International Journal of Orthopaedics Sciences

E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2020; 6(3): 795-800

www.orthopaper.com
Received: 06-05-2020
Accepted: 15-06-2020

Dr. Tapan Jain
Resident, Department of Orthopaedics, GMC Bhopal, Madhya Pradesh, India

Dr. Pankaj Mishra
Assistant Professor, Department of Orthopaedics, GMC Bhopal, Madhya Pradesh, India

Dr. Harendra Singh
Resident, Department of Orthopaedics, GMC Bhopal, Madhya Pradesh, India

Dr. Vipin Singh
Resident, Department of Orthopaedics, GMC Bhopal, Madhya Pradesh, India

Dr. Anil Chouksey
Resident, Department of Orthopaedics, GMC Bhopal, Madhya Pradesh, India

Dr. Lakshya Bhardwaj
Resident, Department of Orthopaedics, Dr. RN Cooper Municipal Medical College, Mumbai, Maharashtra, India

Corresponding Author:
Dr. Pankaj Mishra
Assistant Professor, Department of Orthopaedics, GMC Bhopal, Madhya Pradesh, India

Fracture neck of femur in elderly patients-fixation with hemiarthroplasty by anterior approach and outcome

Dr. Tapan Jain, Dr. Pankaj Mishra, Dr. Harendra Singh, Dr. Vipin Singh Dr. Anil Chouksey and Dr. Lakshya Bhardwaj

DOI: https://doi.org/10.22271/ortho.2020.v6.i3l.2287

Abstract
The optimal approach for hemiarthroplasty is hotly debated. We analysed 60 consecutive elderly patients who underwent hemiarthroplasty. Patients were analysed for all complications, during and after surgery. The results were gratifying and were comparable with major series of hemiarthroplasty via the anterior approach. No patient had a post of hip dislocation. 57 patients (95%) had no or minimal pain after the surgery. There were no major intra-operative complications and mean Harris hip score was 86 at one-year follow-up. We conclude that the anterior approach, already known to cause less post op dislocation is safe due to less intra operative and post-operative complication.

Keywords: Hemiarthroplasty, anterior approach, Harris hip score

Introduction
Hip fractures are common injuries in the elderly. There are many risk factors for femoral neck fractures, including female gender, low bone density, and reduced mobility [1, 2]. Hip fractures in the elderly usually result from trivial trauma and often are associated with osteoporosis [3] and other associated medical conditions that may increase the prevalence of falls. In young adults' hip fractures are rare and are due to high velocity trauma [4].
Two factors which must be considered while dealing with displaced femoral neck fractures are early mobilization and minimization of complications. These factors may be affected by selection of surgical approach. The direct anterior approach (DAA) is a good approach for total hip arthroplasty (THA), with ample literature showing its association with decreased risk of dislocation, low postoperative pain, early rehabilitation and lesser hospital stay time compared to other surgical approaches [5, 6].
The aim of this paper is to determine the intra operative and postoperative complication associated with direct anterior approach (Smith Peterson) for hemiarthroplasty.

Anatomy and Classification
The hip is a synovial joint of the ball-and-socket variety formed by the globular femoral head cupped into the acetabular or cotyloid cavity of the hip bone. It plays a major role in the static and dynamic physiology of the locomotor system and, although it is the most stable ball-and-socket joint in the body, it still maintains an extraordinary range of motion [7].
Femoral neck fractures initially were classified by Sir Astley Cooper in 1823 as either intracapsular or extracapsular, which he felt had prognostic implications [8].
Pauwels (1935) [9, 10, 11] introduced first biomechanical classification for femoral neck fractures. This classification calculates the angle between the fracture line of the distal fragment and the horizontal line to determine shearing stress and compressive force (Fig 1). The classification is described as follows

- Type I: up to 30°. Compressive forces are dominant.
- Type II: 30°–50°. Shearing force occurs and may have a negative effect on bone healing.
- Type III: 50° and more. Under these circumstances, shearing force is predominant and is associated with a significant amount of varus force which will more likely result in fracture displacement and varus collapse.

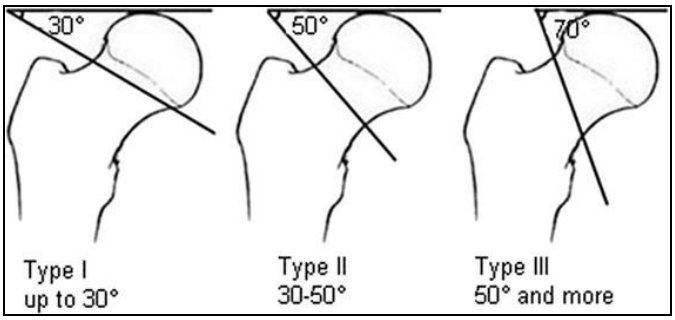

Fig 1: Pauwels Classification

Garden Robert Symon (1961) [12, 13] described a comprehensive classification. The Garden classification incorporates displacement, fracture completeness, and relationship of bony trabeculae in the femoral head and neck (Table 1) (Fig 2).

Table 1: Garden classification

Type	Description	Nondisplaced or displaced
I	Valgus impacted incomplete fracture, disruption of the lateral cortex while the medial cortex is preserved	Nondisplaced
II	Complete fracture	Nondisplaced
III	Complete fracture, partial displacement indicated by change in angle of the trabeculae	Displaced
IV	Complete fracture, complete displacement leading to parallel orientation of the trabeculae	Displaced

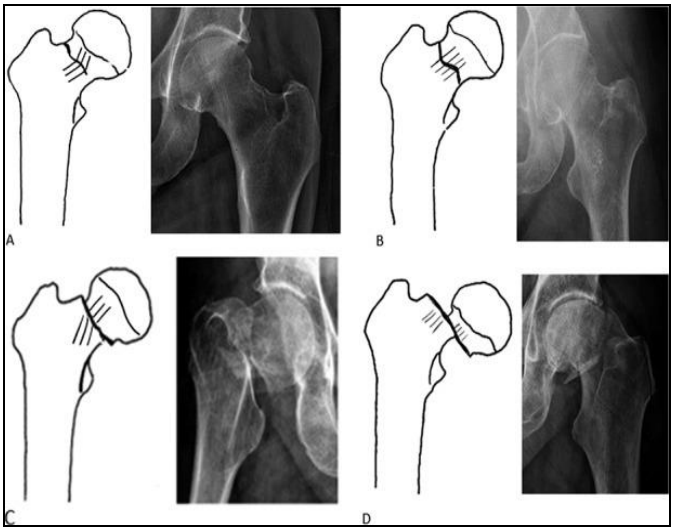

Fig 2: The Garden classification is shown in the drawings and corresponding radiographs for Garden Types (A) I, (B) II, (C) III, and (D) IV femoral neck fractures.

Materials and Methods

60 patients of age >60 yrs. and both sex with fracture neck of femur operated via hemiarthroplasty using Anterior approach with Austin Moore prosthesis between October 2017 to August 2019 were included in this prospective interventional study. Patients without any major hip pathology prior to the fracture were included.

Investigations

Routine examination of blood, radiographic examination and necessary investigation for anaesthetic fitness were done.

Fig 3: Standard X-ray in AP and lateral views.

Surgical Procedure for Hemiarthroplasty with Anterior Approach (Smith Peterson approach) [14, 15, 16]:

Spinal anaesthesia was given. Patient is in supine position on the conventional fracture table. The hip was positioned at the table break in order to allow extension during the procedure. Site of the surgery was thoroughly painted with iodine and spirit and draped. 8-cm long skin incision starts about 2-cm lateral and inferior to the anterior superior iliac spine pointing distally to the head of the fibula. The deep intermuscular dissection is made between the tensor fasciae latae muscle and the sartorius and rectus femoris muscle, thus respecting a true internervous plane. After accurate ligation of the ascending branches of the medial femoral circumflex artery, the anterolateral joint capsule was incised in the shape of a "V". The pretrochanteric tubercle was then visible and the osteotomy of the femoral neck was done with an oscillating saw. The femoral head was extracted with a corkscrew. Head size was calculated and appropriate size prosthesis was used. The anterior capsule can either be resected or closed after joint replacement. In our study, it was closed in all patients. Incision was closed in layers after thorough wash. Sterile dressing was done. Blood loss was calculated by counting the number of mops used and volume of suction done. Total time of surgery was counted from time of incision to dressing.

Fig 4: Position of patient

Fig 5: Incision over anterior aspect of thigh

Fig 6: Showing the head of femur

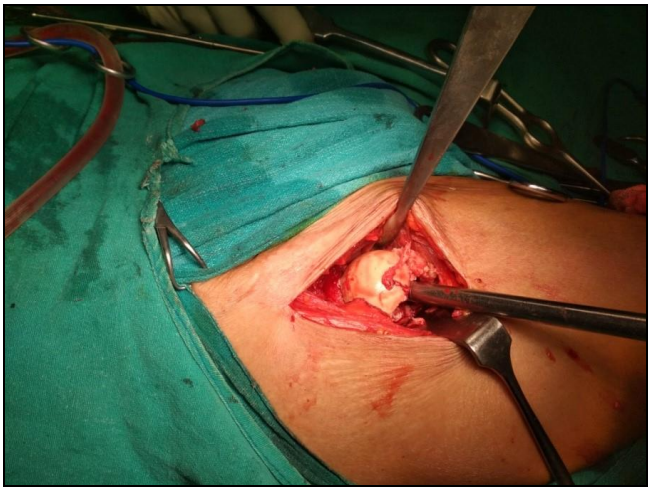

Fig 7: Removal of head with help of corkscrew

Fig 8: Rasping of femoral canal

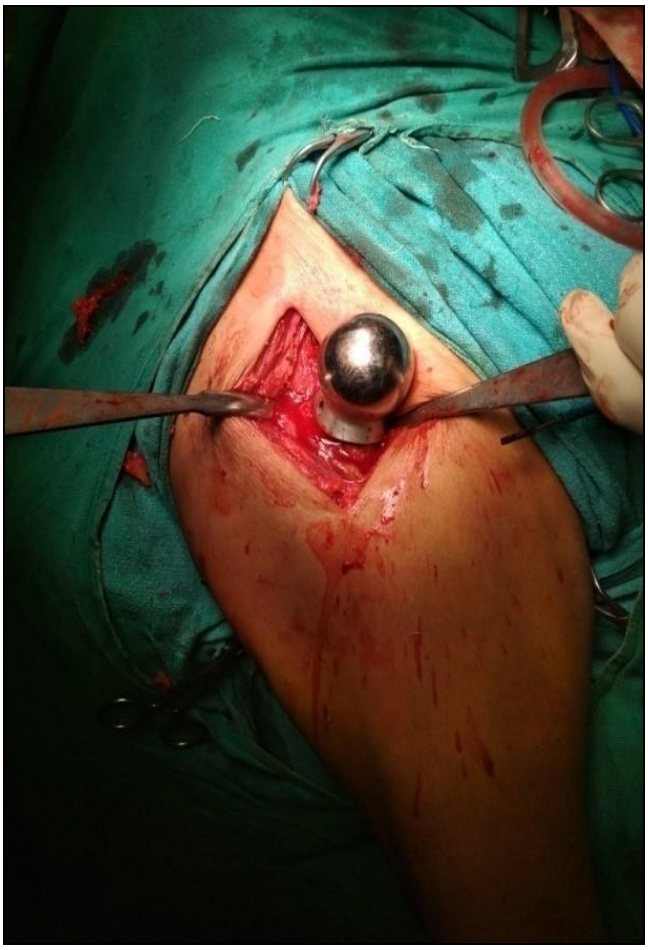

Fig 9: After insertion of prosthesis

Fig 10: Implant and instruments used in hemiarthroplasty

Follow Up: All patients were allowed partial weight bearing as soon as pain subsided. Clinical follow-up was carried out at 1, 6- and 12-months post-surgery. At follow up, after a subjective assessment of quality of life and functional status, patients were evaluated according to Harris hip scoring system [17, 18, 19]. All the details were recorded in the follow up chart. A follow up radiograph of the pelvis was obtained at each follow up. Grading of functional outcome was done as follows.

Table 2: Harris Hip Score Grading

Category	Harris Hip Score
Excellent	90-100
Good	80-89
Fair	70-79
Poor	69 or less

Pain
- ☐ None or ignores it (44)
- ☐ Slight, occasional, no compromise in activities (40)
- ☐ Mild pain, no effect on average activities, rarely moderate pain with unusual activity; may take aspirin (30)
- ☐ Moderate pain, tolerable but makes concessions to pain; some limitation of ordinary activity or work; may require occasional pain medicine stronger than aspirin (20)
- ☐ Marked pain, serious limitation of activities (10)
- ☐ Totally disabled, crippled, pain in bed, bedridden (0)

Limp
- ☐ None (11) ☐ Moderate (5)
- ☐ Slight (8) ☐ Severe (0)

Support
- ☐ None (11) ☐ Two canes (2)
- ☐ Cane for long walks (7) ☐ Two crutches (0)
- ☐ Cane most of the time (5) ☐ Not able to walk (0)
- ☐ One crutch (3)

Distance Walked
- ☐ Unlimited (11) ☐ Indoors only (2)
- ☐ Six blocks (8) ☐ Bed and chair (0)
- ☐ Two or three blocks (5)

Stairs
- ☐ Normally without using a railing (4)
- ☐ Normally using a railing (2)
- ☐ In any manner (1)
- ☐ Unable to do stairs (0)

Put on Shoes and Socks
☐ With ease (4) ☐ With difficulty (2) ☐ Unable (0)

Sitting
- ☐ Comfortably in ordinary chair 1 hour (5)
- ☐ On a high chair for ½ hour (3)
- ☐ Unable to sit comfortably in any chair (0)

Enter public transportation: ☐ Yes (1) ☐ No

Flexion contracture: _____ (degrees)

Leg-length discrepancy: _____ (cm)

Absence of Deformity (all Yes = 4; <4 = 0)
- <30 degrees fixed flexion contracture: ☐ Yes ☐ No
- <10 degrees fixed adduction: ☐ Yes ☐ No
- <10 degrees fixed internal rotation in extension: ☐ Yes ☐ No
- Limb-length discrepancy <3.2 cm: ☐ Yes ☐ No

Range of Motion (*Normal)
Total degree measurements, then check range to obtain score
Flexion (*140 degrees): _____ External rotation (*40 degrees): _____
Abduction (*40 degrees): _____ Internal rotation (*40 degrees): _____
Adduction (*40 degrees): _____

Range-of-Motion Scale
211-300 degrees (5) 61-100 degrees (2)
161-210 degrees (4) 31-60 degrees (1)
101-160 degrees (3) 0-30 degrees (0)

Range-of-Motion Score: _____

Total Harris Hip Score: _____

Fig 11: Harris Hip Score

Fig 12: Anterior Approach Clinical Pics

Fig 13: Post Op

Fig 14: Follow Up 1 Month

Results

Table 3: Demographic Distribution

Age of patients	Total
61-70	20 (33%)
71-80	40(67%)

In present study, out of 60 cases of anterior approach group 20 cases (33%) were in the age group of 61-70 years and 40 cases (67%) were in the age group of 71-80 years.

Table 4: Gender Distribution

Sex	Total
Male	15(25%)
Female	45(75%)

Out of 60 cases of anterior approach group 15 cases (25%) were males and 45 cases (75%) were females.

Table 5: Comparing Baseline Parameters Blood Loss

Surgical approach	Mean blood loss (in ml)
Anterior	223.00

In Present study mean blood loss in anterior approach was around 223.00 ml.

Table 6: Duration of Surgery

Surgical approach	Mean surgery duration (in min)
Anterior	78

In present in study mean duration of surgery in anterior approach was around 78 minutes.

Table 7: Duration of Post Op Hospital Stay

Surgical approach	Mean duration (in days)
Anterior	3.75

In present in study mean duration of hospital stay in anterior approach was around 3.75 days.

Table 8: Complications

Complications	Total
Nil	57 (95%)
Anterior hip dislocation	nil
Surgical site infection	3 (5%)

Anterior approach had no patient of anterior hip dislocation and three patients of surgical site infection.

Table 9: Comparing Pain

Month	Pain	Total
1	None	30(50%)
	Mild	6(10%)
	Slight	21(35%)
	Severe	3 (5%)
6	None	60 (100%)
12	None	60 (100%)

In present study, at first month, 10% patients in anterior approach had mild pain while at 6 months no pain was observed.

Table 10: Comparing Hip Range of Motion Score

Hip range of motion	Mean ROM Score
1 month	4.00
6th month	5.00
12th month	5.00

In present study it was found that the end of 1 month, 6th month and 12th month, hip range of motion score was 4, 5 and 5 respectively.

Table 11: Harris Hip Score

Harris hip score	Mean
1 month	75.10
6th month	85.90
12th month	85.90

In present study on comparing the Harris hip score it was found that at the end of 1 month, 6th month and 12th month Harris hip score was 75.10, 85.90, 85.90 respectively.

Discussion

This study of 60 cases of fracture neck of femur treated with hemiarthroplasty with Austin Moore Prosthesis in elderly patients of both the sexes using anterior approaches to hip. The observations were made and results were analyzed. The study was also compared with relevant studies of other authors.

The present study shows that mean blood loss in anterior approach is 223 ml. Similarly, studies of Keene G.S. *et al.* (1993) [20] and Trinh TQ *et al.* (2015) [21] reported that blood loss during surgery 251 ml and 229 ml respectively. Our results are similar to previous studies. Duration of surgery in anterior approach group was 78 minutes in our study. Similar results were concluded by Keene G.S. *et al.* (1993) and Trinh TQ *et al.* (2015). Post op hospital stay is less in anterior approach. Similar results were found in studies of Trinh TQ *et al.* (2015). Lesser post-operative hospital stay can be attributed to less post op pain in anterior approach group. The present study shows that post op dislocation of hip is not common complication of anterior approach. Similar results were found in studies of Keene G.S. *et al.* (1993), Unwin A J *et al.* (1994) [22] and Jean Langlo *et al.* (2015) [23]. Less hip dislocation in anterior approach group can be attributed to repair of anterior capsule which remains intact in the anterior approach group. Also, surgical site infection is 5% in our study consistent with results of Keene G.S. *et al.* (1993). In present study HHS at 1th month was 75.1, at 6th month 85.9 and at 12th month also 85.9. Similar results were found in studies of Kerstin Schneider *et al.* (2012) [24] and Chulsomlee K. *et al.* (2018) [25].

Conclusion

This single centre prospective study concludes that the intra operative complications includes blood loss which is about 225 ml (mean) in anterior approach and postoperative complications includes surgical site infection which is 5%, mean length of hospital stay is around 4 days and 95% of those do not develop any complication. Also, anterior less post op dislocation compares to the other approaches especially posterior approach. We believe anterior approach is safe due to less intra operative and post-operative complication.

References

1. Cummings SR, Browner W, Black DM, Nevitt MC, Genant HK, Cauley J *et al.* Bone density at various sites for prediction of hip fractures. The Lancet. 1993; 341(8837):72-5.
2. Kannus P, Parkkari J, Sievänen H, Heinonen A, Vuori I, Järvinen M. Epidemiology of hip fractures. Bone. 1996; 18(1):S57-63.
3. Koval KJ, Zuckerman JD. Hip fractures: I. Overview and evaluation and treatment of femoral-neck fractures. JAAOS-Journal of the American Academy of Orthopaedic Surgeons. 1994; 2(3):141-9.
4. Protzman RR, Burkhalter WE. Femoral-neck fractures in young adults. JBJS. 1976; 58(5):689-95.
5. Zawadsky MW, Paulus MC, Murray PJ, Johansen MA. Early outcome comparison between the direct anterior approach and the mini-incision posterior approach for primary total hip arthroplasty: 150 consecutive cases. The Journal of arthroplasty. 2014; 29(6):1256-60.
6. Parvizi J, Restrepo C, Maltenfort MG. Total hip arthroplasty performed through direct anterior approach provides superior early outcome: results of a randomized, prospective study. Orthopedic Clinics. 2016; 47(3):497-504.
7. Harty M. The anatomy of the hip joint. InSurgery of the hip joint Springer, New York, NY, 1984, 45-74.
8. Cooper A. A treatise on dislocations and on fractures of the joints: fractures of the neck of the thigh-bone. Clinical Orthopaedics and Related Research®. 1973; 92:3-5.
9. Nowakowski AM, Ochsner PE, Majewski M. Classification of femoral neck fractures according to pauwels: interpretation and confusion. J Biomedical Science and Engineering. 2010; 3:638-43.
10. Bartonícek J. Pauwels' classification of femoral neck fractures: correct interpretation of the original. Journal of orthopaedic trauma. 2001; 15(5):358-60.
11. Kazley JM, Banerjee S, Abousayed MM, Rosenbaum AJ. Classifications in brief: garden classification of femoral neck fractures. Clinical orthopaedics and related research. 2018; 476(2):441.
12. Garden RS. Low-angle fixation in fractures of the femoral neck. The Journal of Bone and Joint Surgery. British volume. 1961; 43(4):647-63.

13. Linton P. Types of displacement in fractures of the femoral neck. The Journal of bone and joint surgery. British volume. 1949; 31(2):184-9.
14. Rachbauer F, Kain MS, Leunig M. The history of the anterior approach to the hip. Orthopedic Clinics of North America. 2009; 40(3):311-20.
15. Light TR, Keggi KJ. Anterior approach to hip arthroplasty. Clin Orthop Relat Res. 1980; 152(4):255-60.
16. Post ZD, Orozco F, Diaz-Ledezma C, Hozack WJ, Ong A. Direct anterior approach for total hip arthroplasty: indications, technique, and results. JAAOS-Journal of the American Academy of Orthopaedic Surgeons. 2014; 22(9):595-603.
17. Nilsdotter A, Bremander A. Measures of hip function and symptoms: Harris hip score (HHS), hip disability and osteoarthritis outcome score (HOOS), Oxford hip score (OHS), Lequesne index of severity for osteoarthritis of the hip (LISOH), and American Academy of orthopedic surgeons (AAOS) hip and knee questionnaire. Arthritis care & research. 2011; 63(S11):S200-7.
18. Mahomed NN, Arndt DC, McGrory BJ, Harris WH. The Harris hip score: comparison of patient self-report with surgeon assessment. The Journal of arthroplasty. 2001; 16(5):575-80.
19. Harris WH. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty: an end-result study using a new method of result evaluation. JBJS. 1969; 51(4):737-55.
20. Keene GS, Parker MJ. Hemiarthroplasty of the hip—the anterior or anterior approach? A comparison of surgical approaches. Injury. 1993; 24(9):611-3.
21. Trinh TQ, Ferrel JR, Pulley BR, Fowler TT. Short-term outcomes of femoral neck fractures treated with hemiarthroplasty using the anterior approach. Orthopedics. 2015; 38(12):e1091-7.
22. Unwin AJ, Thomas M. Dislocation after hemiarthroplasty of the hip: a comparison of the dislocation rate after anterior and lateral approaches to the hip. Annals of The Royal College of Surgeons of England. 1994; 76(5):327.
23. Schneider K, Audigé L, Kuehnel SP, Helmy N. The direct anterior approach in hemiarthroplasty for displaced femoral neck fractures. International orthopaedics. 2012; 36(9):1773-81.
24. Chulsomlee K, Sa-ngasoongsong P, Kulachote N, Sirisreetreerux N, Tuntiyatorn P, Vasaruchapong S *et al*. Hip muscle power recovery after hip replacement using anterior-based muscle-sparing approach in elderly femoral neck fracture: a prospective study in 40 patients. Orthopedic research and reviews. 2018; 10:31.