e-ISSN: 0975-1556, p-ISSN:2820-2643
Available online on www.ijpcr.com
International Journal of Pharmaceutical and Clinical Research 2024; 16(4); 842-845

Original Research Article

Outcome of Primary Cemented Bipolar Hemiarthroplasty compared with Internal fixation in Elderly Patients with Unstable Intertrochanteric Fracture

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Received: 27-02-2024 / Revised: 24-03-2024 / Accepted: 18-04-2024
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Conflict of interest: Nil

Abstract:

Introduction: Optimal therapy for unstable intertrochanteric fractures in elderly people is difficult owing to difficult anatomical reduction, low bone quality, and delayed weight bearing. The current study was designed to examine the outcome of internal fixation in comparison to primary cemented bipolar (PCB) hemiarthroplasty in elderly patients with unstable intertrochanteric fractures.

Materials and Methods: The study comprised 50 adult patients with intertrochanteric fractures who were treated in a tertiary care center. Patients were separated into two groups. Primary hemiarthroplasty was performed in 25 patients (group A), while internal fixation was performed in 25 patients (group B). The primary outcome indicators included post-operative mortality, comorbidities, and functional outcomes.

Results: The majority of patients who underwent hemiarthroplasty began full weight bearing at the end of the first week after surgery, whereas patients who underwent fixation began full weight bearing at the end of the seventh week, which was significant. The mean Harris Hip Score 12 weeks after surgery was 83.86 for the hemiarthroplasty group and 72.12 for the fixation group, which was significant. Postoperative complications were greater in Group B compared to Group A.

Conclusion: Primary cemented bipolar hemiarthroplasty outperformed internal fixation in terms of lower complication rate and functional outcome.

Keywords: Unstable Intertrochanteric Fractures, Internal Fixation, Hemiarthroplasty.

Introduction

Intertrochanteric fractures are among the most common hip fractures in the elderly, and they are mainly caused by low-energy trauma.[1] It contributes for up to 48 percent of all hip fractures.[2] These fractures are associated with high morbidity and mortality, mechanical difficulties, and a significant financial burden for patients and their families.[3,4] Osteosynthesis is an easy and predictable way to heal stable fractures. However, the treatment of unstable intertrochanteric. Fractures in older individuals provide a challenge due to the difficulties of getting anatomical reduction and the higher rates of morbidity and death [5,6].

Internal fixation has been the preferred treatment of unstable intertrochanteric fractures in older individuals for several decades. Many investigations have demonstrated mechanical and technical failures with this form of treatment.[7-9] Treatment with primary cemented bipolar hemiarthroplasty may accelerate the resumption of activity in these cases while lowering postoperative morbidity due to immobilization or fixation failure.[10] The purpose of our study was to evaluate the outcome of primary cemented bipolar hemiarthroplasty in elderly patients diagnosed with unstable inter trochanteric femur fracture.

Materials and Methods:

This is a prospective hospital-based study conducted at a tertiary care hospital for a period of

18 months after approval from institutional ethical committee. A total of 50 patients with unstable intertrochanteric fractures were included in the study group after obtaining consent to compare the outcomes of primary cemented hemi-arthroplasty versus internal fixation in treatment of elderly unstable hip fractures

Inclusion criteria: Male or Female patients, older than 60years, fresh/old fractures, any etiology, unstable Intertrochanteric fracture of femur (Evans type III and type IV.

Exclusion criteria: Patients who were unfit for surgery, not willing for surgery, treated conservatively, had stable intertrochanteric fracture i.e. Evans type I and type II, compound fractures, pathological fractures, fracture neck of femur and sub trochanteric fractures.

The study population (n=50) was divided into two groups of 25 patients each using a computer-generated random number sequence generated by someone who was not involved in the surgical operation. Group A (n=25) underwent hemi-arthroplasty, while Group B (n=25) received internal fixation (dynamic hip screw and proximal femoral nail). All surgical procedures were done by the same surgical team that was blinded to the randomization process.

Dynamic hip screw (DHS): The lag screw was inserted following reduction on the traction table using a direct lateral femoral approach with vastus lateralis reflection, and its location was confirmed with a C-arm. The tip-apex distance (TAD) was considered and found to be within acceptable limits. A side plate was then affixed to the femoral shaft using cortical screws. The gadget utilized was manufactured by SH Pitkar Orthotools Pvt Ltd in Pimpri-Chinchwad, India.

Proximal femoral nail (PFN): On the traction table, a small incision was made above the greater trochanter, through the trochanteric entry and under C-arm viewing. Canal opening and serial reaming were completed, and the size and length of the proximal femoral nail (PFN) were determined. Intramedullary nailing (IMN) was performed by inserting two proximal lag screws through a handle (jig) and then applying two distal locking screws. The outcome was examined using the C-arm. The equipment utilized was manufactured by MJ surgical in Ahmedabad, Gujarat, India.

PCB Hemiarthroplasty: All arthroplasties were carried out using the lateral Hardinge technique in the decubitus position. The head and bone fragments were removed, but the greater trochanter remained. In three cases, the severely fractured calcar was removed and rebuilt with cement (Figure 3); however, the lesser trochanter was not removed. The greater trochanter was then reattached with cerclage wire, and a cemented bipolar prosthesis was fitted. The implant utilized was the LINK SP II hip prosthesis manufactured by Waldemar Link in Hamburg, Germany.

Post-operative Protocol: Patients in the bipolar arthroplasty group were able to walk full weight bearing on the second postoperative day with the assistance of a physiotherapist. Patients in the internal fixation group were ambulated non-weight bearing on the second postoperative day and eventually proceeded to partial then full weight bearing based on intraoperative bone fixation quality and bone healing on follow-up radiographs. Clinical radiological examination: Following hospital discharge, patients in both groups were followed at six, twelve months, and 24 months for radiological control and functional evaluation using the Harris Hip score at each visit

Data analysis: The acquired data were analyzed using the Statistical Package for Social Sciences (version 21). The t-test was employed to determine whether there was a significant difference between all numerical parameters in the study's two surgery groups. P-values < 0.05 indicated statistical significance.

Results

in group-A, average age was72.6 years with 11 men and 14 women.12 patients had Evans III and 13 had Evans IV fracture type. In group-B, average age was 71.4 years with 12 men and 13 women.11 patients had Evans III and 13 had Evans IV fracture type as shown in Table.1.

Table 1: Demographic and clinical data

variable	Group A (n=25) Hemiarthroplasty	Group B (n=25) Internal fixation
Mean age (years)	72.6	71.4
Sex (M/f)	11/14	12/13
Fracture type (no. of patients) Evans III Evans IV	 12 13	 11 13
Comorbidities (n): DM:HTN:COPD	 9:10:2	 10:9:1

Postoperative complications were higher in Group B than Group A as shown in Table 2

Table 2: Postoperative complications

complication	Group A (n=25) Hemiarthroplasty	Group B (n=25) Internal fixation
Infection Deep Superficial	4 2.8 1.2	16.6 6.4 10.2
Deep venous thrombosis	2.4%	5.2%
Bedsore	6.4%	7.4%
Cutout	0	10.5%
Delayed union	0	2.6%
Dislocation	1.5%	0
Non-union	0	2.4%
Malunion		
Varus malunion	0	7.5%
Medialization	0	4.6%
Mortalility	15.6	14.9

Most patients who underwent hemiarthroplasty started full weight bearing at the end of the first week postoperatively, while patients who underwent fixation started full weight bearing at the end of 7th week post-operatively which was significant. The mean Harris Hip Score at 12 weeks post-operatively was 83.86 for the hemiarthroplasty group and 72.12 for the fixation group which was significant as shown in Table 3

Table 3: Functional Outcomes

variable	Group A (n=25) Hemiarthroplasty	Group B (n=25) Internal fixation	p value
Mean time to full weight bearing (weeks)	1.3±0.3	7.9±1.3	0.002*
Harris Hip score (100) 3 months 12 months 24 months	 81.43±7.53 83.86±7.23 85.92±8.64	 69.64±7.24 72.12±7.76 74.98±8.12	 0.001* 0.01* 0.003*

*significance

Discussion

Intertrochanteric fractures in elderly osteoporotic patients are difficult to treat and have an elevated risk of morbidity and mortality. The goal of treating these fractures is to provide a solid fixation and early mobilization, allowing for an early return to regular activities. [11]

The current study displayed superior results with hemiarthroplasty than with internal fixation for the treatment of unstable hip fracture in elderly patients, in terms of clinical and functional outcomes. Partial and full weight bearing began early in the hemiarthroplasty group, as observed in previous studies by Huang and Yee [12] and Kayali et al.[13] Liang et al.[14] concluded in their study that hemiprosthesis is a successful technique for reducing morbidity, death, and the cumulative financial burden of the patient's family.

Kayali et al.[13] found a one-year mortality rate of 24% in the hemiarthroplasty group and 16% in the fixation group. In their systematic evaluation, Parker et al.[15] observed 18 against 14 cases of mortality in arthroplasty versus fixation, respectively; Bonnevialle et al.[16] reported 21% versus 21.2% three-month mortality in both groups.

The Harris hip scores were considerably higher in the bipolar arthroplasty group compared to the PFN group at 3 months, 12 months, and 24 months, which was consistent with other published studies. [17,18]

Conclusion

Primary cemented bipolar hemiarthroplasty for the treatment of unstable intertrochanteric fractures in older individuals appears to be a safe and successful technique, with earlier ability to bear full body weight, lower failure rates, and a better functional outcome. Bipolar hemiarthroplasty shows good results compared to internal fixation in elderly patients.

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