result in the amputation of an entire leg. The following acute intraoperative events[8] can result in vascular damage.

1. Use of retractors: Sharp pointed retractors should never be placed randomly. When using them next to the acetabulum, place them against the bone.
2. Use careful caution to avoid osteotomies causing direct damage to vessels.

THROMBOEMBOLISM

This is the most prevalent significant consequence after hemiarthroplasty8, and it can result in death within three months. In the first 3 weeks following surgery, it commonly appears in the veins of the thigh and calf. Pain and discomfort in the calf, as well as a positive Homan's sign, unilateral swelling and erythema of the low-grade fever, and a fast pulse, are used to make a clinical diagnosis. Chest pain (particularly if pleuritic in character), ECG, CXR, and arterial blood gas analysis are used to identify pulmonary embolism. Venography, B-mode ultrasonography, impedance plethysmography, radioactive iodine-labelled fibrinogen, and pulmonary angiography are all tests for DVT.

Prophylaxis of DVT[8]:

Early mobilisation, elastic stockings, and other non-pharmacologic modalities are examples of non-pharmacologic modalities.

- Agents such as aspirin, low-dose heparin, adjusted-dose heparin, Dextran, and warfarin are pharmacologic methods.

DISLOCATION

Some surgeons state that following hemiarthroplasty, there are almost no dislocations. Others are concerned about the frequency with which this suggestion occurs, which is upsetting to the patient as well as their careers. The rate of dislocation differs depending on the author. While there is considerable debate about the advantages and disadvantages of the various methods, it appears from several studies that posterior procedures have a substantially higher chance of dislocation (5.8% at the Mayo Clinic, according to Woo & Morrey) than anterior approaches (2.3 percent at the same Clinic)[9].

The advantages of the posterior approach likely to outweigh the danger of dislocation.

That, however, is a completely separate topic. In every example, we employed the posterior strategy. When comparing the dislocation rates of Charnley devices implanted at different centres by different senior surgeons using the same procedures and approach, the dislocation rate ranges from less than 1% to very high rates, prompting the surgeons to discard the conventional socket.

Classification of Dislocation:

There are 3 ways in which dislocation may be classified: -

1.In terms of the event(s) precipitating the dislocation

- Spontaneous Dislocation or True Dislocation - occurs as a result of a normal daily action, such as rising up from a low seat or getting out of a car, etc. femur neck fracture
- Traumatic Dislocation - occurs as a result of a severe blow to the hip. There will always be cases of traumatic dislocation in studies with long follow-up, unless

they are purposefully omitted from the study. Traumatic dislocations, on the other hand, must be specified in any post-total hip replacement dislocation study.

2.In terms of aetiology

P. Fontes, I. Benoit, A. Lortat-Iacob, and R. Didry have proposed a technique for classifying dislocations under this area that could be useful.[9].

Following a poor implant placement - less frequently due to a faulty femoral component placement.

As a result of the periarticular muscles (mostly the gluteus medius, but also the short external rotators) weakening, joint restraint is lost, amplifying the effect of the capsule excision. Weakness of the gluteus medius does not always indicate muscle waste, but rather a new and altered pattern of muscle action, allowing joint restriction in flexion to be lost.

Faulty placement and joint constraint loss are frequently reported to occur in tandem.

3. In terms of time to dislocate

We can distinguish between three time frames using the system proposed by I.P. Daly and B.F. Morrey:

Dislocation that occurs within three months after arthroplasty. The most common type of dislocation is this one. These dislocations are most commonly caused by incorrect implant placement and are aided by postoperative soft tissue relaxing. Early dislocations account for 75% of all dislocations. Unless the patient's evaluation reveals indications of major component malposition, these dislocations can be successfully treated with closed reduction and immobilisation.

Secondary Dislocation - occurs four to five years after arthroplasty. Malposition of the stem or anomalies of the abductors are common causes of these

dislocations (10 percent of all dislocations). The goal of the investigation should be to find component malposition. The goal of treatment is to rectify the implant position in order to avoid a recurrence of the dislocation.

At 5 years and beyond, there is a late dislocation. The rates of late dislocation vary substantially between research. These are most likely the result of gradual stretching of the pseudo capsule produced by particle debris-induced inflammation.

Established Treatment:

Simple closed reduction can be used to address dislocations in a cautious manner. Surgically.

- In early dislocations, closed reduction followed by a few weeks of immobilisation is appropriate. The decreased hip will remain stable in 72.5 percent of instances on average. Ali Khan[10] discovered an 81 percent rate, while Woo & Morrey9 discovered a 65 percent rate. In 77 percent of cases, a dislocation that occurs once will occur again. Recurrence is usually caused by significant implant malposition, which must be addressed surgically. External immobilisation following reduction does not diminish the risk of recurrence statistically.
- Surgical reduction - if necessary, with component (typically cup) location correction and possibly gluteal muscle tensioning. Because stability is achieved in 68.6% of cases on average, there is a substantial chance of recurrence. The following graphs were discovered in the literature[9]. 76 percent for Fraser and Wroblewski, 69 percent for Woo and Morrey (1982), and 61 percent for Daly and Morrey (1992). It should be noted, however, that the statistical results of closure and surgical reduction cannot be compared because the two procedures are

utilised to treat different groups of patients, with surgical reduction being used more frequently for recurrent dislocation management.

LIMB LENGTH DISCREPANCY

It is preferable to have equal limb lengths, however this is rarely attainable. More emphasis is placed on pain alleviation, enhanced mobility, and stability. On an X-ray evaluation, the centre of the head of the femoral component should be at the level of the upper edge of the greater trochanter, according to Muller.

HETEROTOPIC OSSIFICATION

Men with ankylosing spondylitis, joined hips, hypertrophic osteoarthritis, or post-traumatic arthritis are more likely to have significant bone resection as well as substantial soft tissue dissection

Classification of Brooker et al.[11]

1. Bone islands inside soft tissue
2. Proximal femur bone spurs with at least 1 cm between opposing bone surfaces
3. Bone spurs from the proximal femur or pelvis with a distance between opposing bone surfaces of less than 1cm.
4. Ankylosis.

Similar to myositis ossificans in terms of histology. The most common functional impairment is loss of mobility. Prophylaxis with

1. low-dose radiation within 3 days of surgery (single dose of 600 -700 rad)
2. For 6 weeks, take 75 mg of indomethacin every day.
3. Bisphosphonates

ASEPTIC LOOSENING[8]

One of the most serious long-term consequences of hemiarthroplasty is aseptic loosening, which is one of the most prevalent reasons for revision surgery. Aseptic loosening is caused by a number of variables working together. These include the following:

1. Mechanical factors
2. Technical Factors
3. Biological and Host factors

Mechanical Factors

Micro motion and micro fractures develop inside the cement and subchondral bone as a result of continuous mechanical strain. It may also cause the link between the cement and the bone to disintegrate, resulting in bone resorption, radiolucent lines, and gradual aseptic loosening.

Mechanism of stem loosening

- Mode I - Pistoning behaviour
- Mode II - Medial stem pivot
- Mode III - Calcar pivot
- Mode IV - Cantilever bending

Various causes that contribute to the mechanical overload are

The patient's weight has risen.

Increased activity post surgery.

Faulty femoral component positioning, resulting in altered hip biomechanics and higher loads travelling through this artificial joint.

Technical Factors

The mechanical cause of aseptic loosening is aided by a number of technical aspects.

- Inadequate cement encapsulation of the prosthesis.
- Failure to implant the cement before it becomes sticky or doughy, preventing it from flowing properly into the bone's interstices.
- Failure to keep the stem from moving while the cement hardens
- Inadequate cement pressurisation, resulting in the cement not adequately entering the cancellous bone.
- Voids in the cement as a result of improper cement mixing, resulting in an excessive amount of air bubbles, or allowing blood to mix with the cement.
- If a prosthesis is utilised, the causes are incorrect size, inappropriate reaming with oversized broaches, and loss of cancellous bone mantle thickness in the uncemented group.

Biological and Host Factors

Due to wear and tear, minute particles of debris are freed from the various components of the arthroplasty. These particles engage with the macrophage monocyte system, triggering a granulomatous foreign body reaction. As a result, soluble inflammatory mediators are released, which act directly on connective tissue and lyse it, causing peri-implant osteolysis.

Aseptic loosening is caused by the interaction of all of these causes. Mechanical and technical considerations, on the other hand, are thought to have a role in the aseptic loosening of cemented femoral components. Aseptic loosening of the cemented acetabular component and non-cemented total hip arthroplasties are caused in part by biological causes.

OSTEOLYSIS

The mechanism of production of osteolysis

The formation of wear particles -> their passage through the joint fluid to the periprosthetic bone -> the cellular reaction to the particulate debris (IL-6, IL-1, TNF are associated with focal osteolysis)

STEM FAILURE

The stem deforms and fractures as a result of cyclic loading and usually occurs several years following hemiarthroplasty surgery.

1. Excessive weight in large men with degenerative arthritis
2. Increased physical activity
3. Varus position of stem
4. A femoral element with a long neck or a high offset
5. Inadequate cement or bone support for the proximal section of the stem

PERIPROSTHETIC FRACTURES

Intra operative

The dangers to be considered Preoperative bone loss that persists.

The ratio of femoral cortex to canal is low. Cortex reaming is in progress.

The stems are quite large.

Post-Operative

Increased use of the leg following surgery causes stress fractures.

Fractures in the femoral shaft induced by stress risers, such as cortical flaws and insufficient cement distal to the prosthesis tip.

Trauma that is severe enough to fracture a normal limb can produce fractures.

INFECTIONS

Hemiarthroplasty post-operative infections are typically catastrophic, necessitating the removal of both components and cement, and are associated with a high risk of morbidity and mortality. According to Gristina, the difficulty in eradicating infection is linked to the formation of bacteria in the biofilm on the biomaterials.

Treatment includes

1. Antibiotic treatment.
2. Hip amputation and drainage.
3. Arthroplasty with debridement and modified Girdle stone excision.
4. Total hip arthroplasty (one or two stages).
5. Hip disarticulation as a life-saving treatment as a last option.

Hip arthrodesis is ideal for young patients with unilateral disease, but due to a lack of adequate bone stock, it is extremely difficult. Acute post-operative infections are usually superficial. Antibiotics, incision, and drainage with intermittent antibiotic therapy are all recommended. The use of antibiotic irrigation and vacuum drainage should be the therapy of choice. X-rays should be reviewed for joint loosening in deep delayed infections, which can be active or indolent and low grade. Aspiration of the joint can confirm the diagnosis.

Components and cement should be removed if loosening is present, and a modified Girdle stone procedure should be performed. They may be left in place if there is no evidence of loosening at the time of surgery in the hopes of saving the hip. Sutures should not be used to close the wound; instead, it should be left open. Non-absorbable sutures that resemble skin and pass deep into the fascia can be used.

Antibiotics should be given intravenously for 4-6 weeks and orally for 4-6 months. The treatment for late hematogenous infections is the same as described above.

RADIOLOGICAL EVALUATION

During immediate post-op, observations and measurements were taken on the anteroposterior radiograph of the pelvis

A radiographic examination is also included.

1. 1. Femoral component loosening.
2. 2. The location of the femoral stem.
3. 3. Subsidence in the vertical plane.
4. 4. Heterotopic Ossification.

LOOSENING OF THE FEMORAL COMPONENT

Uncemented femoral component: Engh's criteria (Clinica Orthop 1990 – 257)

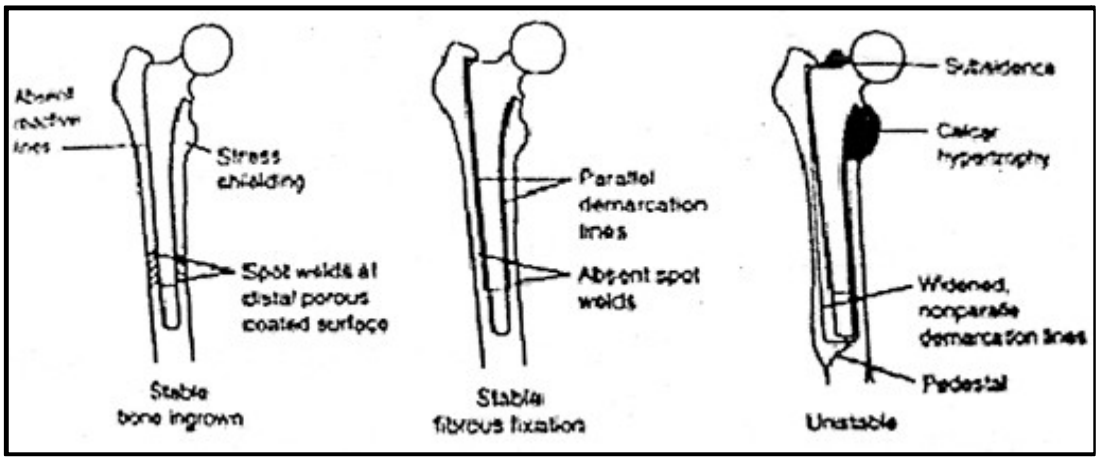


Fig. 14 Engh's criteria

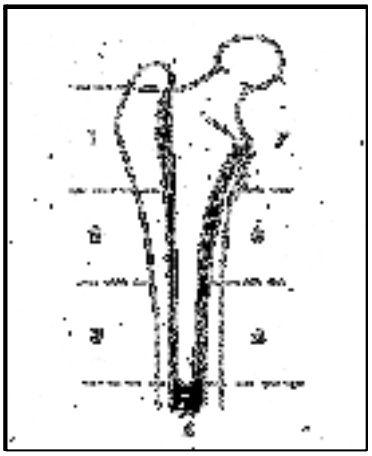
1. Ingrown stable bone
2. Stress shielding is absent when reactive lines are absent.
3. Spot welds on the porous covered surface at the distal end.
4. Fibrous fixation that is stable.
5. There are no spot welds on the parallel demarcation lines. Unstable
    - Subsidence
    - Calcar hypertrophy
    - Widened nonparallel demarcation line
    - Pedestal

Cemented femoral component[8]

Criteria for Gruenzone (clinic ortho1979). Loosening, according to Gruen, is described as a radiological interpretation of a change in the mechanical integrity of the load-bearing femoral component in particular.

Acrylic cement that has been fractured.

A gap of greater than 2mm exists between the stem-cement and cement-bone interfaces. The femoral component moves around a lot.



Fracture of the stem.

Fig. 15 Gruen zones

5. FEMORAL STEM POSITION

On AP radiographs, the mid points of the transverse diameters of the stem of the prosthesis and the femoral shaft were determined at levels of one, three, and five cm proximal to the tip of the stem to evaluate if the femoral component had been displaced Varus or valgus. The midpoints of these diameters were then used as reference points to draw two lines. The angles between lines12 were used to measure any Varus or Valgus angulation of the femoral component relative to the axis of the femoral shaft.

Femoral stem position was noted as

1. Central
2. Valgus
3. Varus

Varus Centre Valgus

Fig. 16 Engh's criteria

6. VERTICAL SUBSIDENCE[8]

The change in distance between the superomedial extent of the porous coating and the most proximal point on the lesser trochanter was used to determine vertical subsidence of the femoral component. Subsidence was also tested by measuring the distance from the greater trochanter's tip to the femoral component's superolateral border and looking for superior lucency in the bone there. Subsidence was defined as a reduction in the vertical position of 5mm or greater.

7. HETEROTOPIC OSSIFICATION

When heterotopic bone was found, it was evaluated using Brooker et al.[11]'s classification.

Brooker's classification

I. Islands of ossification
II. Bone spurs from the proximal femur or pelvis with at least 1 cm between opposing bone surfaces.
III. < 1 cm
IV. Ankylosis

LITERATURE REVIEW:

1. M. T. Hongisto et al.,[13] conducted study in 2012. Study comprised a prospectively and retrospectively documented cohort including 462 consecutive patients treated with a unipolar hip HA using a lateral or posterior approach in the Department of Trauma and Orthopaedic Surgery at the Seinajoki Central Hospital between 1 September 2008 and 31 August 2012. At 1 year after hip fracture, more patients undergoing hemiarthroplasty with the posterior approach (22%) survived without mobility aids compared to those with the lateral approach (12%). Hemiarthroplasty using a lateral approach predisposed to the need for ambulatory aids 1 year after hip fracture. The posterior approach, however, predisposed to hip dislocation.

2. Fullam et al.,[14] conducted study in 2017 in which a total of 13 studies were retrieved: 12 observational studies and 1 randomised trial. The majority of studies were based at single sites. Larger observational studies using multi-site and national registry data have emerged in recent years. Reporting of technique and outcomes is inconsistent. A trend for higher rates of dislocation using the PA was observed and eight studies recommended the use of the DLA over the PA.

3. A J Unwin and M Thomas et al.,[15] conducted study in 1996, compared the 3-month dislocation rate for hip hemiarthoplasties inserted via the posterior and direct lateral routes. In all, 2906 primary hemiarthroplasties, performed between 1986 and 1992 in four hospitals on a training hospital rotation, were analysed. The posterior approach was used in 1656 (57%) and the lateral in 1250 (43%). The groups were otherwise comparable. The overall dislocation rate for the posterior approach was 9.0% (149/1656), whereas that for the direct lateral approach was 3.3% (41/2150). The difference is statistically highly significant.

4. Torbjorn B Kristensen et al.,[16] conducted study in 2016. In the study Femoral neck fracture in patients aged 60 years and older were included from the Norwegian Hip

Fracture Register (2005–2014). 18,918 procedures were reported with direct lateral approach and 1,990 with posterior approach. PROM data (satisfaction, pain, quality of life (EQ-5D), and walking ability) were reported 4, 12, and 36 months postoperatively. The Cox regression model was used to calculate relative risk (RR) of reoperation. Statistically significant differences were seen in PROM data with less pain, better satisfaction, and better quality of life after surgery using the posterior approach than using the direct lateral approach. The risk of reoperation was similar between the approaches.

5. In the study by V. Divya et al.,[17] 30 cases underwent hemi - arthroplasty of hip by Hardinge's approach vs. Moore's technique and they found that there was difference in duration of hospital stay, the duration of healing and the rate of complications were much higher in the Moore's technique.

6. P.D. Vaughan et al.,[18] in their study Femoral stem tip orientation and surgical approach in total hip arthroplasty in 2007, observed that neutral stem tip position in THA is significantly more difficult to obtain with an antero-lateral approach, when compared to the posterior approach. In Anterolateral approach, 12 subjects had neutral, 12 subjects had Valgus and 26 subjects had varus stem position and in posterior approach 26 subjects had Neutral, 7 subjects had Valgus and 17 subjects had varus stem position.

7. Macpherson GJ et al.,[19] in their study the posterior approach reduces the risk of thin cement mantles with a straight femoral stem design in 2010 observed that arrack grading did not reveal any difference in cement mantle quality between the two

groups. AP and lateral radiographs showed no difference in stem alignment between the groups. The risk of a thin cement mantle (< 2 mm) was lower with a posterior approach (OR = 1.8, 95% CI: 1- 3; p = 0.03). The greatest risk of a cement mantle thickness of < 2 mm occurred in Gruen zones 8-9 regardless of the surgical approach used.

8. Rogmark C et al.,[20] in 2014 observed that Cemented stems and a direct lateral transgluteal approach reduced the risk of reoperation after hip fractures treated with hemiarthroplasty in patients over 75 years. Men and younger patients had a higher risk of reoperation. For the age group 60-74 years, there were no such differences in risk in this material.

9. Jolles BM et al.,[21] in 2004 during the systematic review observed that No significant difference between posterior and direct lateral surgical approach was found [1/77 (1.3%) versus 3/72 (4.2%); relative risk (RR) 0.35; 95% confidence intervals (CI) 0.04 to 3.22]. The risk of nerve palsy or injury (all nerves taken together) was significantly higher among the direct lateral approaches [1/43 (2%) versus 10/49 (20%); RR 0.16, 95% CI 0.03 to 0.83].

10.Putananon C et al.,[22] in their Meta-analysis in 2018 observed that anterior and lateral approaches were the first and second ranks for postoperative HHS and VAS score, while posterior and lateral approaches were the first and second ranks for postoperative complications. We recommended using lateral approach that has an acceptable postoperative pain, function and complications (second rank for all outcomes) as a surgical technique for THA. In terms of complication, posterior approach was the lowest risk with RR of 0.39 (95% CI 0.19, 0.81), 0.57 (95% CI 0.21, 1.57) and 1.74 (95% CI 0.36, 8.33) when compared to anterior, followed by lateral and posterior-2 approaches.

11.Graves SC et al.,[23] in 2016 observed that Mean surgical blood loss (403 versus 293 mL) and in-hospital transfusion rates (20% vs 10%) were higher in the direct-anterior approach group compared to posterior approach. There was no significant difference in adverse events between direct-anterior approach group and posterior approach. Hence posterior approach was better surgical approach for THA.

12. Pincus D et al.,[24] in 2020 out of 30 098 patients (mean [SD] age, 67 years [10.7 years]; 16 079 women [53.4%]) who underwent THA, 2995 (10%) underwent the anterior approach; 21 248 (70%), the lateral approach; and 5855 (20%) the posterior approach. Patients undergoing anterior approaches had a significantly greater risk of a major surgical complication (2% vs 1%).

MATERIALS AND METHODS

Study settings: Patients undergoing Hemiarthroplasty in Department of Orthopaedics at the KLE's Dr. Prabhakar Kore Hospital and Medical Research Centre and Charitable Hospital, Belagavi.

Study Population: Patient undergoing hemiarthroplasty of hip joint procedure by posterior approach and lateral approach for fracture neck of femur

Inclusion Criteria:

1. Patients with age group >60 yrs of either sex
2. Low energy, non-pathological fragility cervical hip fracture.
3. Patients who give informed consent to participate in the study

Exclusion Criteria:

1. Immobility (mobile with wheel chair or bed bound)
2. Pathological fractures
3. Moderate to high energy hip fractures
4. Patients with Acetabular arthritis
5. Patients with active infection

STUDY DESIGN: A hospital based Prospective Study.

STUDY PERIOD: One year [1st January 2020 to 31st December 2020]

SAMPLE SIZE: Was estimated by using the difference in Mean Duration of Hospital stay between Lateral approach and posterior approach in Hemiarthroplasty from the study Wang Gang et al as 6.4±2.2 days and 9.2 ± 3.1 days. Using these values at 95% Confidence limit and 80% power sample size of 16 was obtained in

each group by using the below mentioned formula and Med calc sample size software. With 20% non-response sample size of 16 + 3.2 ≈ 20 cases were included in each group.

$$\text{Sample size} = \frac{2SD^2(Z_{\alpha/2}+Z_{\beta})^2}{d^2}$$

SD – Standard deviation = From previous studies or pilot study

$Z_{\alpha/2} = Z_{0.05/2} = Z_{0.025} = 1.96$ (From Z table) at type 1 error of 5%

$Z_{\beta} = Z_{0.20} = 0.842$ (From Z table) at 80% power

d = effect size = difference between mean values

So now formula will be

$$\text{Sample size} = \frac{2SD^2(1.96+0.84)^2}{d^2}$$

SAMPLING METHOD:

Patient undergoing posterior approach and lateral approach hemiarthroplasty of hip joint for fracture neck of femur will be recruited in to each group by randomization. Randomization plan will be obtained from randomization.com.

METHODS:

In this study we are assessing the functional outcome of posterior approach and lateral approach of Hemiarthroplasty of hip joint for fracture neck of femur- A one-year hospital based prospective study.

PROCEDURE:

LATERAL APPROACH: Exposure to hip joint

1. ***Plane***
   a. Internervous plane: there is no such thing as an internervous plane.
   b. Intermuscular plane: Splits gluteus medius distal to innervation (superior gluteal nerve), and also splits Vastus lateralis lateral to innervation (femoral nerve).
2. **Preparation:**
3. **Anaesthesia:**
4. **Options:**
5. **General**
6. **Spinal**
7. **Position**
   - **Lateral**
   - **Supine**

Approach

Begin a longitudinal incision 5cm proximal to the tip of the greater trochanter, centred over the tip of the greater trochanter, and extend roughly 8cm down the line of the femur.

Sharp dissection: Split the fascia lata and retract it anteriorly to reveal the gluteus medius tendon. Detach the gluteus medius fibres that adhere to the fascia lata.

To avoid harm to the superior gluteal nerve, split the fibres of the gluteus medius longitudinally commencing at the middle of the greater trochanter and extending incision inferiorly via the fibres of the Vastus lateralis. develop anterior flap from anterior greater trochanter with its underlying gluteus minimus, anterior part of Vastus lateralis requires sharp dissection of muscles off bone or lifting small fleck of bone expose anterior joint capsule follow dissection anteriorly

along greater trochanter and onto femoral neck which leads to capsule gluteus minimus needs to be releas

Structures in Danger:

Gluteal nerve superior: Runs 3-5 cm above greater trochanter between gluteus medius and minimus protect by restricting proximal incision of gluteus medius and placing a stay suture at the apex of gluteal split leads to Trendelenburg gait pattern.

To avoid iatrogenic harm, the majority of lateral structures in the neurovascular bundle of the anterior thigh keep retractors on bone with no soft tissue underneath.

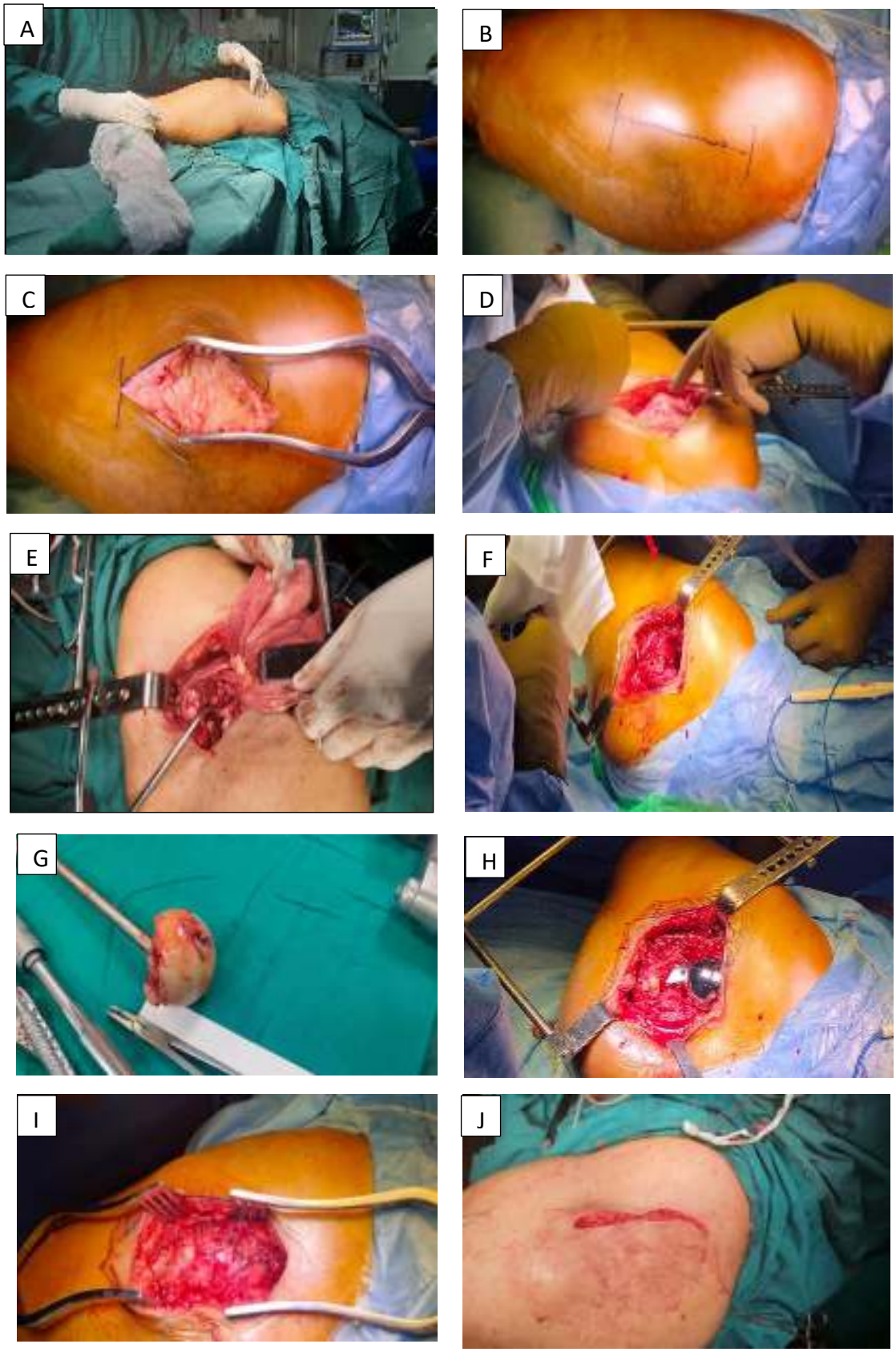


Fig. 17 (a-j) Pictures Depicting Steps of Lateral Approach in Hemiarthroplasty of hip joint.

POSTERIOR APPROACH:

Introduction: Provides exposure to Acetabulum, proximal femur.

Indications

- Total hip arthroplasty.
- Hip hemiarthroplasty.
- Get rid of any stray bodies.
- Septic hip drainage is reliant.
- Bone grafting in the pedicle.
- Complementary approaches.
- Kocher-Langenbeck.
- For more difficult acetabular work, a wider exposure is used.
- Incision made at the same time as the posterior approach to the hip, but somewhat more anterior above the greater trochanter.

Planes

There is no such thing as an internervous plane.

Plane intermuscular: When the first nerve branch to the upper half of the muscle is reached, the Gluteus maximus muscle split is stopped. The superior gluteal artery provides the proximal 1/3 of the muscle, while the inferior gluteal artery supplies the distal 2/3. The line of fat on the surface of the gluteus maximus defines the hiatus in the vascular plane.

Preparation: The most prevalent type of anaesthesia is general anaesthesia. The position is lateral.

Hip arthroplasty is the indication. Position of preference.

• Fractures of the posterior wall and lips.

• In a lateral position, skeletal traction can be employed. Advantages.

• Femoral head dislocation is possible, and buttock tissue can "fall away" from the field.

Prone position

Indications: Transverse fractures of acetabulum

Approach

Incision: Make 10 to 15 cm curved incision one-inch posterior to posterior edge of greater trochanter (GT) begin 7 cm above and posterior to GT curve posterior to the GT and continue down shaft of femur mini-incision approach shows no long-term benefits to hip function

Superficial dissection: Incise fascia lata to uncover Vastus lateralis distally lengthen fascial incision in line with skin incision, split fibers of gluteus maximus in proximal incision, cauterize vessels during split to avoid excessive blood loss.

Deep dissection: Internally rotate the hip to place the short external rotators on stretch place stay suture in piriformis and obturator internus tendon (short external rotators) evidence shows decreased dislocation rate when short external rotators repaired during closure, detach piriformis and obturator internus close to femoral insertion, reflect backwards to protect sciatic nerve, incise capsule with longitudinal or T-shaped incision, dislocate hip with internal rotation after Capsulotomy.

Proximal extension: May extend proximal incision towards iliac crest for exposure of ilium

Distal extension: Extend incision distally down line of femur down to level of knee vastus lateralis may either be split or elevated from lateral intermuscular septum

Dangers

- Sciatic nerve
- Inferior gluteal artery
- First perforating branch of profunda femoris
- Femoral vessels
- Superior gluteal artery and nerve

Pictures Depicting Steps of Posterior Approach in Hemiarthroplasty

A

B

A

B

G

H

I

J

K

L

Fig. 18 (A-L) Pictures Depicting Steps of Posterior Approach in Hemiarthroplasty of hip joint.

Investigations:

All the patients underwent

1. Routine Investigations: Blood: Hb%, TLC, DLC, ESR, Platelet Count, Blood Grouping, CRP, RBS, Coagulation profile
2. X Ray of Pelvis - hip joint, AP and Lateral view.
3. Urine routine: Albumin, Sugar, Microscopy

   a.Investigations required for anaesthetics fitness

Statistical Analysis: [25,26,27]

The data was imported into a Microsoft Excel spreadsheet and analysed with SPSS 22. Frequencies and proportions were used to represent categorical data. For qualitative data, the Chi-square test will be utilised as a test of significance.

The mean and standard deviation were used to describe continuous data. To determine the mean difference between two quantitative variables and qualitative variables, the independent t test or Mann Whitney U test were used as tests of significance.

After applying all statistical principles, a p value (probability that the result is true) of 0.05 was judged statistically significant.

Ethical consideration:

1. Institutional Ethical clearance was obtained prior to the start of the study
2. Informed consent was obtained from all the patients recruited prior to the start of the study
3. Standard of Care was provided to all the patients during the study period and follow-up.

RESULTS

Table 1: Age distribution comparison between two groups

		Group			
		Lateral		Posterior	
		Count	%	Count	%
Age	<70 years	10	45.5%	9	45.0%
	71 to 80 years	10	45.5%	10	50.0%
	>80 years	2	9.1%	1	5.0%
	Total	22	100.0%	20	100.0%
	Mean age	72.45 ± 5.990		71.90 ± 6.585	

$\chi 2 = 0.291$, df =2, p =0.864

In Lateral group, mean age of subjects was 72.45 ± 5.990 years and in posterior group, mean age of subjects was 71.90 ± 6.585 years. There was no significant difference in age distribution. There was no significant difference in age distribution between two groups.

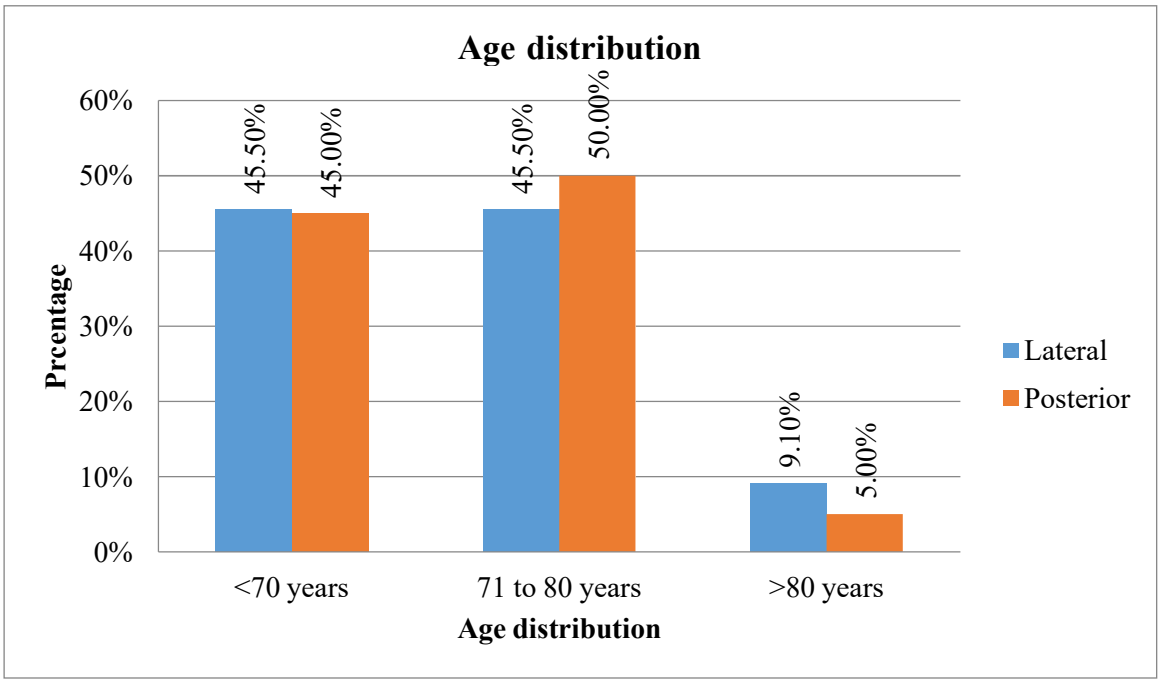


Fig. 19: Bar diagram showing Age distribution comparison between two groups

Table 2: Gender distribution comparison between two groups

		Group			
		Lateral		Posterior	
		Count	%	Count	%
Gender	Female	9	40.9%	9	45.0%
	Male	13	59.1%	11	55.0%
	Total	22	100.0%	20	100.0%

$\chi 2 = 0.072$, df =1, p =0.789

In Lateral group, 59.1% were males and 40.9% were females and in posterior group, 55% were males and 45% females. There was no significant difference in gender distribution between two groups.

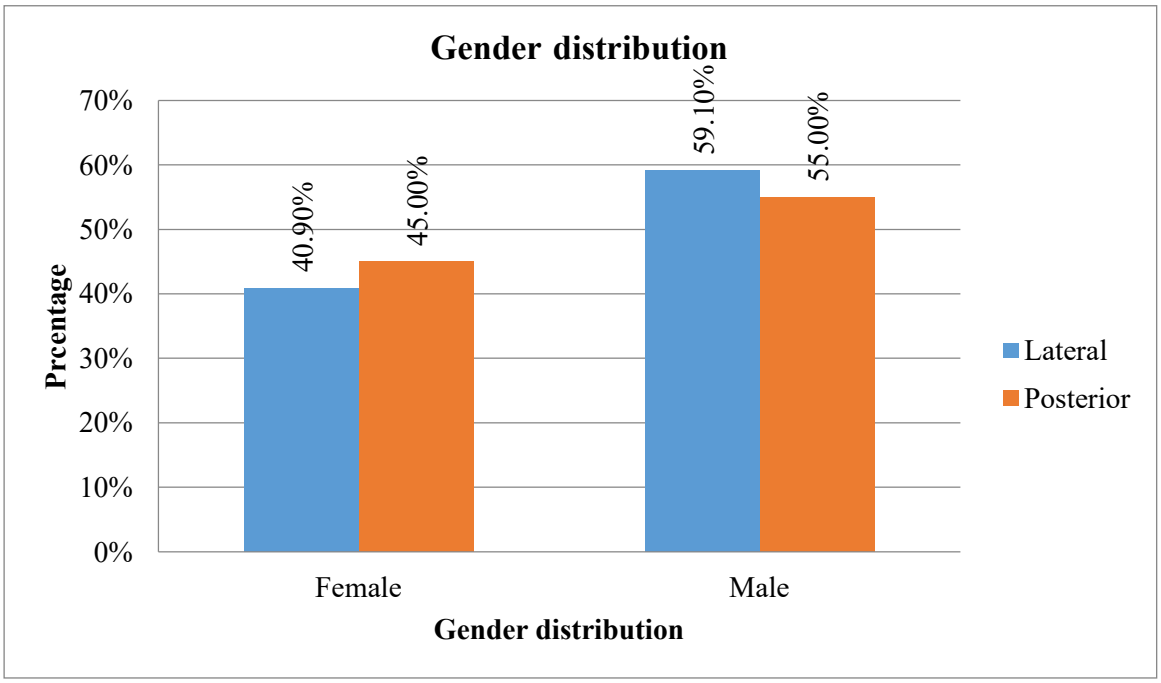


Fig. 20: Bar diagram showing Gender distribution comparison between two groups

Table 3: Haemoglobin distribution comparison between two groups

	Group						P value
	Lateral			Posterior			
	Mean	SD	Median	Mean	SD	Median	
Pre-Op Hb gm%	11.89	0.76	12.0	11.78	0.56	12.0	0.716
Post Op Hb gm%	10.68	0.93	11.0	10.67	0.77	11.0	0.056

Mean Pre-Operative Hb was 11.89 ± 0.76 gm% in Lateral group and 11.78 ± 0.56 in Posterior group. There was no significant difference in mean Pre op Hb% between two groups.

Mean Post-Operative Hb was 10.68 ± 0.93 gm% in Lateral group and 10.67 ± 0.77 in Posterior group. There was no significant difference in mean Post op Hb% between two groups.

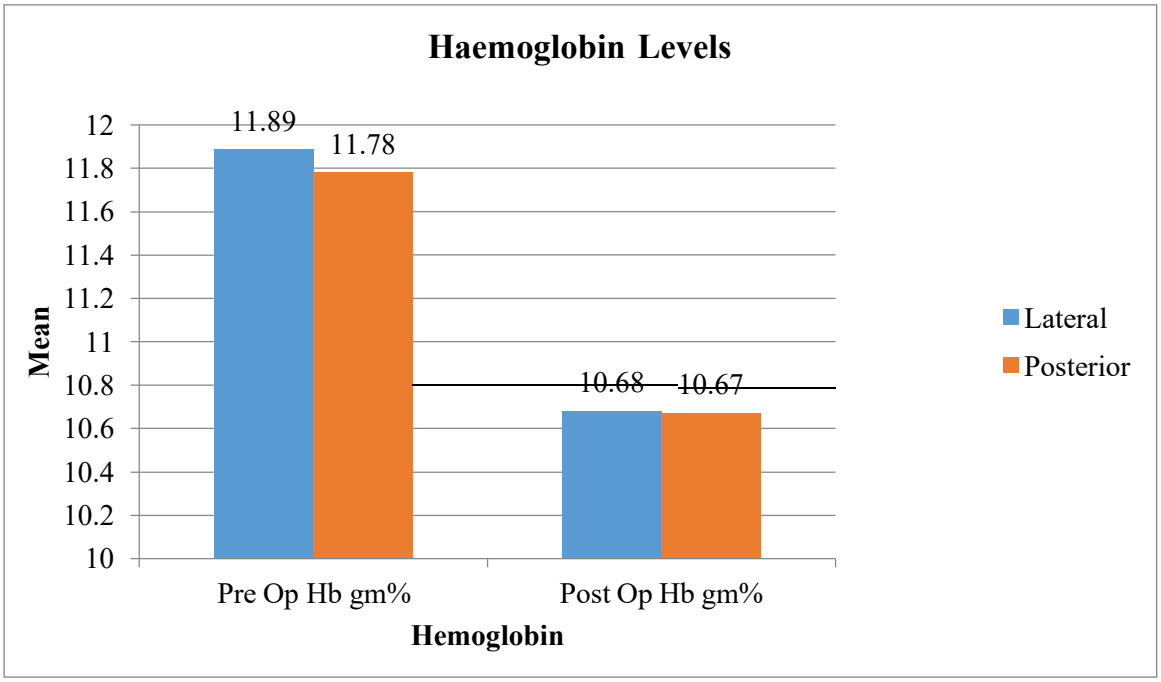


Fig. 21: Bar diagram showing Haemoglobin distribution comparison between two groups

Table 5: Duration of Surgery findings comparison between two groups

		Duration of Surgery (min)			P value
		Mean	SD	Median	
Group	Lateral	68.64	9.409	70	0.514
	Posterior	70.50	8.870	70	

Mean duration of surgery in Lateral group, 68.64 ± 9.409 min and in posterior group was 70.50 ± 8.870 min. There was no significant difference in duration of surgery between two groups.

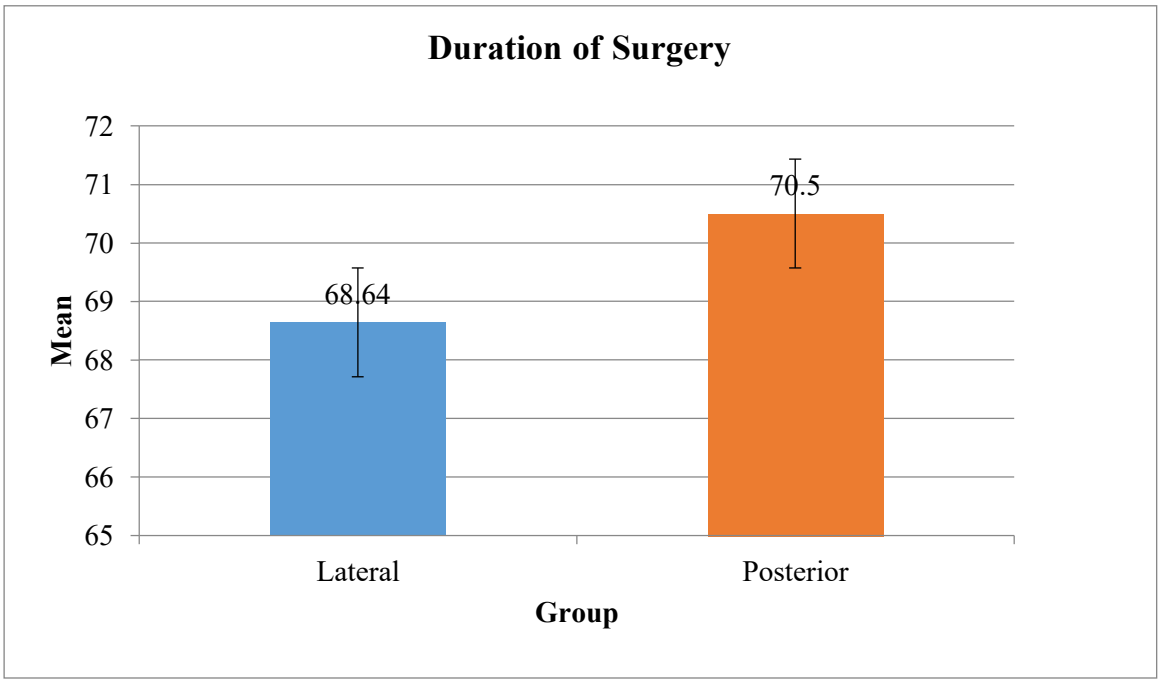


Fig. 23: Bar diagram showing Duration of Surgery findings comparison between two groups

Table 6: Amount of Blood loss findings comparison between two groups

		Amount of Blood loss (ml)			P value
		Mean	SD	Median	
Group	Lateral	232.27	79.22	200	0.773
	Posterior	224.50	93.83	200	

Mean Amount of Blood loss in Lateral group, 232.27 ± 79.22 ml and in posterior group was 224.50 ± 93.83 ml. There was no significant difference in duration of surgery between two groups.

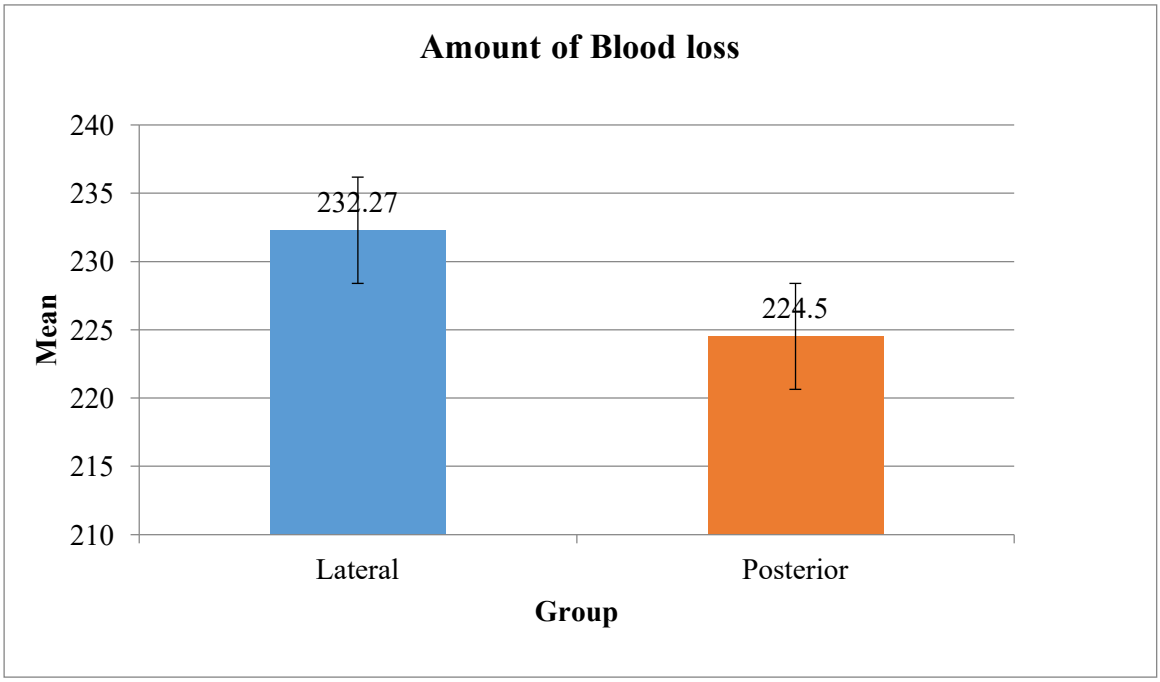


Fig. 24: Bar diagram showing Amount of Blood loss findings comparison between two groups

Table 7: Drain Output findings comparison between two groups

		Drain Output (ml)			P value
		Mean	SD	Median	
Group	Lateral	59.55	9.50	60	0.468
	Posterior	57.50	8.51	60	

Mean Drain Output in Lateral group, 59.55 ± 9.50 ml and in posterior group was 57.50 ± 8.51 ml. There was no significant difference in Drain Output between two groups.

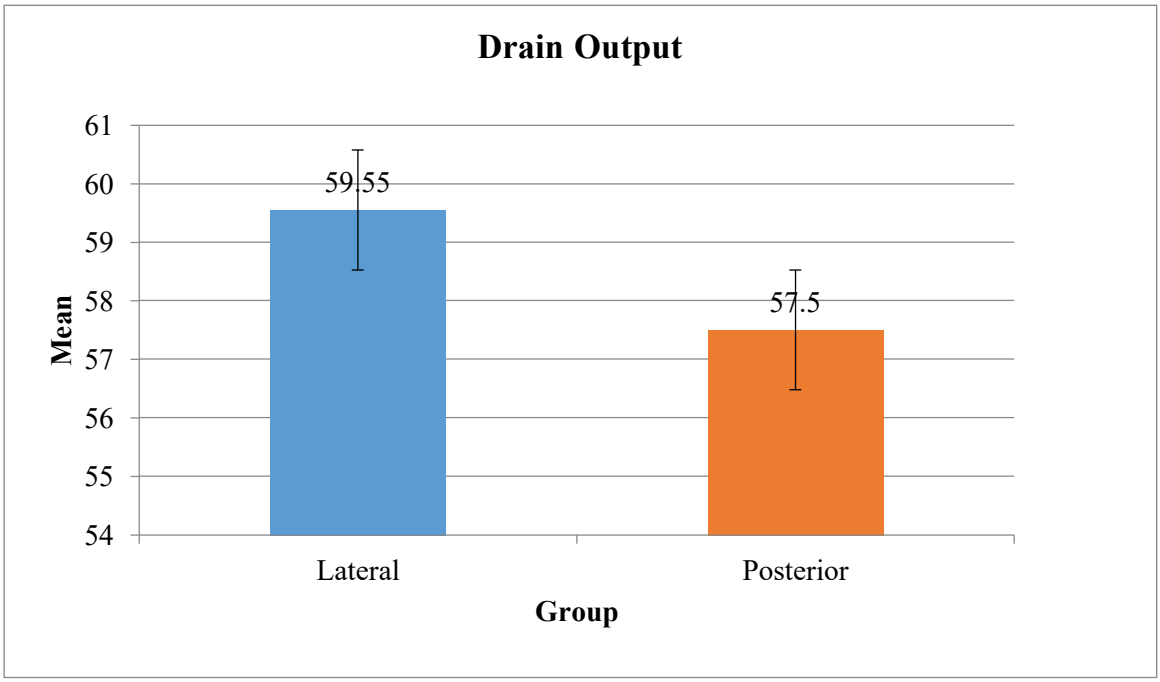


Fig. 25: Bar diagram showing Drain Output findings comparison between two groups

Table 8: Nerve Injury comparison between two groups

		Group			
		Lateral		Posterior	
		Count	%	Count	%
Nerve Injury	No	22	100.0%	19	95.0%
	Yes	0	0.0%	1	5.0%

$\chi 2 = 1.127$, df =1, p =0.289

In lateral group, 0% had nerve injury and in posterior group, 5% had nerve injury. There was no significant difference in nerve injury between two groups.

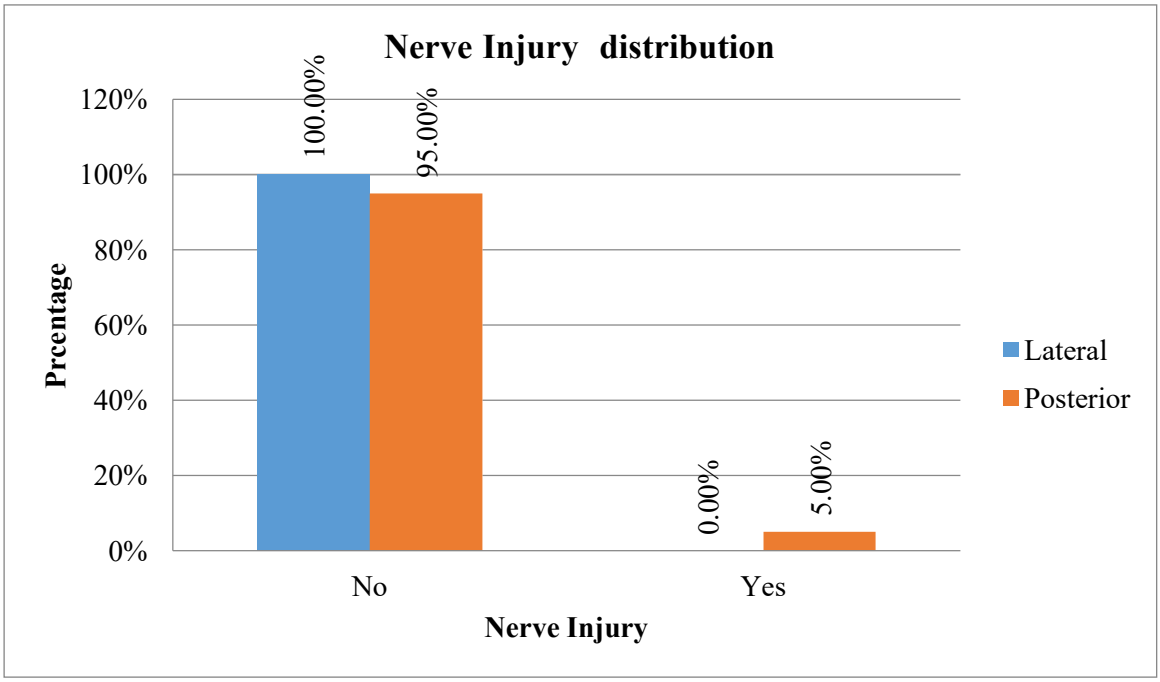


Fig. 26: Bar diagram showing Nerve Injury comparison between two groups

Table 9: Day of Mobilization comparison between two groups

		Group			
		Lateral		Posterior	
		Count	%	Count	%
Mobilization Rate (day)	2nd day	15	68.2%	10	50.0%
	3rd day	7	31.8%	10	50.0%

$\chi 2 = 1.437$, df =1, p =0.231

In Lateral group, 68.2% were mobilized on 2nd day and 31.8% were mobilized on 3rd day and in Posterior group, 50% were mobilized on 2nd day and 50% were mobilized on 3rd day. There was no significant difference in day of mobilization between two groups.

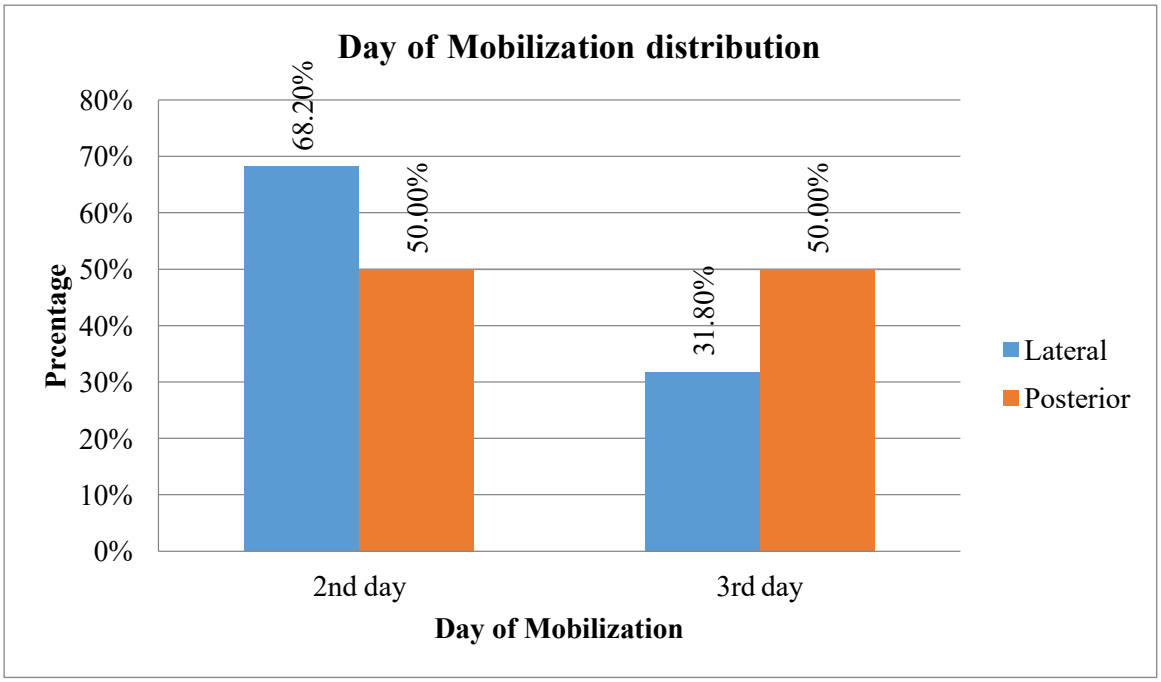


Fig. 27: Bar diagram showing Day of Mobilization comparison between two groups

Table 10: Incidence of Dislocation comparison between two groups

		Group			
		Lateral		Posterior	
		Count	%	Count	%
Incidence of Dislocation	No	22	100.0%	19	95.0%
	Yes	0	0.0%	1	5.0%

$\chi 2 = 1.127$, df =1, p =0.288

In Lateral group, 0% had dislocation and in Posterior group, 5% had dislocation. There was no significant difference in Incidence of dislocation between two groups.

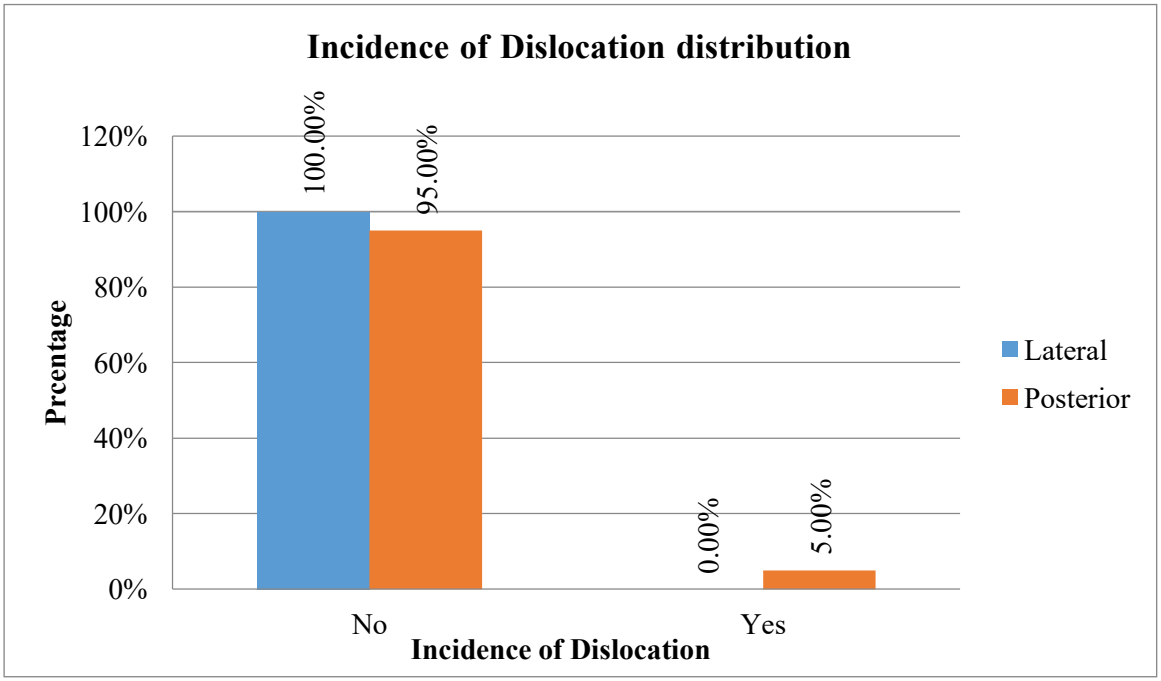


Fig. 28: Bar diagram showing Incidence of Dislocation comparison between two groups

Table 11: Post-Operative Pain and infection rate comparison between two groups

		Group				P value
		Lateral		Posterior		
		Count	%	Count	%	
Pain	Mild	22	100.0%	20	100.0%	-
Infection	No	21	95.5%	17	85.0%	0.292
	Yes	1	4.5%	3	15.0%	

In Lateral group and posterior group, 100% had mild pain.

In lateral group, 4.5% had infection and in posterior group, 15% had infection. There was no significant difference in infection rate between two groups.

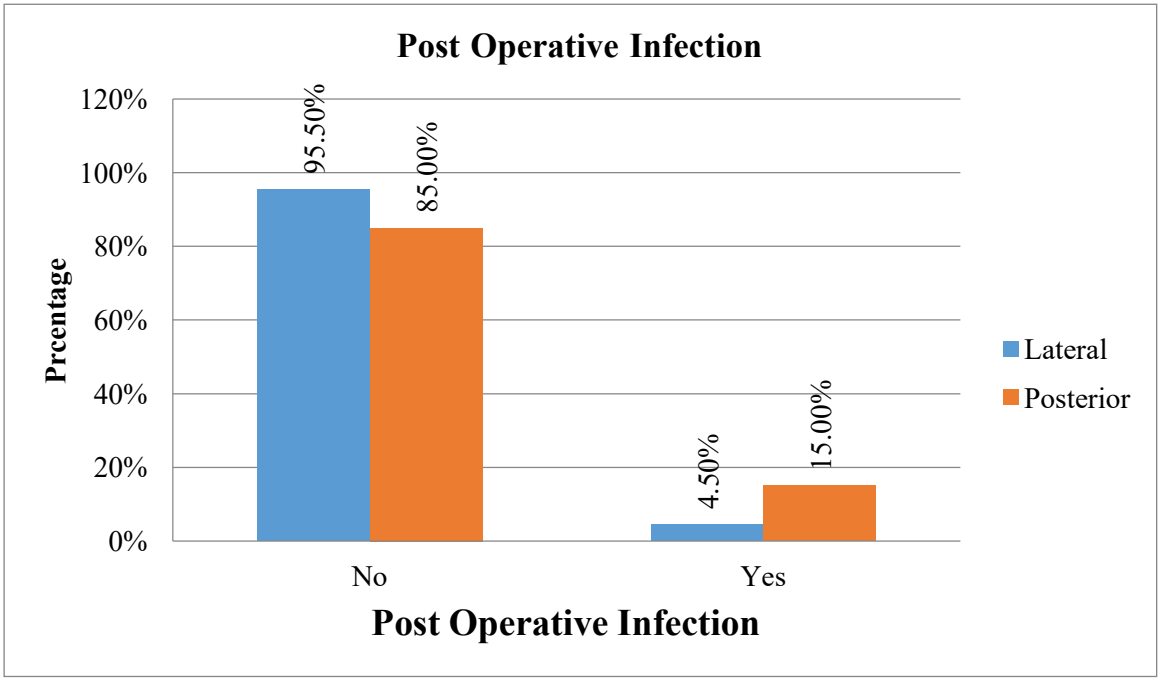


Fig. 29: Bar diagram showing Post-Operative Pain and infection rate comparison between two groups

Table 12: Duration of hospital stay comparison between two groups

		Duration of hospital stay			P value
		Mean	SD	Median	
Group	Lateral	11.95	1.79	12	0.295
	Posterior	12.55	1.85	12	

Median duration of hospital stay in lateral group was 12 days and in posterior group, was 12 days. There was no significant difference in duration of hospital stay between two groups.

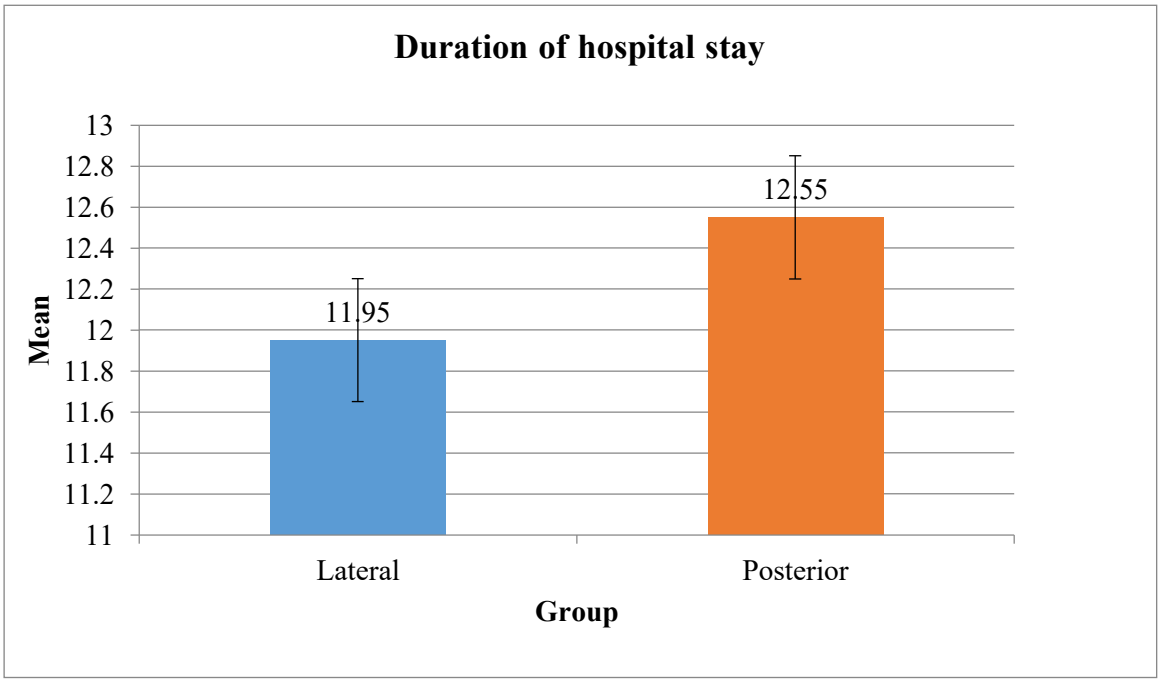


Fig. 30: Bar diagram showing Duration of hospital stay comparison between two groups

Table 13: Stem Position Comparison between two groups

		Group			
		Lateral		Posterior	
		Count	%	Count	%
Stem Position	Neutral	20	90.9%	17	85.0%
	Valgus	2	9.1%	0	0.0%
	Varus	0	0.0%	3	15.0%
	Total	22	100.0%	20	100.0%

$\chi 2 = 5.161$, df $= 2$, $p = 0.076$

In Lateral group, 90.9% had neutral, 9.1% had Valgus and 0% had Varus stem position and in Posterior group, 85% had neutral and 15% had Varus stem position. There was no significant difference in stem position between two groups.

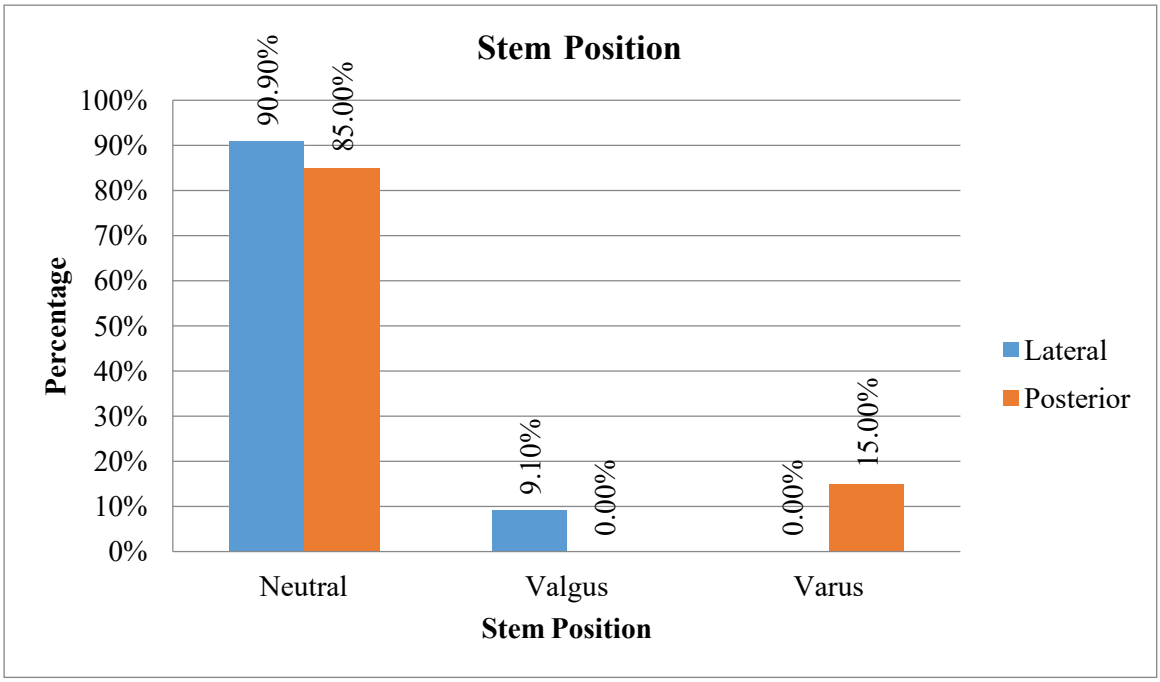


Fig. 31: Bar diagram showing Stem Position Comparison between two groups

DISCUSSION

A hospital based Prospective Study was conducted among 42 Patients undergoing Hemiarthroplasty of hip joint in Department of Orthopaedics at the KLE's Dr. Prabhakar Kore Hospital and Medical Research Centre and Charitable Hospital, Belagavi for a period of One year [1st January 2020 to 31st December 2020]. 42 patients were divided in to two groups by randomization. One group underwent lateral approach and other group underwent posterior approach for Hemiarthroplasty. Functional outcomes were compared between two groups.

Profile of subjects:

In the present study in Lateral group, mean age of subjects was 72.45 ± 5.990 years and in posterior group, mean age of subjects was 71.90 ± 6.585 years. In Lateral group, 59.1% were males and 40.9% were females and in posterior group, 55% were males and 45% females. Age and Gender was matched hence eliminating Selection bias.

Wang Gang et al.,[28] in their study included 16 males and 26 females, with an average age of 78.1 years (65-89 years), which were randomly divided into anterolateral group (22 cases) and posterior group (20 cases).

O. Leonardsson et al.,[29] in their national survey observed that mean age of subjects undergoing lateral approach was 85 (70 to 101) years and in posterior approach was 85 (70 to 102). Majority of subjects in both groups were females (74% and 75% respectively).

Daniel Pincus et al.,[30] in their study observed that mean age of subjects in antero lateral approach group was 65.3 (11.4) years and in posterior approach group was 67.2 (10.6) years. 46.2% were mean and 53.8% were women in antero lateral approach group and 46.2% were men and 53.8% were women in posterior approach group.

Divya et al.,[31] in their study observed that the mean age group in Hardinge's group was 43.48years, in Moore's group was 44.24 years. 16 females and 14 males were included in Hardinge's group and 18 females and 12 males were included in Moore's distribution.

Prasad Aparajit et al.,[32] in their study observed that mean age of subjects in lateral group was 65.85±5.64 years and in Posterior group was 64.30±5.39 years. Male/Female ratio in Lateral group was 17/23 and in posterior group was 15/25.

From the study it can be observed that majority of subjects with hip fractures was more common in elderly males. Were as in literature it was observed that Hip fractures are more common among females irrespective of age. This difference could be the based on the selection criteria.

Pre-Operative and Intraoperative Findings

In the present study, Mean Pre-Operative Hb was 11.89 ± 0.76 gm% in Lateral group and 11.78 ± 0.56 in Posterior group. Mean Post-Operative Hb was 10.68 ± 0.93 gm% in Lateral group and 10.67 ± 0.77 in Posterior group. On X-ray in Lateral group, 9.1% had Type 1, 18.2% had Type 2, 22.7% had Type 3 and 50% had Type 4. In Posterior group, 0% had Type 1, 30% had Type 2, 55% had Type 3 and 15% had Type 4. Mean duration of surgery in Lateral group, 68.64 ± 9.409 min and in posterior group was 70.50 ± 8.870 min. Mean Amount of Blood loss in Lateral group, 232.27 ± 79.22 ml and in posterior group was 224.50 ± 93.83 ml. Mean DrainOutput in Lateral group, 59.55 ± 9.50 ml and in posterior group was 57.50 ± 8.51 ml. In lateral group, 0% had nerve injury and in posterior group, 5% had nerve injury.

Wang Gang et al.,[28] in their study observed that mean duration of was (72±15) minutes in Anterolateral group, and (87±10) minutes in posterior group.

Pincus D et al.,[30] in their study observed that median (Interquartile Range) duration of surgery in Lateral group, 108 (94 to 130) min and in posterior group was 99 (84 to 118) min.

Divya et al.,[31] in their study observed that in Hardinge's group and Moore's group, 5 patients had Type 3 and 25 patients had Type 4 Garden type.

Prasad Aparajit et al., [32] in their study observed that mean duration of surgery in Lateral group was 47.50±7.59 min and in Posterior group was 48.43±5.38 min.

From the literature it can be observed that findings of our study were similar to the studies mentioned above and factors such as mean duration of surgery, blood loss and drain output depends on the expertise of operating surgeon and pre-operative Comorbidities associated withthe patients.

Outcome

In the present study, in Lateral group, 68.2% were mobilized on 2nd day and 31.8% were mobilized on 3rd day and in Posterior group, 50% were mobilized on 2nd day and 50% were mobilized on 3rd day. Median duration of hospital stay in lateral group was 12 days and in posterior group, was 12 days.

Wang Gang et al.,[28] The average length of hospital stay was (6.42.2) days (range, 4-9 days)for patients who underwent an anterior approach, and (9.23.1) days (range, 6-13 days) for patients who underwent a posterior approach, according to their research. For the Anterolateral approach, the average Harris hip score was 91.2310.20, while the average pain score was

40.266.31. The average Harris hip score for the posterior approach was 90.03 11.05, while the average pain score was 42.335.06.

O. Leonardsson et al.,[29] in their study observed that mean duration of surgery to response in lateral group was 13 (7 to 22) and in Posterior group was 14 (7 to 22) months. However, in the present study follow-up for period of one year was not done due to feasibility issues and covid pandemic.

Divya et al.,[31] in their study in Hardinge's group majority were admitted in hospital for 15 days and in Moore's group, majority were admitted for 14 to 16 days respectively.

Prasad Aparajit et al.,[32] observed that there was no significant difference in functionaloutcome between lateral and posterior approach.

From the literature it was observed that there was not much notable significant difference in Outcome between two approaches in Hip fractures. Hence the approach can be decided.

Complications:

In the present study, in Lateral group, 0% had dislocation and in Posterior group, 5% had dislocation. In lateral group, 4.5% had infection and in posterior group, 15% had infection.

Wang Gang et al.,[28] in their study observed that no patients with the anterolateral approach experienced dislocation. One hip (5%) in the posterior group had dislocation.

O. Leonardsson et al.,[29] in their study observed that in lateral approach, 1.1% had infection, 0.9% had dislocation, 0.5% had fracture, 0.1% had Acetabular erosion,

0.6% had reoperations. In Posterior group, 1.3% had infection, 2% had dislocation, 0.4% had fracture, 0% had Acetabular erosion and 0.3% had other reoperations.

Pincus D et al.,[30] in Anterolateral group observed a complication rate of 2% and in Posterior group, complication rate was 1%. In Antero lateral group 1.2% had deep infection, 0.7% had dislocation, 1.2% required revision and in posterior approach, 0.4% had deep infection, 0.3% had dislocation and 0.7% had revision.

Divya et al.,[31] in their study observed that in Hardinge's group, 0% had dislocation, 6.6% had infection, 3.3% had malorientation, reduced in rom, 10% had Abductor lurch gait. In Moore's group, dislocation was observed in 13.3%, infection in 10%, 6.6% in Mal-orientation of the cup, 3.3% had Reduced ROM, 13.3% had Sciatic nerve injury and 0% had Abductor lurch gait.

Prasad Aparajit et al.,[32] in Lateral group observed that 12.5% had infection, 0% had dislocation, 0% had nerve injury, aseptic loosening, Acetabular erosion. In Posterior approach, 17.5% had infection, 5% had dislocation, 0% had nerve injury, aseptic loosening, Acetabular erosion.

From the literature it can be observed that lateral approach had lower percentage of complications compared to Posterior approach. However statistical significance was not observed.

Stem Position:

In the present study in Lateral group, 590.9% had neutral, 9.1% had Valgus and 0% had Varus stem position and in Posterior group, 85% had neutral and 15% had Varus stem position.

Wang Gang et al.,[28] in their study observed that Positioning of the implants was satisfactory in both groups. The abduction angle of the cup showed no statistical significance between two groups. Cup abduction angle was (45.2°±4.8°) in anterolateral group and (44.3°± 5.2°) in posterior group.

Sambhwani S et al.,[33] in their study observed that among subjects who underwent lateral approach, no patient had a true Varus-aligned stem (i.e, ≤−5° on the coronal assessment).

From the present study and literature noted that there were no notable differences in outcomes and complications between the two approaches. In terms of early surgical problems, neither thelateral nor the posterior methods appear to offer a distinct advantage. Evidence on early surgical complication rates alone cannot be used to make a judgement in favour of one surgical method. More outcome measures, as well as studies on the severity of various types ofproblems, should be added. As a result, a prescription for a certain surgical method is stillbased on a subjective assessment of the severity of various problems.

CONCLUSION

From this study it can be concluded that both Lateral approach and Posterior approach for Hemiarthroplasty of hip joint had no statistically significant difference in the form of surgical time, blood loss, rate of dislocation, associated nerve injury, infection rate, and position of femoral stem. However clinically Lateral approach had no incidence of Nerve injury, early mobilization was observed on 2nd day in majority, no incidence of dislocation, mild pain, lesser duration of hospital day compared to posterior approach.

SUMMARY

A hospital based Prospective Study was conducted among 42 Patients undergoing Hemiarthroplasty of hip joint in Department of Orthopaedics at the KLE's Dr. Prabhakar Kore Hospital and Medical Research Centre and Charitable Hospital, Belagavi for a period of One year [1st January 2020 to 31st December 2020]. 42 patients were divided in to two groups by randomization. One group underwent lateral approach (22 patients) and other group underwent posterior approach (20 patients) for Hemiarthroplasty of hip joint. Functional outcomes were compared between two groups.

The Following observations were made in the study:

1. In Lateral group, mean age of subjects was 72.45 ± 5.990 years and in posterior group, mean age of subjects was 71.90 ± 6.585 years.
2. In Lateral group, 59.1% were males and 40.9% were females and in posterior group, 55% were males and 45% females.
3. Age and Gender was matched hence eliminating Selection bias.
4. Mean Pre-Operative Hb was 11.89 ± 0.76 gm% in Lateral group and 11.78 ± 0.56 in Posterior group. Mean Post-Operative Hb was 10.68 ± 0.93 gm% in Lateral group and 10.67 ± 0.77 in Posterior group.
5. In Lateral group, 9.1% had Type 1, 18.2% had Type 2, 22.7% had Type 3 and 50% had Type 4. In Posterior group, 0% had Type 1, 30% had Type 2, 55% had Type 3 and 15% had Type 4.
6. Mean duration of surgery in Lateral group, 68.64 ± 9.409 min and in posterior group was 70.50 ± 8.870 min.

7. Mean Amount of Blood loss in Lateral group, 232.27 ± 79.22 ml and in posterior group was 224.50 ± 93.83 ml.
8. Mean Drain Output in Lateral group, 59.55 ± 9.50 ml and in posterior group was 57.50 ± 8.51 ml.
9. In lateral group, 0% had nerve injury and in posterior group, 5% had nerve injury.
10. In Lateral group, 68.2% were mobilized on 2nd day and 31.8% were mobilized on 3rd day and in Posterior group, 50% were mobilized on 2nd day and 50% were mobilized on 3rd day.
11. In Lateral group, 0% had dislocation and in Posterior group, 5% had dislocation.
12. In lateral group, 4.5% had infection and in posterior group, 15% had infection.
13. Median duration of hospital stay in lateral group was 12 days and in posterior group, was 12 days.
14. In Lateral group, 90.9% had neutral, 9.1% had Valgus and 0% had Varus stem position and in Posterior group, 85% had neutral and 15% had Varus stem position.

RECOMMENDATIONS

From this study it can be recommended that both the approaches are safe for Hemiarthroplasty of hip joint. However Lateral approach had slight advantage over Posterior approach in terms of no complications like nerve injury, dislocation and lesser duration in hospital stay. Operating surgeon based on his expertise based on his expertise can choose either of the methods for Hemiarthroplasty of hip joint.

LIMITATIONS

1. The present study was conducted among 42 patients; hence a higher samplesize could lead to better comparison.
2. Expertise of Surgeon was not considered in the present study
3. Influence of other factors such as Age, gender on functional outcome was not studied.
4. Due to ongoing Covid Pandemic Follow-up consultation was done through Teleconsultation.

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ANNEXURE I
ETHICAL CLEARANCE.

K.L.E. ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed - to-be-University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)

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Ref: MDC/DOME/ **Date: 24/12/2019**

To,

REG. NO. BL0119009

PG student in Orthopedics,
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"A ONE YEAR HOSPITAL BASED COMPARATIVE STUDY ON OUTCOME OF POSTERIOR AND LATERAL APPROACH IN HEMIARTHROPLASTY OF HIP JOINT"**, is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr. Anita Dalal)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Roopa M Bellad)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

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ANNEXURE II: INFORMED CONSENT

TITLE OF THE STUDY **"A ONE YEAR HOSPITAL BASED COMPARITIVE STUDY ON OUTCOME OF POSTERIOR AND APPROACH IN HEMIARTHROPLASTY OF HIP JOINT"**

PRINCIPAL INVESTIGATOR: REG. NO. BL0119009

GUIDE: DR. _____

Introduction and Purpose: Hemiarthroplasty of the hip was first introduced in 1940 by Moore and Bohlman, with the later introduction of the Austin-Moore endoprosthesis. Thompson introduced a similar endoprosthesis in 1954. Moore initially recommended the use of a posterior surgical approach for the insertion of his prosthesis. Following this, other approaches to the hip, most notably the anterior and anterolateral approaches, were utilised. In recent years, the description by Hardinge of a direct lateral approach to the hip joint has popularised a previous description of a similar approach given by McFarland and Osborne in 1954 Hemiarthroplasty is common procedure for displaced fragility hip fractures. HA enables immediate full weight-bearing without the risk of typical complications related to internal fixation, including avascular necrosis and non-union. Moreover, in patients older than 60 years, HA results in fewer reoperations compared with internal fixation.

Furthermore, total hip arthroplasty (THA) is considered a better option for previously independent and healthy patients due to the functional results, despite an increased incidence of hip dislocation. The best approach for hip joint arthroplasty, however, remains controversial.

The purpose of the study is to evaluate the comparative outcome of posterior approach and lateral approach of hemiarthroplasty with respect to need for mobility aids, mobility level, living arrangements, pain, hip dislocation, and survival 12

months after hip fracture. Femoral neck fractures are one of the commonest injuries sustained by the elderly population. The incidence is growing rapidly due to increase in ageing of human population and lifestyle modifications.

It is commonly associated trivial trauma in older age patient, high energy trauma in younger age patient will result in fractures configuration

The purpose of this study is to determine the best Clinical outcome for "**A ONE YEAR HOSPITAL BASED COMPARITIVE STUDY ON OUTCOME OF POSTERIOR AND APPROACH IN HEMIARTHROPLASTY OF HIP JOINT"** in Orthopaedic department of KLE'S Dr. Prabhakar Kore Hospital and Medical Research Centre and Charitable Hospital, Belagavi from 1st January 2020 to 31st December 2021.

ANNEXURE III : PROFORMA

PATIENT NO: IP NO:

NAME:

AGE: SEX:

ADDRESS:

OCCUPATION:

DOA: DOS: DOD:

CHIEF COMPLAINTS:

PRESENTING COMPLAINTS:

- Pain
- Swelling
- Instability
- Giving away sensation
- Stair climbing difficulty
- Wound
- Deformity

HISTORY OF PRESENT ILLNESS:

NATURE OF INJURY:

- Road Traffic Accident
- Sports injuries
- Others

MODE OF INJURY:

- Direct
- Indirect

DURATION SINCE INJURY: _____days

a.History of Diabetes Mellitus, Hypertension, Asthma, Rheumatoid Arthritis, Tuberculosis and other chronic illness

Yes

No

b. Previous history of any medication received:

Yes

No

PERSONAL HISTORY:

- Diet : Veg/ Mixed/ Nonveg
- Appetite : Increased or Decreased
- Habits : Smoking/ Alcohol /Tobacco chewer / others
- Bowel & Bladder Habits: Normal or Abnormal

FAMILY HISTORY:

GENERAL PHYSICAL EXAMINATION:

- Built : Well/Moderate/Poor
- Temperature: Pulse:
- Blood Pressure: Respiratory Rate:
- Pallor
- Cyanosis
- Icterus
- Clubbing
- Pedal edema
- Lymphadenopathy

SYSTEMIC EXAMINATION:

- Cardiovascular System Examination:
- Respiratory System Examination:
- Per Abdomen Examination:
- Central Nervous System Examination:

LOCAL EXAMINATION:

INSPECTION:

Lower Limb Involved RIGHT LEFT

- Pain
- Attitude
- Skin: Blebs / Ecchymosis / Avulsed / Bruise
- Swelling
- Effusion
- Deformity

PALPATION:

- Tenderness
- Abnormal mobility
- Loss of transmitted movement's and continuity of bone
- Peripheral Pulses: Dorsalispedis / Posterior Tibial
-

a.Neurovascular Deficits: (Tingling numbness, Power)

Yes

No

b.Presence of any associated injury:

Yes

No

c.If yes specify

RANGE OF MOVEMENTS:

hip joint movements Flexion: Extension:

RELEVANT INVESTIGATIONS:

1. CT SCAN
2. X RAY OF HIP JOINT
3. ROUTINE INVESTIGATIONS:
4. BLOOD: Hb%, TLC, DLC, ESR, Platelet Count, Blood Grouping, CRP, RBS, Coagulation profile
5. HIV, HbsAg, HCV

6. URINE: albumin, sugar, microscopy.

DIAGNOSIS:

1. CT SCAN
2. X RAY OF HIP JOINT

TREATMENT:

FIRST AID: 1. YES 2. NO

- Fluid Replacement
- Immobilization of the Injured Limb
- Analgesics
- Antibiotics

DEFINITIVE TREATMENT:

Relevant Investigations and Medical Fitness for Surgery

Yes

No

Anaesthesia

- General
- Spinal
- Combined spinal epidural anaesthesia

Antibiotic Therapy - 1. Pre-operative 2. Post-operative

Analgesics

COMPLICATIONS:

Intraoperative: 1) YES 2) NO

Postoperative Immediate: 1) YES 2) NO

- Bleeding
- Infection

- Neurovascular damage
- Compartment syndrome
- Deep vein thrombosis

Duration of stay in hospital:

Range of movement of hip joint at discharge:

Flexion Extension

Physiotherapy:
hip joint

- Ankle and active toe movements
- Static quadriceps exercises
- Mobilization of knee and hip
- Non weight bearing crutch walking/ walker
- Time of full weight bearing

Follow up:
Date:
Serial no.:

Time since surgery:
Clinical union

Range of movements

Final Deformity: Angulation Varus/ Valgus
Anterior / Posterior

Final Result: Excellent / Good / Fair / Poor

To be evaluated by

ANNEXURE IV

PHOTOGRAPHS

FEMORAL STEM POSITION

NEUTRAL

VALGUS

VARUS

CASE 1

PRE-OPERATIVE X RAY

POST- OPERATIVE X RAY

CASE 2

PRE-OPERATIVE X RAY

POST-OPERATIVE X RAY

CASE3

PRE-OPERATIVE X RAY

POS -OPERATIVE X RAY

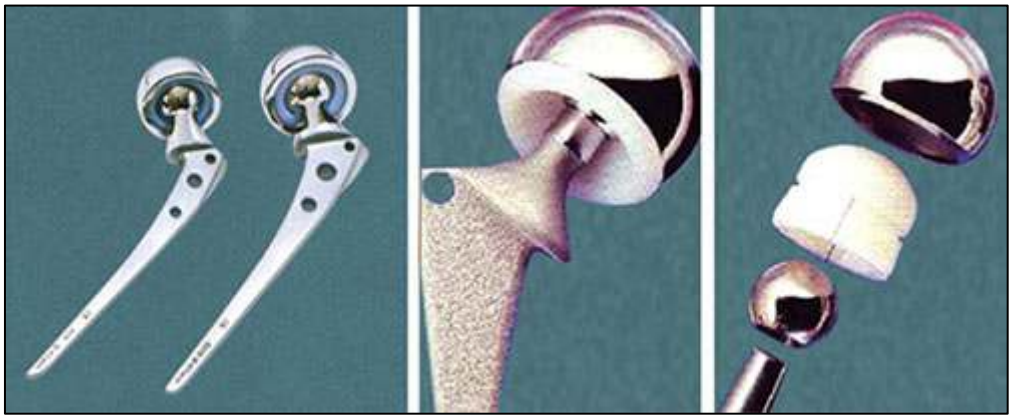
CASE 4

PRE-OPERATIVE X RAY

POST- OPERATIVE X RAY

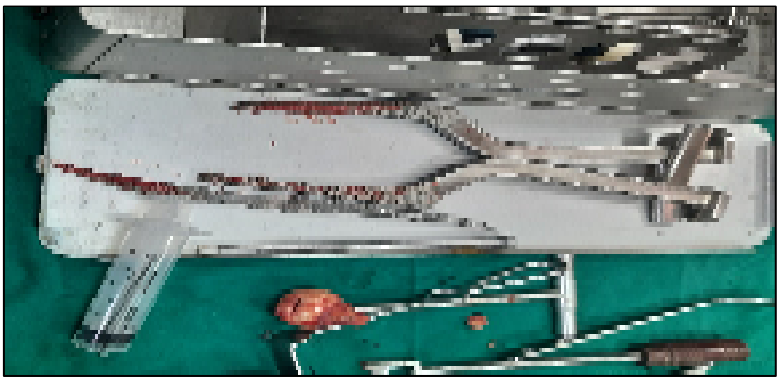
IMPLANTS

Austin-Moore and Thompson unipolar femoral prostheses



Bipolar prosthesis and its modular parts

INSTRUMENTS



ANNEXURE V - KEY TO MASTERCHART

Sex:

M = Male,

F = Female

Nerve Injury: 0 = No, 1 = Yes

Incidence of Dislocation: 0 = No, 1 = Yes

Infection: 0 = No, 1 = Yes

Stem Position: 0 = Neutral, 1 = Valgus, 2 = Varus

ANNEXURE III: MASTERCHART

Sl. no	Group	IP NO	Age	Sex	Pre - Operative	Intraoperative		Post - Operative								
					Hb gm%	Duration of Surgery (min)	Amount of Blood loss (ml)	Drain Output (ml)	Nerve Injury	Mobilizatin Rate (day)	Incidence of Dislocation	Post Op Hb gm%	Duration of hospital stay	Pain	Infectio n	Stem Position
1	Lateral	1000712	68	M	13.0	60	500	60	0	2	0	12.0	11	Mild	0	1
2	Lateral	1001456	72	M	13.0	60	400	60	0	2	0	11.0	11	Mild	0	0
3	Lateral	1007460	72	M	12.0	70	200	50	0	3	0	11.0	12	Mild	0	0
4	Lateral	942702	76	F	12.0	60	200	50	0	2	0	11.0	12	Mild	0	0
5	Lateral	1011438	67	F	11.0	90	300	60	0	2	0	9.4	12	Mild	0	0
6	Lateral	945151	68	M	11.0	80	200	60	0	2	0	10.0	12	Mild	0	0
7	Lateral	960075	72	F	11.4	60	200	60	0	3	0	10.0	12	Mild	0	0
8	Lateral	939457	74	M	12.0	70	200	80	0	2	0	10.0	11	Mild	0	0
9	Lateral	940144	78	F	11.4	90	250	80	0	2	0	11.0	10	Mild	0	0
10	Lateral	951263	80	M	10.4	60	200	80	0	2	0	8.4	10	Mild	1	0
11	Lateral	955077	71	F	11.4	70	250	60	0	3	0	10.0	11	Mild	0	0
12	Lateral	1013925	70	M	12.6	60	220	60	0	2	0	11.0	10	Mild	0	0
13	Lateral	958339	68	M	12.0	60	200	60	0	2	0	11.0	11	Mild	0	1
14	Lateral	958576	65	F	11.0	60	200	60	0	2	0	10.0	10	Mild	0	0
15	Lateral	1058645	74	M	12.0	80	250	60	0	3	0	11.0	12	Mild	0	0
16	Lateral	960768	68	F	11.0	60	200	50	0	3	0	9.6	13	Mild	0	0
17	Lateral	962630	70	M	13.0	70	200	50	0	3	0	11.0	16	Mild	0	0
18	Lateral	970789	84	M	12.4	70	200	50	0	2	0	11.8	12	Mild	0	0
19	Lateral	971386	76	M	12.4	70	250	50	0	2	0	11.6	12	Mild	0	0
20	Lateral	973434	85	F	12.4	70	170	50	0	2	0	11.8	14	Mild	0	0
21	Lateral	1029631	65	F	12.8	70	170	60	0	3	0	12.0	17	Mild	0	0
22	Lateral	1036340	80	M	11.4	70	150	60	0	2	0	10.4	12	Mild	0	0
23	Posterior	976039	76	M	12.0	60	500	70	0	2	0	11.0	11	Mild	0	2
24	Posterior	1006770	64	M	12.0	60	400	60	0	2	0	11.0	11	Mild	0	0
25	Posterior	1004410	74	M	12.0	60	300	60	0	3	0	10.0	11	Mild	0	0
26	Posterior	925795	74	F	12.0	60	200	50	0	3	0	11.0	12	Mild	0	0

27	Posterior	940621	65	M	11.6	80	300	80	0	3	0	10.0	11	Mild	0	0
28	Posterior	963548	77	F	11.0	60	200	50	0	3	1	10.0	12	Mild	0	0
29	Posterior	974398	80	F	11.6	70	170	50	0	2	0	11.4	15	Mild	1	0
30	Posterior	997502	80	M	11.8	70	150	60	0	2	0	11.4	11	Mild	0	0
31	Posterior	1015181	65	F	12.6	80	200	60	0	2	0	12.0	14	Mild	0	0
32	Posterior	1022911	81	F	12.4	80	200	60	0	3	0	12.0	16	Mild	0	0
33	Posterior	985053	80	F	11.4	60	200	60	0	3	0	11.0	12	Mild	0	2
34	Posterior	938608	78	F	11.2	80	200	50	0	3	0	10.6	11	Mild	0	0
35	Posterior	991100	65	M	11.0	80	150	50	0	3	0	10.0	14	Mild	1	0
36	Posterior	1052315	76	M	12.0	80	150	50	0	2	0	11.0	15	Mild	1	2
37	Posterior	1046276	68	F	12.0	80	150	50	0	2	0	11.0	12	Mild	0	0
38	Posterior	1035328	65	M	11.0	80	150	50	0	2	0	10.0	11	Mild	0	0
39	Posterior	1043876	79	M	11.0	60	150	50	0	2	0	10.0	11	Mild	0	0
40	Posterior	1041437	69	F	13.0	70	170	60	1	2	0	11.0	11	Mild	0	0
41	Posterior	1056346	64	M	12.0	70	250	60	0	3	0	10.0	16	Mild	0	0
42	Posterior	1057743	62	M	12.0	70	300	70	0	3	0	9.0	14	Mild	0	0