



A COMPARATIVE STUDY OF TREATMENT OF UNSTABLE INTERTROCHANTERIC FRACTURES WITH PROXIMAL FEMORAL NAILING AND CEMENTED HEMIARTHROPLASTY IN ELDERLY PATIENTS

Surgery

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ABSTRACT

Introduction: Fractures of the Intertrochanteric region are some of the most common fractures encountered by an orthopaedic surgeon. With increase in life expectancy, the incidence of these fractures is also increasing. The incidence of hip fractures worldwide is estimated at 1.6 million. Hip fractures always cause short term and long-term complications and morbidities. Intertrochanteric fractures in osteoporotic bones with gross comminution are highly unstable and are associated with a high risk of morbidity and mortality.

Aim: To compare the clinical outcome in patients operated with proximal femoral nailing versus patients operated with cemented hemiarthroplasty in case of unstable intertrochanteric fractures of elderly patients.

Materials And Methods: This is a hospital based comparative study done in elderly patients of age 65 years and above with unstable intertrochanteric fractures being admitted in Apollo Hospitals, Bhubaneswar. Sample size had been determined on the basis of availability of the patients and was taken as 25 for proximal femoral nailing and 25 for cemented hemiarthroplasty on the basis of randomisation sampling method before March 2020. Patients were evaluated on the basis of clinical history, clinical examination, surgical and post-operative rehabilitation after taking proper consent.

Results: Cemented hemiarthroplasty for the unstable intertrochanteric fractures of the femur in elderly has good early clinical outcome on the basis of this study. In this study 6th month and 9th month harris hip score were significantly more in cemented hemiarthroplasty compared to proximal femur nailing which was statistically significant. Cemented hemiarthroplasty in unstable intertrochanteric fractures has a major advantage of allowing early mobilization, immediate weight bearing with walker, rapid rehabilitation, shorter hospital stay and early return to work so we believe that cemented bipolar hemiarthroplasty is of choice in freely mobile elderly patients above sixty five years of age with an intertrochanteric femoral fracture.

Conclusion: cemented bipolar hemiarthroplasty is of choice in freely mobile elderly patients above sixty five years of age with an intertrochanteric femoral fracture.

KEYWORDS

Unstable intertrochanteric fractures, complications, hemiarthroplasty and proximal femoral nailing.

INTRODUCTION

Fractures of the IT region are some of the most common fractures encountered by an orthopaedic surgeon. With increase in life expectancy, the incidence of these fractures is also increasing¹. By 2040, the incidence is expected to have doubled.² IT fractures account for approximately 45% to 50% of all hip fractures in the elderly 6 and out of these, 50% to 60% are classified as unstable.³ Unstable IT fractures are those having comminution of the posteromedial buttress, exceeding a simple lesser trochanteric fragment or those with subtrochanteric extension. Unstable IT fractures are a major cause of concern in the elderly due to the associated increase in morbidity and mortality.

The goal of treatment is restoring mobility safely and efficiently, while minimizing the risk of medical complications and technical failure. Restoration of mobility depends on the quality of bone and the type of implant used. The incidence of failure with unstable IT fractures is as high as 50%⁷ and the cut out rate can be as high as 8% for hip screws. Publications in the last two decades have suggested that the use of prosthetic replacement or PFN for unstable IT fractures have allowed early postoperative mobilization and prevents excessive collapse at fracture site. Patients can return to their preinjury level of activity much earlier by treatment with either of these modalities; thus, eliminating the postoperative complications caused by prolonged immobilization or implant failures.⁴

The purpose of this study was to primarily compare functional recovery in patients with unstable IT fractures of femur treated with Cemented Hemiarthroplasty or Proximal Femoral Nailing using Harris hip score. The secondary objective was to compare intraoperative and postoperative parameters of patients in all the groups.

Aims And Objectives

Aim:

To compare the clinical outcome in patients operated with proximal femoral nailing versus patients operated with cemented hemiarthroplasty in case of unstable intertrochanteric fractures of elderly patients.

Objectives:

- I. To compare the clinical outcome in patients operated with proximal femoral nailing versus patients operated with cemented hemiarthroplasty in case of unstable intertrochanteric fractures of elderly patients on the basis of hospital stay, amount of perioperative blood loss and fluoroscopy time.
- ii. To compare radiological and functional outcome in patients operated with proximal femoral nailing versus patients operated with cemented hemiarthroplasty in case of unstable intertrochanteric fractures in elderly patients on the basis of HARRIS HIP SCORE and DURATION OF AMBULATION at 6 months, 9 months and 1 year post-operative.

MATERIALS AND METHODS

Study Site:

Orthopaedic department, Apollo Hospitals, Bhubaneswar.

Study Population:

The elderly patients with unstable intertrochanteric fractures getting admitted in Apollo Hospitals, Bhubaneswar.

Study Design:

This is a hospital based comparative study. Chi-square test (χ^2 test) and t-test has been used for statistical analysis.

Sample Size & Justification

This is a hospital based comparative study. The sample size had been determined on the basis of availability of the patients. The sample size was taken as 25 for proximal femoral nailing and 25 for cemented hemiarthroplasty on the basis of randomisation sampling method.

Inclusion Criteria

- Male/Female patients,
- Age 65 years and above, fresh/old fractures,
- Unstable intertrochanteric fracture of femur (Evans type III and type IV)

Exclusion Criteria

Patients who had stable intertrochanteric fracture i.e. Evans type I and

type II, compound fractures, pathological fractures, fracture neck of femur, sub trochanteric fractures and severe co-morbid conditions like vulvular heart disease, heart failure, morbid obesity, respiratory distress and acute renal failure were excluded from the study.

Statistical Analysis:

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS 24.0. and Graph Pad Prism version 5. A chi-squared test (χ^2 test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate. p -value ≤ 0.05 was considered for statistically significant.

RESULT & DISCUSSION

This study was done in elderly patients of age 65 years and above with unstable intertrochanteric fractures being admitted in Apollo Hospitals, Bhubaneswar. Sample size had been determined on the basis of availability of the patients and was taken as 25 for proximal femoral nailing and 25 for cemented hemiarthroplasty on the basis of randomisation sampling method before March 2020. Patients were evaluated on the basis of clinical history, clinical examination, surgical and post-operative rehabilitation after taking proper consent.

Our study showed that in group cemented hemiarthroplasty, all 25(100.0%) patients had pain on clinical examination. In group proximal femur nailing, all 25 (100.0%) patients had pain on clinical examination. In group cemented hemiarthroplasty, 25(100.0%) patients had swelling on clinical examination. In group proximal femur nailing, 25 (100.0%) patients had swelling on clinical examination. In group cemented hemiarthroplasty, all 25 (100.0%) patients had operated under spinal, epidural block anaesthesia. In group proximal femur nailing, all 25 (100.0%) patients had been operated under spinal anaesthesia. Association of type of anaesthesia vs surgery done was statistically significant ($p < 0.0001$). In group cemented hemiarthroplasty, 25(100.0%) patients had antibiotic prophylaxis. In group proximal femur nailing, 25 (100.0%) patients had antibiotic prophylaxis. In group cemented hemiarthroplasty, 25(100.0%) patients had static quadriceps pod 1. In group proximal femur nailing, 25 (100.0%) patients had static quadriceps pod 1. In group cemented hemiarthroplasty, 25(100.0%) patients had static quadriceps pod 2.

Song WD et al⁵ (2010) found that no statistical differences were observed in terms of hospitalization duration, ambulation time, postoperative complications and postoperative hip function between two groups ($P > 0.05$); intraoperative bleeding and operation time in PFNA fixation group were superior over prosthetic replacement group ($P < 0.05$). Both the PFNA fixation and prosthetic replacement have good clinic curative effects in treatment of femoral intertrochanteric fracture in the elderly, but PFNA fixation has advantages on the reduction of operation time and intraoperative bleeding.

Bassiony AA et al⁶ (2013) showed that only 24 patients were available for evaluation. The mean follow-up period was 22 months (range, 18–36 months). At the last follow-up, the mean Harris hip score was 85 points. Radiologically, all stems were stable, without significant changes in alignment or progressive subsidence. No infection or thromboembolic complications were encountered. Cemented bipolar hemiarthroplasty with calcar replacement is a good option for unstable intertrochanteric fractures in the elderly. It allows early weight bearing and rapid return to prefracture activity and does not have the difficulty and complications of internal fixation of this complex fracture.

Li M et al⁷ (2014) showed that the neck shaft angle was $134^\circ \pm 15^\circ$ (range, 115° – 150°), and the fracture healing time was 14.0 ± 2.5 weeks (range, 11–19 weeks). The Harris hip score was 85.6 ± 17.5 points (range, 65–100 points) and included 41 excellent cases (25.15%), 92 good cases (56.44%), 26 moderate cases (15.95%), and 4 poor cases (2.45%) for a positive outcome rate of 81.60%. There were no varus hip deformities, screw cutouts, or femoral shaft fractures. Fourteen patients had thigh pain (9.82%), and five had inner thigh pain (3.07%); seven had more severe pain that was improved by physical therapy. PFNA-II has the advantages of a simple operation, few complications, and clinical efficacy for the treatment of intertrochanteric fractures. However, evaluation of its long-term efficacy and risk of other

complications requires a large-sample, multicenter observational study.

We showed that in group proximal femur nailing, 25 (100.0%) patients had static quadriceps pod 2. In group cemented hemiarthroplasty, 25(100.0%) patients had static quadriceps pod 15. In group proximal femur nailing, 25 (100.0%) patients had static quadriceps pod 15. In group cemented hemiarthroplasty, 25(100.0%) patients had assisted knee rom pod 1. In group proximal femur nailing, 25 (100.0%) patients had assisted knee rom pod 1. In group cemented hemiarthroplasty, 25(100.0%) patients had assisted knee rom pod 2. In group proximal femur nailing, 25 (100.0%) patients had assisted knee rom pod 2. In group cemented hemiarthroplasty, 25(100.0%) patients had assisted knee rom pod 15. In group proximal femur nailing, 25 (100.0%) patients had assisted knee rom pod 15. In group cemented hemiarthroplasty, 25(100.0%) patients were walking with walker pod 1. Association of walking with walker pod 1 vs surgery done was statistically significant ($p < 0.0001$). In group cemented hemiarthroplasty, 25(100.0%) patients were walking with walker pod 2. Association of walking with walker pod 2 vs surgery done was statistically significant ($p < 0.0001$). In group cemented hemiarthroplasty, 25(100.0%) patients were walking with walker pod 15. In group proximal femur nailing, 25 (100.0%) patients had walking with walker pod 15. In group cemented hemiarthroplasty, 25(100.0%) patients had mild pain in follow up 6th month. In group proximal femur nailing, 25 (100.0%) patients had mild pain in follow up 6th month. In group cemented hemiarthroplasty, 25(100.0%) patients had mild pain in follow up 9th month. In group proximal femur nailing, 25 (100.0%) patients had mild pain in follow up 9th month.

Jolly A et al⁸ (2019) conducted 50 patients underwent CRIF with PFN and 50 patients were treated with primary cemented hemi replacement arthroplasty with bipolar prosthesis. Harris Hip score analysis revealed that the difference between the patients treated with cemented hemiarthroplasty and proximal femoral nailing was statistically significant in favour of the hemiarthroplasty group within the first 3 months. However, this difference diminished at the 6th month time point and reversed at the 12 month time point indicating a better functional outcome of Proximal Femur Nail in the long term. Although cemented hemireplacement arthroplasty allows early pain free mobilization and has a good short term outcome, over time it is associated with a variety of complications which significantly affects quality of life of patients. On the other hand, although patients treated with PFN had delayed post op mobilization, they had better results when followed up at 1 year post surgery.

Sahoo PK et al⁹ (2015) showed that out of 70 patients, independent full weight bearing and return to pre-fracture activity levels was early in arthroplasty group i.e. 1.2($p < 0.001$) and 5.4($p < 0.01$) weeks respectively as compared to PFN group i.e. 8.2 and 10.2 weeks respectively was significantly earlier in patients with bipolar arthroplasty group. Postoperative complications were lower in the arthroplasty group. Hip scores at 3 months in arthroplasty and PFN group was 80.55 and 68.89($p < 0.001$); at 24 months, 86.46 and 75.91($p < 0.01$) respectively. Primary cemented hemiarthroplasty in unstable elderly hip fractures is reliable, technically simple and a safe procedure. It has a major advantage of allowing early mobilisation, immediate full weight bearing, rapid rehabilitation, shorter hospital stay and early return to work. Cemented arthroplasties are advantageous in non-union and high risk patients suffering from psychiatric illness in preventing peri-prosthetic dislocations and fractures.

Our study showed that in cemented hemiarthroplasty group, the mean duration of surgery (mean $\pm$ s.d.) Of patients was 127.4400 ± 10.5873 . In proximal femur nailing group, the mean duration of surgery (mean $\pm$ s.d.) Of patients was 90.3200 ± 8.8021 . Distribution of mean duration of surgery with surgery done was statistically significant ($p < 0.0001$). In cemented hemiarthroplasty group, the mean 6th month harris hip score (mean $\pm$ s.d.) Of patients was 74.8700 ± 1.0097 . In proximal femur nailing group, the mean 6th month harris hip score (mean $\pm$ s.d.) Of patients was 70.2660 ± 1.0192 . Distribution of mean 6th month harris hip score with surgery done was statistically significant ($p < 0.0001$). In cemented hemiarthroplasty group, the mean 9th month harris hip score (mean $\pm$ s.d.) Of patients was 83.1360 ± 1.0036 . In proximal femur nailing group, the mean 9th month harris hip score (mean $\pm$ s.d.) Of patients was 78.2180 ± 1.0192 . Distribution of mean 9th month harris hip score with surgery done was statistically significant ($p < 0.0001$). In cemented hemiarthroplasty group, the mean

12th month harris hip score (mean± s.d.) Of patients was 92.6180±1.1450. In proximal femur nailing group, the mean 12th month harris hip score (mean± s.d.) Of patients was 92.2940±1.1118. Distribution of mean 12th month harris hip score with surgery done was statistically significant (p=0.3152).

Ahmed E et al¹⁰ (2012) showed that the Harris Hip Score ranged from 93 to 51 with a mean value 78.19. Four cases (9.76%) were excellent (91 - 100), 16 cases (39.02%) good (81 - 90), 16 cases (39.02%) fair (71 - 80) and 5 cases (12.02%) poor (≤70). Six cases had complications; infection (1), dislocation (1), stem loosening and subsidence (2), bleeding peptic ulcer (1) and intra-operative crack of the femur while preparing the femoral canal for implant insertion (1). Five patients died within the first year (12.19%). Four patients had revision surgery. Conclusion: Bipolar hemiarthroplasty for the unstable intertrochanteric fractures of the femur in elderly has good early clinical outcome. It is to be considered as one of the treatment options for such injury speciality in case of fragility fractures.

Minghui LI et al¹¹ (2013) conducted that the average hip Harris score was (86.5± 19.5) points (65-100 points). Among them, 29 cases (22.83%) were excellent, 76 cases (59.8%) were good, 20 cases (15.7%) were moderate, 2 cases (1.6%) were poor. Totally, excellent and good rate was 82.7%. No complications including hip varus deformity, screw cut-out and femoral shaft fractures were found. There were 14 patients (11.0%) with thigh pain and 5 patients (3.9%) with inner thigh pain. The heavier pain in 4 patients was improved by physical therapy. Asian PFNA-II has advantages including simple operation, fewer complications, and better clinical efficacy for the treatment of intertrochanteric fractures, but its long term efficacy and complications still need a large sample and multi-center observation.

CONCLUSION

We found that higher age group patients were in cemented hemiarthroplasty compared to proximal femur nailing which was statistically significant.

Majority of the patients with Diabetes and hypertension were treated with cemented hemiarthroplasty compared to proximal femur nailing which was statistically significant.

It was found that duration of surgery was higher in cemented hemiarthroplasty compared to proximal femur nailing which was statistically significant.

It was found that amount of blood loss was higher in cemented hemiarthroplasty compared to proximal femur nailing which was statistically significant.

In this study 6th month and 9th month harris hip score were significantly more in cemented hemiarthroplasty compared to proximal femur nailing which was statistically significant but there was no statistically significant difference in 12th month harris hip score in two groups.

Cemented hemiarthroplasty for the unstable intertrochanteric fractures of the femur in elderly has good early clinical outcome. It is to be considered as one of the treatment options for such injury especially in case of fragility fractures.

According to our results, we believe that cemented bipolar hemiarthroplasty is of choice in freely mobile elderly patients above sixty five years of age with an intertrochanteric femoral fracture.

Table: Association Between Clinical Examination Pain And Type Of Anaesthesia: Surgery Done

		CEMENTED HEMIARTH ROPLASTY	PROXIM AL FEMUR NAILING	TOTAL	Chi- square value	p- value
Clinical Examina tion Pain	PRESE NT	25 Row % 50.0 Col % 100.0	25 50.0 100.0	50 100.0 100.0		
	TOTAL	25 Row % 50.0 Col % 100.0	25 50.0 100.0	50 100.0 100.0		

Type Of Anaesth esia	SPINAL Row % Col %	0 0.0 0.0	25 100.0 100.0	25 100.0 50.0	50.000 0	<0.00 01
	SPINAL ,EPIDU RAL BLOCK	25 Row % Col %	0 0.0 0.0	25 100.0 50.0		
	TOTAL	25 Row % Col %	25 50.0 100.0	50 100.0 100.0		

Table: Distribution Of Mean 6th Month Harris Hip Score And 9th Month Harris HIP Score: Surgery Done

		Num ber	Mean	SD	Mini mum	Maxi mum	Medi an	p- value
6 th Month Harris HIP Score	CEMEN TED HEMIAR THROPL ASTY	25	74.870 0	1.00 97	74.200 0	78.700 0	74.60 00	<0.0001
	PROXIM AL FEMUR NAILIN G	25	70.266 0	1.01 92	69.050 0	71.900 0	70.65 00	
9 th Month Harris HIP Score	CEMEN TED HEMIAR THROPL ASTY	25	83.136 0	1.00 36	80.800 0	84.850 0	82.80 00	<0.0001
	PROXIM AL FEMUR NAILIN G	25	78.218 0	1.01 92	74.700 0	78.700 0	78.60 00	

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