

FUNCTIONAL OUTCOME OF HEMIARTHROPLASTY IN INTERTROCHANTERIC FEMUR FRACTURE

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**Abstract**

Background: Managing unstable osteoporotic intertrochanteric femur fractures poses significant challenges due to poor bone quality and intricate reduction procedures. Internal fixation in these cases often leads to complications arising from prolonged immobility. This study aims to assess the outcomes of hemiarthroplasty in the treatment of unstable intertrochanteric femur fractures. The objective is to evaluate the functional outcomes of hemiarthroplasty in patients with unstable intertrochanteric femur fractures using the Harris Hip Score. **Materials and Methods:** A comprehensive retrospective and prospective analysis was conducted on 44 patients diagnosed with unstable intertrochanteric femur fractures. Fractures were categorized according to the AO/OTA and Evans classification systems, and patients were treated with Cemented Bipolar prostheses. **Result:** Among the 44 patients, 28 (63.6%) were females and 16 (36.4%) were males. The most affected age group was 71-90 years, predominantly among females. The most prevalent fracture types were Evans type 3 and 4, and AO/OTA 31 A-2.2/2.3. Based on the Harris Hip Score Functional assessment, the results showed 45% excellent outcomes, 35% good outcomes, and 20% fair outcomes. No poor outcomes were observed. **Conclusion:** Primary bipolar hemiarthroplasty yields favourable functional outcomes, as indicated by the Harris Hip Score, in elderly patients with unstable osteoporotic intertrochanteric femur fractures. Nevertheless, long-term follow-up is essential to assess the sustainability of these results.

INTRODUCTION

The incidence of intertrochanteric fractures of the femur is on the rise among the elderly population, constituting 45% of all hip fractures. These fractures significantly contribute to morbidity and mortality in the elderly. Intertrochanteric fractures can be broadly classified into stable and unstable types, with instability exacerbated in older adults due to issues such as osteoporosis and comminution.^[1,2]

Traditionally, the treatment goal for intertrochanteric femur fractures in the elderly was early mobility and reducing complications arising from prolonged immobilization. Historically, conservative approaches involved extended bed rest in traction for at least 12 weeks. However, this method led to complications like bedsores, urinary tract infections, pneumonia, and thromboembolic events, resulting in high morbidity and mortality. Furthermore, fracture-related complications such as malunion and shortening impeded patient ambulation.^[3,4]

As a response, treatment strategies shifted towards fixation methods involving devices like dynamic hip screws and Jewett nail plates, particularly effective for stable fractures. However, managing unstable intertrochanteric fractures in elderly patients posed

challenges due to difficulties in achieving anatomical reduction and prolonged healing times, delaying patient mobilization.^[5,6]

Osteoporosis exacerbates these challenges by altering bone composition, thinning cortical bone, reducing cancellous bone mineral density, and altering trabecular patterns, compromising implant fixation. Comminuted fractures in cancellous areas present further difficulties in fragment fixation, especially in regions with posteromedial voids, rendering internal fixation ineffective.^[7,8]

These patients often face prolonged limitations in weight-bearing due to comminution, osteoporosis, and instability. In an attempt to facilitate rapid mobilization, permit early weight-bearing, and avoid immobilization-related complications, hemiarthroplasty has emerged as a viable treatment option for unstable intertrochanteric fractures.^[9,10]

The objective of this study is to assess whether hemiarthroplasty stands as the preferred treatment for elderly patients with unstable intertrochanteric fractures. This evaluation aims to decrease both mortality and morbidity while also investigating post-hemiarthroplasty mobilization times and associated complications.^[11,12]

MATERIALS AND METHODS

This study, conducted between February 2019 and January 2020. The study included 44 patients with unstable intertrochanteric fractures, selected based on specific criteria.

Inclusion Criteria

- Patients aged over 50 years
- Patients of any gender
- Patients with comminuted and unstable intertrochanteric femur fractures
- Patients able to ambulate prior to the fracture
- Patients with trochanteric fractures and previous failed internal fixation

Exclusion Criteria

- Patients with stable intertrochanteric femur fractures
- Patients below 50 years of age
- Patients with compound intertrochanteric femur fractures
- Patients medically unfit for surgery and anaesthesia
- Cases involving pathological fractures

The patients underwent initial evaluation, with diagnosis based on careful clinical examination and routine X-Rays (postero-anterior and lateral views). Fractures were classified according to AO/OTA and Evans Classification. Treatment involved the use of cemented bipolar prostheses. A standard Moore's posterior approach was employed, performed by a senior surgeon. Calcar reconstruction was conducted when necessary, and trochanteric wiring was performed in 80% of cases. Bed exercises focusing on glutei, hamstrings, and quadriceps commenced the day after surgery.

Breathing exercises began on the following day, and patients were encouraged to ambulate with weight-bearing as tolerated on the affected lower limb using a walker from the first post-operative day. Drain removal occurred 48 hours after surgery, with post-operative dressing on the 2nd and 5th days. Suture removal took place 12 days after surgery.

Clinical, radiological, and functional evaluations were conducted at 6 weeks, 12 weeks, 6 months, 9 months, and 1 year post-surgery. The assessments

were based on the Harris Hip Score to evaluate the outcomes.

RESULTS

This study focused on 44 cases of unstable intertrochanteric femur fractures treated primarily with bipolar hemiarthroplasty, employing mostly cemented prostheses.

The majority of unstable intertrochanteric fractures occurred in the 7th-9th decades of life, with females being more affected than males. The age range varied from 57 to 100 years, with a mean age of 79.54 years. Female patients constituted 63.4% of the cases, outnumbering males at 36.6%. Left-sided fractures were more prevalent, accounting for 59.1% of cases. Slip and falls at home were the most common cause of injury in this study, followed by failed trochanteric fixation. Approximately 50% of the cases belonged to types 31 A2.2 and 31 A2.3, both of which were predominantly unstable intertrochanteric fractures according to Evans classification. Most patients suffered from osteoporotic fractures, all of which were comminuted in nature.

Out of the 44 cases, 40 were treated with cemented bipolar prostheses, and the remaining 4 cases received cemented modular bipolar prostheses. Surgical procedures were carried out using the Moore's posterior approach, with a higher proportion of patients residing in urban areas compared to rural regions. Hypertension was the most common associated comorbidity, followed by diabetes mellitus.

In terms of postoperative mobility, 54.5% of cases achieved full weight-bearing walking with walker support by the third day, with an average mobilization day of the fourth day post-surgery. Functional outcomes were evaluated using the Harris hip score at 6 weeks, 3 months, 6 months, and 1 year follow-ups.

After one year, the Harris hip score evaluation revealed 14 patients with excellent results, 18 patients with good results, and 8 patients with fair results. Remarkably, 80% of the patients demonstrated well to excellent results according to the Harris hip score, aligning with outcomes observed in most comparable studies.

Table 1: Distribution of patients according to mean Harris Hip Score at 6 weeks, 3 months, 6 months, 9 months and 12 months

Time interval	No	Harris Hip Score (Mean ± SD)	't' Value	P Value
6 weeks	44	80.41 ± 4.26	-10.247, df=20	0.000*
3 months	42	82.52 ± 4.75		
3 months	42	82.52 ± 4.75	-4.056, df=19	0.001*
6 months	40	83.50 ± 5.02	-5.480, df=19	0.000*
6 months	40	83.50 ± 5.02		
9 months	40	84.90 ± 5.17	-6.096, df=18	0.000*
9 months	40	84.90 ± 5.17		
12 months	38	86.53 ± 5.73		

Paired 't' test applied. *P value < 0.05 was taken as statistically significant

However, there were two complications noted in this study. One patient experienced a periprosthetic

fracture, which was successfully treated with a locking compression plate. The second patient

developed a superficial infection, managed effectively with intravenous antibiotics and regular dressing.

DISCUSSION

Managing intertrochanteric fractures in the elderly presents unique challenges. In this age group, fractures tend to be comminuted, with prevalent osteoporosis complicating implant placement and fixation stability. Achieving bony union requires prolonged immobilization. Simultaneously, these patients often need rapid mobilization due to compromised health and psychomotor skills, creating a delicate balance between early mobility and implant stability.^[13]

Geriatric patients frequently suffer from compromised mobility due to underlying medical conditions. Paradoxically, these are the same patients plagued by osteoporosis and severe comminution, making achieving rigid fixation nearly impossible. Such patients, unable to engage in graded or protected weight-bearing, face risks associated with implant failure until the fracture heals. Consequently, balancing the need for early mobilization against the necessity of hip protection for union is vital.^[14]

We contend that employing primary hemiarthroplasty in a carefully selected group of physiologically elderly patients with compromised general health, osteoporosis, and comminuted fractures offers a solution. This approach effectively bypasses the phase of fracture healing, providing immediate stability, mobility, and pain relief. This eliminates the need for prolonged immobilization, enabling early ambulation. It circumvents the dilemmas associated with internal fixation, where the conflict between early mobilization and hip protection for union often leads to complications and implant failures.

In our study, the majority of patients fell within the 71-90 years age group, consistent with other research. Females were notably more affected, with slip and fall at home being the primary cause, possibly due to the fragility of osteoporotic bones. The left side was predominantly affected, and hypertension emerged as the most common comorbidity, aligning with similar findings in other studies.

Our classification of fractures using AO/OTA and Evans criteria, especially grouping fractures as unstable types, simplifies the categorization for better analysis. The postoperative mobility achieved in our patients, with most walking with full weight-bearing support by the 3rd day, showcases the effectiveness of this approach. The results at the end of one year, assessed through Harris hip score, were promising, with 80% of patients exhibiting good to excellent outcomes, comparable to other studies.

Comparing our findings with existing literature, our results align with similar studies, reinforcing the efficacy of primary hemiarthroplasty in managing unstable intertrochanteric fractures in the elderly.

This approach not only addresses the conflicting demands of early mobilization and implant stability but also provides consistent and favourable functional outcomes in this challenging patient population.

Complications:

In our study, we encountered 4 complications. Two patients experienced a periprosthetic fracture six weeks post-surgery. Prompt intervention involved open reduction and internal fixation using a locking compression plate. The patient remained non-weight bearing for six weeks. Subsequent assessments revealed union of the fracture, although the patient's outcome at the one-year mark was categorized as fair according to the Harris hip score.

Two complications involved a superficial infection in a patient. Serous discharge from the wound began on the 7th post-operative day. Treatment included alternate day dressings and a two-week course of antibiotics. The wound healed well during follow-up, and the patient's recovery was satisfactory.

Unfortunately, two patients in our study succumbed to myocardial infarction. Importantly, these cases were unrelated to the operative procedure. Notably, our study did not report complications such as implant loosening, dislocation, bed sores, or pneumonia, all of which are commonly associated with prolonged immobilization.

In a similar vein, in Patil et al.'s study, one patient experienced implant loosening, another suffered from dislocation, and a third patient had an infection, all of which were managed appropriately. Sancheti et al. reported a case of infection in their study, treated successfully with a two-week course of antibiotics, and another patient could not walk due to Alzheimer's, hindering cooperation. These complications highlight the multifaceted challenges in managing postoperative complications and emphasize the need for comprehensive patient care and tailored interventions.

CONCLUSION

The incidence of intertrochanteric femur fractures in the elderly population is escalating and accounts for a significant portion (45%) of fractures in this demographic. Stable intertrochanteric fractures find effective treatment through internal fixation, with no complications concerning bone healing.

However, the scenario changes with unstable intertrochanteric fractures, primarily occurring in elderly individuals afflicted with osteoporosis. These fractures present challenges due to comminution and age-related medical conditions.

Primary hemiarthroplasty emerges as a superior treatment option for unstable intertrochanteric fractures in osteoporotic elderly patients. This approach provides a stable, pain-free, and mobile joint, allowing for early mobilization. By bypassing the phase of fracture healing, hemiarthroplasty offers

immediate stability and mobility, eliminating the issues associated with prolonged bed rest.

Compared to fixation methods, hemiarthroplasty exhibits a low rate of revision surgeries and complications. Utilizing the Harris hip score, we observe favorable functional outcomes with primary bipolar hemiarthroplasty. Nevertheless, long-term follow-up remains essential to comprehensively assess the efficacy and durability of this treatment approach.

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