

A COMPARATIVE STUDY OF OUTCOME OF HEMIARTHROPLASTY DONE THROUGH DIRECT LATERAL (MOD. HARDINGE'S) APPROACH AND POSTERIOR (SOUTHERN MOORE'S) APPROACH OF HIP

Orthopaedics

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KEYWORDS

INTRODUCTION

Hip fractures in the elderly are a major public health concern. With a global incidence of 1.7 million hip fractures in 1990, this may reach 6.3 million in 2050.^[1] The treatment of hip fractures is based on the location of the fracture: intra and extra-capsular fractures.^[2] Intra-capsular fractures comprise around 60% of all hip fractures and up to 80% of these are displaced.^[3] Fracture displacement increases the risk of disruption to the femoral head blood supply and is thus associated with increased rates of AVN of femoral head, Non-union, Delayed union and failure of fracture fixation procedures.^[4] The current treatment guidelines for hip fractures advise that "displaced intra-capsular neck of femur fractures be treated with arthroplasty procedures".^[5] The introduction of unipolar prosthesis by Thompson in 1954 and Austin Moore in 1957 to replace the femoral head ushered in the era of hemiarthroplasty and as a standard treatment for neck of femur fractures.^[6] In 1974, Bateman introduced bipolar prosthesis to reduce the chance of acetabular erosion usually caused by the unipolar prosthesis.^[7]

Total hip arthroplasty is still not a popular treatment modality for neck of femur fracture in our country because majority of the patients do well with hemiarthroplasty and due to the high costs involved with THA. The procedure also has a higher occurrence of dislocations and higher morbidity as compared to hemiarthroplasty.^[8] Currently, the two most commonly used approaches for hemiarthroplasty to the hip are the lateral and the posterior approach.^[9] The lateral approach includes separating the gluteus medius and vastus lateralis insertions from the greater trochanteric insertion, which are attached after prosthesis implantation into their original position.^[10]

Both techniques hold their respective advantages and problems.^[11] The posterior approach is claimed to result in better regain of function as there is less damage to the hip muscles.^[12] Insufficiency of the hip abductors, limping, and outer aspect thigh pain has been seen with the lateral approach used for elective hip arthroplasties.^[13] The presence and the effect of gait disturbances caused by different surgical approaches in neck of femur fractures operated with hip arthroplasty have not been adequately reported in the literature.^[14]

The purpose of this study was to compare hip function in neck of femur fracture patients operated with cemented hemiarthroplasty using the direct lateral and posterior approach to the hip. We hypothesized that hemiarthroplasty done through both the approaches i.e. direct lateral (Mod. Hardinge's) approach and posterior (Southern Moore's) approach of hip are equally effective.

AIM AND OBJECTIVES

- To compare the outcome of hemiarthroplasty done through direct lateral (Mod. Hardinge's) approach and posterior (Southern Moore's) approach of hip in elderly population.
- To correlate the end result of my study with other similar type of studies and come to a conclusion.

MATERIALS AND METHODS

1. Type Of Study: Randomized controlled trial

2. Study Design: Prospective study

3. Study Area:

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4. Justification Of Sample Size:

Calculation of sample size assuming p value <0.05 to be significant and considering effect to be two sided, we get $Z\alpha = 1.96$; assuming power of study to be 90% we get $Z1-\beta = 1.28$; considering an effect size (difference in contralateral pelvic tilt 6 week post-operative) of 3.5 to be statistically significant we get $n > 2(Z\alpha + Z1-\beta)^2 \times SD^2/d^2$ we get $n = 28$. Hence minimum 28 patients will be taken in each group.

5. Study Period:

1st August, 2020- 31st March, 2022

6. Study Population:

INTRACAPSULAR NECK OF FRACTURE PATIENTS admitted in orthopaedic wards during the proposed period.

7. Sample Size: 58 (29 in each group)

8. Statistical Methods

Continuous variables are expressed as Mean, Median and Standard Deviation and compared across the groups using Mann-Whitney U test. Categorical variables are expressed as Number of patients and percentage of patients and compared across the groups using Pearson's Chi Square test for Independence of Attributes.

The statistical software SPSS version 22 has been used for the analysis. An alpha level of 5% has been taken, i.e. if any p value is less than 0.05 it has been considered as significant.

9.

I) Inclusion criteria: -

- Age above 60 years
- Intra-capsular neck of femur fractures
- Bipolar hemi-arthroplasty
- Operation done through the direct lateral (Modified Hardinge's) approach and the posterior (Southern Moore's) approach
- Follow up to 6 months

II) Exclusion criteria: -

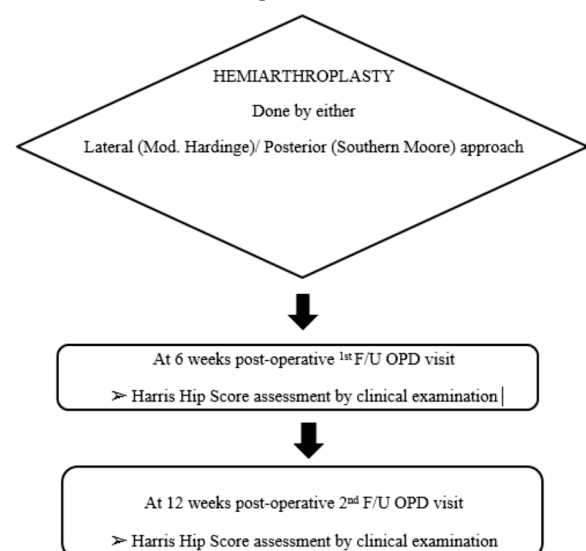
- Poly trauma case
- Having neuro- muscular and psychiatric illness
- Unipolar hemiarthroplasty, where expected life expectancy < 2 years
- Hemi-arthroplasty done through other rare approaches

10. Study Variables:

Age, Sex, Surgical approach used for HA (direct lateral or posterior)

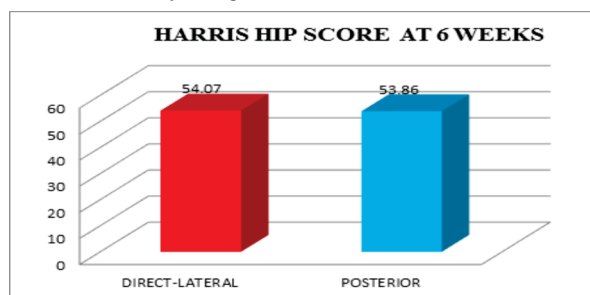
11. Outcome Variables: Harris Hip Score

1. Data Collection And Interpretation

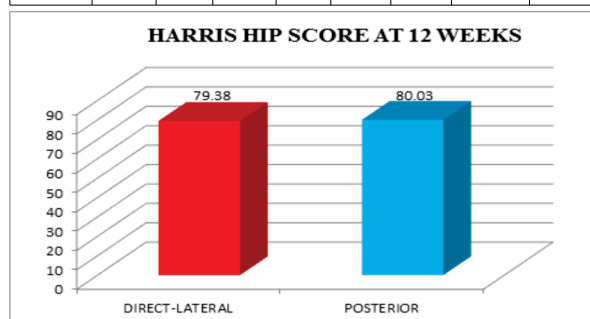


RESULT AND ANALYSIS

The HARRIS HIP SCORE at 6 weeks for the DLA group is higher (54.07) than the PA group (53.86) though at 12 weeks the HHS for the DLA group is lower (79.38) than the PA group (80.03) and that stands out to be statistically not significant.



	APPROACH USED FOR HROPLASTY							
	DIRECT-LATERAL			POSTERIOR				
	Mean	Median	Std. Deviation	Mean	Median	Std. Deviation	p Value	Significance
HARRIS HIP SCORE - AT 6 WEEKS	54.07	53.00	10.32	53.86	53.00	9.55	0.994	Not Significant
HARRIS HIP SCORE - AT 12 WEEKS	79.38	71.00	12.67	80.03	73.00	11.87	0.629	Not Significant



CONCLUSION

From the study we have found the HHS at 6 weeks for the PA group to be lower than that of the DLA group and finally at 12 weeks the PA group ended up with a higher HHS than the DLA group. However, the

difference is statistically not significant ($p < 0.05$). Also, we can strengthen the fact that a good repair of the posterior capsule and short external rotators while using PA can significantly reduce the dislocation rates. Similarly, detaching the gluteus medius insertion cautiously in accordance with the DLA can significantly reduce limp and lateral thigh pain in early post-operative period and thus will allow early rehabilitation and recovery. Increasing the sample size, the study period & the learning curve of the performing surgeon will help in yielding better study results and lesser bias.

List Of Abbreviations

AVN	Avascular Necrosis
DL	Direct Lateral
DLA	Direct Lateral Approach
F/U	Follow Up
HA	Hemi-Arthroplasty
HHS	Harris Hip Score
LTP	Lateral Trochanter Pain
MRI	Magnetic Resonance Imaging
PL	Posterolateral
PLA	Posterolateral Approach
PA	Posterior Approach
RCT	Randomized Controlled Trial
SD	Standard Deviation
THA	Total Hip Arthroplasty
THR	Total Hip Replacement
v/s	Versus

REFERENCES

- Moore AT. The self-locking metal hip prosthesis. JBJS. 1957 Jul 1;39(4):811-27.(9)
- Hardinge K. The direct lateral approach to the hip. The Journal of bone and joint surgery. British volume. 1982 Feb;64(1):17-9.(8)
- Foster DE, Hunter JR. The direct lateral approach to the hip for arthroplasty: advantages and complications. Orthopaedics. 1987 Feb 1;10(2):274-80.
- Cooper C, Campion G, Melton LJ. Hip fractures in the elderly: a world-wide projection. Osteoporosis international. 1992 Nov;2(6):285-9.(1)
- Court-Brown C, McQueen MM. Trauma management in the United Kingdom. The Journal of Bone and Joint Surgery. British volume. 1997 Jan;79(1):1-3.(2)
- Lorio R, Healy WL, Warren PD, Appleby D. Lateral trochanteric pain following primary total hip arthroplasty. The Journal of arthroplasty. 2006 Feb 1;21(2):233-6.(10)
- Parker MJ, Gurusamy KS. Internal fixation versus arthroplasty for intracapsular proximal femoral fractures in adults. Cochrane Database of Systematic Reviews. 2006(4).(4)
- Frihagen F, Grotle M, Madsen JE, Wyller TB, Mowinkel P, Nordsletten L. Outcome after femoral neck fractures: a comparison of Harris Hip Score, EQ-5D and Barthel Index. Injury. 2008 Oct 1;39(10):1147-56.
- Auffarth A, Resch H, Lederer S, Karpik S, Hitzl W, Bogner R, Mayer M, Matis N. Does the choice of approach for hip hemiarthroplasty in geriatric patients significantly influence early postoperative outcomes? A randomized-controlled trial comparing the modified Smith-Petersen and Hardinge approaches. Journal of Trauma and Acute Care Surgery. 2011 May 1;70(5):1257-62.
- Ftoun S, Morga A, Swift C. Management of hip fracture in adults: summary of NICE guidance. Bmj. 2011 Jun 21;342.(5)
- Ranawat CS, Meftah M, Potter HG, Ranawat AS. The posterior approach in THR: assuring capsular stability. Orthopedics. 2011 Sep 9;34(9):e452-5.
- Hongisto MT, Pihlajamäki H, Niemi S, Nuotio M, Kannus P, Mattila VM. Surgical procedures in femoral neck fractures in Finland: a nationwide study between 1998 and 2011. International orthopaedics. 2014 Aug;38(8):1685-90.
- Parker MJ. Lateral versus posterior approach for insertion of hemiarthroplasties for hip fractures: a randomised trial of 216 patients. Injury. 2015 Jun 1;46(6):1023-7.
- Balan B, Shetty SK, Shetty A, Chandran R, Mathias LJ. Displaced intra-capsular neck femur fractures in elderly: Austin Moore's prosthesis or Cemented Modular Bipolar Prosthesis. IntArch Integ Med. 2016;3:287-96.
- Sayed-Noor AS, Hanas A, Sköldenberg OG, Mukka SS. Abductor muscle function and trochanteric tenderness after hemiarthroplasty for femoral neck fracture. Journal of Orthopaedic Trauma. 2016 Jun 1;30(6):e194-200.
- Mukka S, Mahmood S, Kadum B, Sköldenberg O, Sayed-Noor A. Direct lateral vs posterolateral approach to hemiarthroplasty for femoral neck fractures. Orthopaedics & Traumatology: Surgery & Research. 2016 Dec 1;102(8):1049-54.(16)
- Kristensen TB, Vinje T, Havelin LI, Engesaeter LB, Gjertsen JE. Posterior approach compared to direct lateral approach resulted in better patient-reported outcome after hemiarthroplasty for femoral neck fracture: 20,908 patients from the Norwegian hip fracture register. Acta orthopaedica. 2017 Jan 2;88(1):29-34.(12)
- Svenoy S, Westberg M, Figved W, Valland H, Brun OC, Wangen H, Madsen JE, Frihagen F. Posterior versus lateral approach for hemiarthroplasty after femoral neck fracture: early complications in a prospective cohort of 583 patients. Injury. 2017 Jul 1;48(7):1565-9.(11)
- Panchal P, Patel C, Rao A. Study of early outcome of Austin Moore's prosthesis with bone cement in fracture neck femur in elderly. Int J Orthop Sci. 2017;3(3):221-6.
- Royal College of Physicians. National hip fracture database (NHFD) annual report 2017. London: RCP.(3)
- Hongisto MT, Nuotio MS, Luukkaala T, Väistö O, Pihlajamäki HK. Lateral and posterior approaches in hemiarthroplasty. Scandinavian Journal of Surgery. 2018 Sep;107(3):260-8.
- Fullam J, Theodosi P.G., Charity J, et al. A scoping review comparing two common surgical approaches to the hip for hemiarthroplasty. BMC Surg 19, 32 (2019)
- Chandrashekar HS, Akhil M, Chidanand KJ. A prospective study of functional outcome of intracapsular femur neck fractures treated with bipolar prosthesis. International Journal of Orthopaedics. 2020;6(1):1021-6.
- De Vries EN, Gardenbroek TJ, Ammerlaan H, Steenstra F, Vervest AM, Hogervorst M, van Velde R. The optimal approach in hip hemiarthroplasty: a cohort of 1009 patients. European Journal of Orthopaedic Surgery & Traumatology. 2020 May;30(4):569-73.
- Hoskins W, Bingham R, Lorimer M, Hatton A, de Steiger RN. Early rate of revision of

- total hip arthroplasty related to surgical approach: an analysis of 122,345 primary total hip arthroplasties. JBJS. 2020 Nov 4;102(21):1874-82.
26. Toi MC, van Beers LW, Willigenburg NW, Gosens T, Heetveld MJ, Willems HC, Bhandari M, Poolman RW. Posterolateral or direct lateral approach for hemiarthroplasty after femoral neck fractures: a systematic review. Hip International. 2021 Mar; 31(2): 154-65.(15)
27. Babu S, Desai T. Short to midterm functional outcome of unipolar uncemented hemiarthroplasty versus bipolar uncemented hemiarthroplasty in displaced fracture neck of femur in elderly individuals. International Journal of Orthopaedics. 2021;7(1):454-60.