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Functional Outcome of Fracture Neck of Femur in Elderly Treated by Hemiarthroplasty by Hardinge Approach

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Abstract
Many approaches have been described for hemiarthroplasty of hip. Hardinge approach is an anterolateral approach for exposing hip joint. The Hardinge approach published in 1982 entails detaching the bulk of gluteus medius, but only a small portion of the vastuslateralis, from the greater trochanter. The posterior tendinous portion of gluteus medius is left attached to the greater trochanter and provides an anchoring point when reattaching the muscle after the procedure. This study is aimed at assessing the functional outcome of hemiarthroplasty done through hardingeapproach.
Materials and Methods: *This study is a prospective study done in 75 patients with fracture neck of femur treated by hemiarthroplasty by Austin Moores or bipolar prosthesis. Clinical assessment was done at 2 weeks, 6 weeks, 3 months and 6 months. The results were evaluated using AAOS scoring system.*
Results: *75 cases were operated within one week.In this study we had 15(20%) excellent, 51 (68%) good, 6(8%) fair and 3 (4%) poor results at the end of 3 months of clinical follow up.*
Conclusion: *Hemiarthroplasty done by Hardinge approach yielded excellent results and increased range of movement especially flexion so that patients can use indian toilet without fear of dislocation.*

Introduction

Fractures of the neck of femur are devastating injuries that most often affect the elderly. Fractures of the neck of femur have always presented great challenges to orthopaedic surgeons and remains in many ways today the unsolved fracture as far as treatment and result are concerned. With the expectancy increasing with each decade, our society is becoming more and more geriatric with significant number of hospitalized and nursing home patients suffering from femoral neck fractures and their sequel.

.Primary prosthetic replacement is an accepted method of treatment for fractures of the neck of femur in the elderly. In our setup this method is very frequently being used for treating fractures of neck of femur in the elderly patients.

Various approaches to the hip have been described. Schaubel modified the Smith- Peterson approach by osteotomising the iliac crest between the attachments of external oblique muscle medially and fascia lata[1].

McFarland and Osborne[2] described the lateral approach to the hip preserving the integrity of gluteus mediusmuscle. It is based on the anatomical observation made by McFarland and Osborne that gluteus medius and vastuslateralis are in functional continuity through the thick periosteum covering the greater trochanter[3].

Papers discussing the choice of approach for hip fracture surgery generally compare an anterior with a posterior approach. The terms here refer to the capsule incision, so an anterior approach generally refers to a lateral, Transgluteal or Hardinge[4]approach with an anterior capsular incision. A posterior approach invariably relates to a Moore Southern[5] approach.

The term anterior refers to the anterior incision into the hip joint capsule In Hardinge approach, the incision is centered on the greater trochanter with half above the half below. It is either straight or may curve a little posteriorly proximally. The distal half extends in the line of the femur. The exact length of the incision will depend on the ease of exposure, being longer in the more obese or muscular the patient.

Once through the skin, the iliotibial tract and gluteal fascia more proximally are divided in the line of the incision. Separate any adherent fibres of the gluteus medius from the fascia. Any bursal tissue over the greater trochanter is swept away to expose the curved insertion of the gluteus medius into the greater trochanter, which is the center of the wound.

The anterior portion of the tendon of gluteus medius is detached from the trochanter, leaving a cuff of tissue for reattachment. The incision extends from the anterior portion of the vastuslateralis around the trochanter to the apex. At this point the incision runs in the line of the muscle fibres, thus preserving the attachment of the posterior tendinous edge of gluteus medius. The superior gluteal nerve may be injured by excessive incision proximally into gluteus medius. The nerve enters the posterior border of the muscle and fans out in an arc. Any intramuscular incision should not extend more than 5cm from the greater trochanter to be sure of not damaging the nerve. Distally the splitting of the anterior fibres of vastuslateralis can cause troublesome bleeding from branches of the lateral circumflex femoral artery. This can usually be controlled by diathermy.

The femur can now be adducted and externally rotated to bring the anterior capsule into view. Gluteus minimus and further fibres of vastuslateralis are cleared away to reveal the iliofemoral ligament and the anterior hip joint capsule, which is incised with an inverted T-shaped incision to open the joint. The upper part of the T is along the intertrochanteric line, whilst the medial part should extend to the rim of the acetabulum. Hematoma from within the joint capsule will be encountered as the capsule is incised.

Adduction and externally rotating the leg will bring the fracture into view. The hip should be flexed to 90^0, fully adducted and externally rotated so that the leg hangs over the side of the operation table and the knee flexes to 90^0. An assistant is required to hold the leg in this position.

The femoral neck is exposed to allow it to be cut and the prosthesis is inserted.

Frndak[6]et al modified the Hardinge's direct lateral approach by placing the abductor split more anterior directly over the femoral head and neck .Since the split is more anterior ,exposure of femoral head and neck requires less retraction.

Mc Lauchlan[7] described a direct lateral approach to the hip through the gluteus medius used for many years by Hay at the Stracathro Hospital.

Gibson is responsible for the rediscovery of posterolateral approach to the hip first described and recommended by Kocher and Langenbeck. Because detaching the gluteal muscles from ilium and interfering with function of iliotibial band are unnecessary, rehabilitation after surgery is rapid.[8]

A modification of Gibson approach by Marcy and Fletcher in which the hip is dislocated by internal rotation and the anterior part of the joint capsule is preserved to keep the hip from dislocating after surgery.[9]

The main theoretical advantage given for an anterior approach to the hip is that there is a lower risk of dislocation as the orientation of the acetabulum favours posterior dislocation of the hip. This lower risk of dislocation may make rehabilitation of the patient easier due to less

restrictions on hip movement being applied in the post-operative period. In addition, there is less risk of damage to the sciatic nerve with this approach as it is not close to the operative field

Materials and Methods

This study is concerned with the evaluation of 75 consecutive hip cases with fresh femoral neck fractures treated by uncemented Austin Moore hemiarthroplasty in the Department of Orthopedics, Government Medical College, Thiruvananthapuram during the period 2013-2015.

Types of fractures include both undisplaced and displaced fractures as assessed by Gardens classification. The available medical records of these patients have been reviewed. They have been recalled for detailed clinical and radiological examinations for the assessment. The proforma used for the study is given below:

Proforma

1. Name: 2. Age : 3. Sex :

4. Address: 5. IP No.

6. DOA

7. DOS

8. DOD

9. Details of Injury

Mode of Injury :

Side affected : R/L

Type : Garden – 1,2,3 or 4

Associated injuries :

Associated disease :

10. Treatment

Details of Surgery

Type of Anaesthesia :

Approach :

Type of prosthesis – Austin Moore :

Size of Prosthesis :

Post operative

Duration of non weight bearing

Date of partial weight bearing

Date of full weight bearing

11. Results

Subjective

Pain-Present / Not Present

Deformity-Present / Not Present

Limping-Present / Not Present

Function

(a) Walking Distance

(b) Stair Climbing

Squatting / Sitting cross legged

Objective

Scar

Deformity

Range of Movements

Flexion : Extension

Abduction : Adduction

Rotation; IR : ER

Limb length discrepancy; Present / Not Present

Radiological

Implant

Joint

Implant Bone Interface

Proximal Femoral Bone Stock

12. Complications

(a) Anaesthetic Complications :

(b) Wound Infection – Nil / Superficial / deep :

(c) Hypostatic Pneumonia :

(d) Bedsore :

(e) Thrombophlebitis :

(f) Implant Complications :

Fracture femur:

Dislocations :

Loosening :

Intrusion :

Hetrotopic Calcification :

Pain :

Shortening :

Metal Reaction :

(g) Death :

13. Functional Results

(a) Excellent :

(b) Good :

(c) Fair :

(d) Poor

Pre-operative management

All the cases were put on skin traction when there was a delay in surgery. Pre-operative blood transfusion was given in patients with general debility and anemia. Prophylactic antibiotics were given routinely.

Anesthetic technique

Most of the operations were done under spinal anaesthesia, but a few have been done under general anaesthesia.

Surgical technique

Approach: Hardinge lateral approach was used in all cases.

The incision is centered on the greater trochanter with half above the half below. It is either straight or may curve a little posteriorly proximally. The distal half extends in the line of the femur. The exact length of the incision will depend on the ease of exposure, being longer in the more obese or muscular the patient.

Once through the skin, the iliotibial tract and gluteal fascia more proximally are divided in the line of the incision. Separate any adherent fibres of the gluteus medius from the fascia. Any bursal tissue over the greater trochanter is swept away to expose the curved insertion of the gluteus medius into the greater trochanter, which is the center of the wound.

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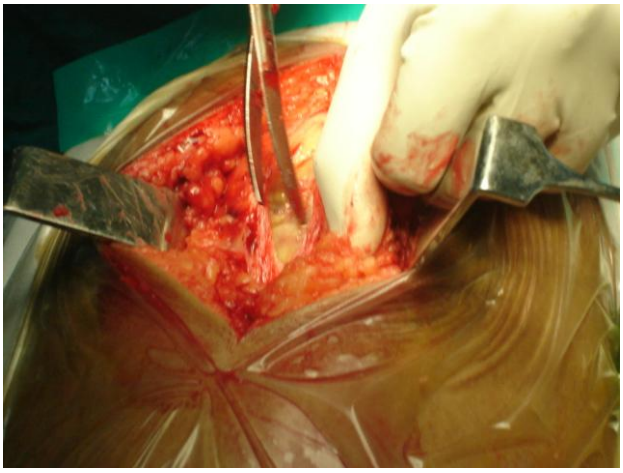
The femoral neck is exposed to allow it to be cut and the prosthesis is inserted.

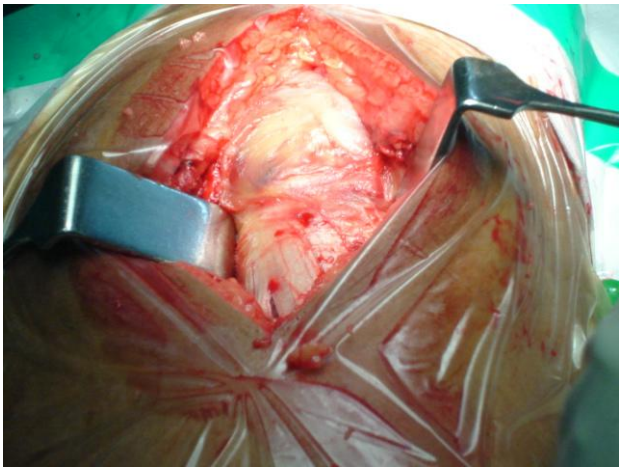
1. **Skin Preparation & Position**

2. Incision-Hardinge Lateral Approach

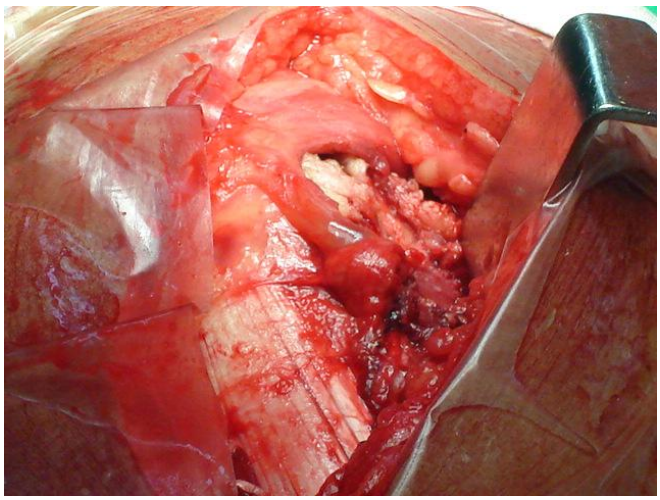
3.Plane Between Tfl and Gluteus Maximus



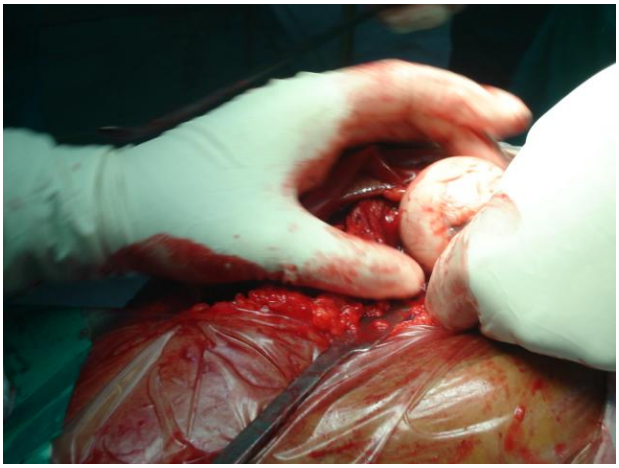
4.Plane Between Tfl And Gluteus Maximus



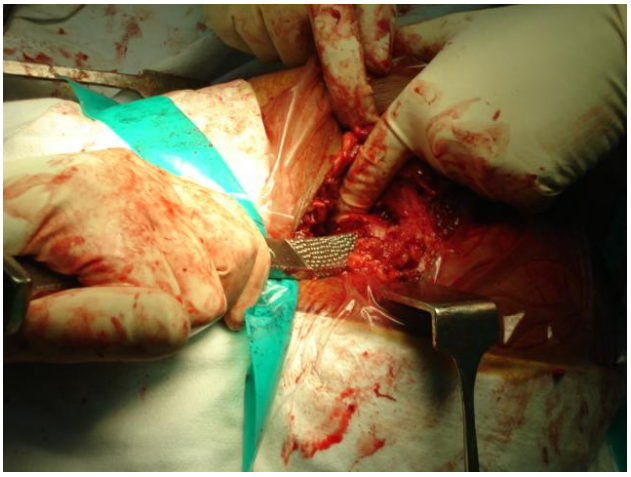
5.Gluteus Medius Cut At Jn Of Ant 2/3 & Post I/3



6.Head Of Femur Delivered Out

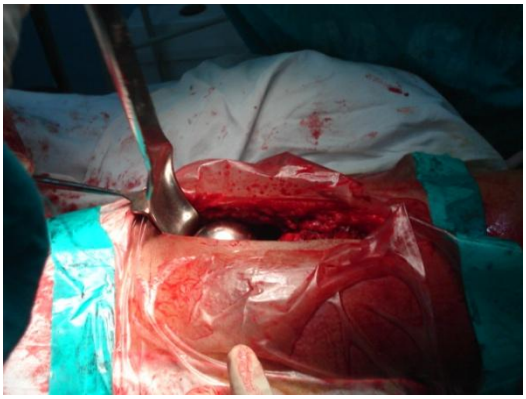


7. Preparation Of Femur



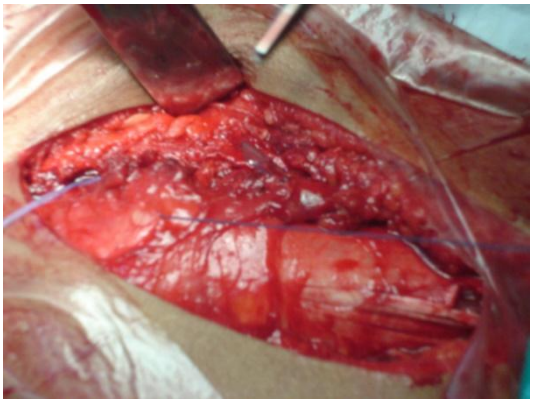
8.Prosthesis Getting Inserted

9.Austin Moore Prosthesis Seated



10.After Reduction

11.Repair Of Gluteus Medius



Prosthesis used in surgery

The femoral head in all cases were replaced with corresponding size Austin Moore prosthesis. Bone cement was not used in any of the cases.

Post operative Management

The patients were allowed to sit on the bed from the first post operative day and they were encouraged to do quadriceps exercises from the first postoperative day. Partial weight bearing was allowed after 5 days. Antibiotics and other supportive measures were given for 10 days. In most of the cases sutures were removed on 8th day.

Methods of analysis of the results

Those patients who were not available for the follow up were exclude from the assessment of results.

The results of operation were assessed on the basis of criteria given by "American Academy of Orthopaedic Surgeons". The patients were classified into four groups ie., excellent good, fair and poor.

Criteria used for the evaluation of patients

Excellent	No pain. Mobility 75% or more, good walking ability, can squat and sit cross legged.
Good	Hip mobility. 50-75%. No pain at rest but slight or tolerable pain during walking. Able to walk with a cane. Able to squat with some difficult.
Fair	Pain at rest and walking, mobility less than 50% can walk short distance with support. Not able to squat.
Poor	Severe pain at rest bound to wheel chair or bed ridden.

Observations and Results

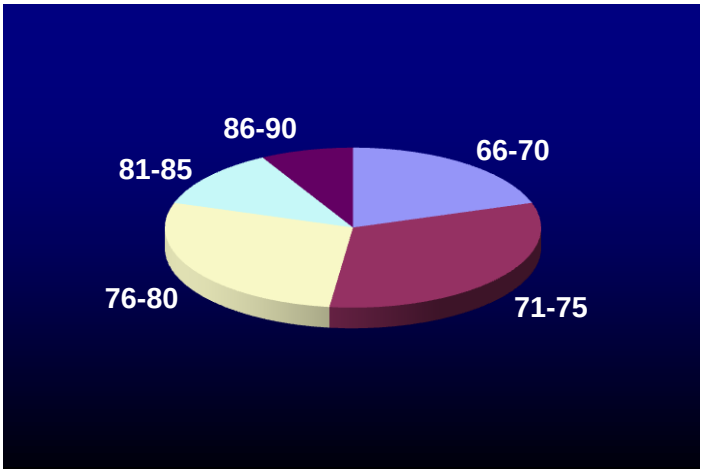
Fracture neck of femur is the second commonest fracture in the elderly. Between 2013 to 2015 we treated 75 cases of fresh fracture neck of femur by hemiarthroplasty with Austin Moore Prosthesis by Hardinge approach - anterior incision into the hip joint capsule in Govt Medical College, Thiruvananthapuram.

Age: The youngest patient in our series was 66 years and oldest was 90 years.

Table - 1

Age	66-70	71-75	76-80	81-85	86-90
No of Patients	15	24	21	9	6

No of Patients

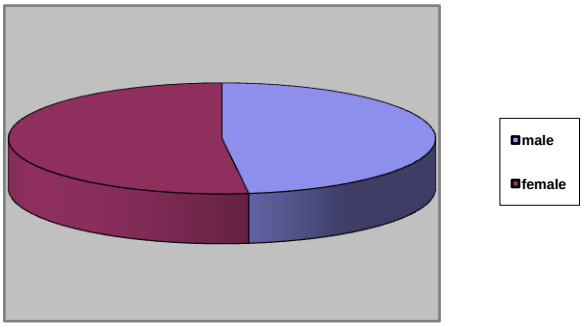


Sex: There were 38 female patients and 37 male patients.

Table - 2

No of cases	Male	Female
75	38	37

No of patients



Side of Fracture

Incidence of right & left fracture

No of cases	Right	Left
75	38	37

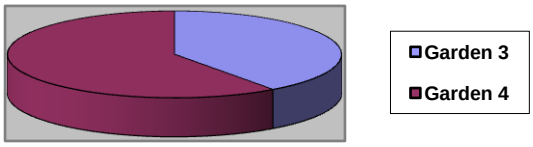
Time of lag between Injury and Surgery

The average delay was 3 days

Type of fracture

Out of 75 cases 10 cases were Garden stage 3 and 15 cases were Garden stage 4.

No of cases	Garden stage 3	Garden stage 4
75	30	45



Hospital stay

Minimum hospital stay was about 7 days and maximum hospital stay was 11 days.

Follow up

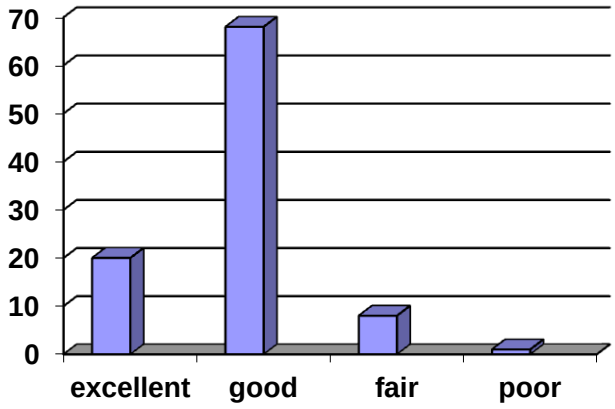
75 cases were followed up. Minimum follow up was 6 months and maximum follow up was 16 months.

Functional Results

Table-4 shows functional results according to criteria given by American Academy of Orthopaedic Surgeons.

Table - 4

Grade	No of cases	%
Excellent	15	20
Good	51	68
Fair	6	8
Poor	3	4



Complications

We classified complications into early and late.

Early complications comprised of those which develop during the period of hospital stay. Late complications comprised of those which developed during the period of follow up.

Early

1. Superficial infections

This was seen in one case who was diabetic. It was treated by wound toilet, glycaemic control and appropriate antibiotics. Wound healed.

2. Deep infection: Nil

3. Fracture of lateral cortex of femur

This happened while inserting the prosthesis. It was treated by delayed weight bearing until the fracture show union.

Late

1. Thigh pain: Four out of twenty five cases had thigh pain

2. Limb length discrepancy: This complication was noted in one case. The cause was flexion deformity of hip

3. Heterotopic ossification: not observed

4. Dislocation: not observed

Table - 5

Complication	No of cases	%
Thigh pain	36	16
Limb length discrepancy	9	4
Infection	9	4
Periprosthetic fracture	9	4

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