

A Comparative Study of Functional Outcomes in Surgical versus Conservative Management of Proximal Femur Fractures among Elderly Patients

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Abstract:

Background: Proximal femur fractures are common serious injuries in the elderly, associated with osteoporosis, disability, morbidity, and high socioeconomic burden. The choice between surgical and conservative management remains crucial for optimal functional recovery.

Aim: To compare functional outcomes of surgical and conservative management in elderly proximal femur fractures.

Methodology: A prospective comparative observational study was conducted on 60 patients aged ≥ 60 years, with 30 managed surgically (DHS/hemiarthroplasty) and 30 conservatively. Functional outcomes were assessed using the Harris Hip Score at 3 and 6 months. Data were analyzed using SPSS, with $p < 0.05$ considered significant.

Results: The surgical group showed significantly higher Harris Hip Scores at 3 months (72.4 ± 8.5 vs 58.7 ± 9.2) and 6 months (84.6 ± 7.1 vs 66.9 ± 8.4) compared to the conservative group. Complications were more frequent in the conservative group, while surgically treated patients demonstrated better recovery and mobility.

Conclusion: Surgical management provides superior functional outcomes, earlier mobilization, and fewer complications compared to conservative treatment and should be preferred when medically feasible.

Keywords: Proximal femur fracture, elderly, surgical management, conservative management, Harris Hip Score.

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Introduction

Proximal femur fractures are among the most common and serious musculoskeletal injuries affecting the elderly population worldwide [1]. These fractures are primarily intertrochanteric and subtrochanteric fractures in the upper part of the femur and are often associated with osteoporosis, low bone mineral density and low energy trauma, including falls from standing height.

The number of proximal femur fractures has risen significantly with the progressive rise in life expectancy and the increasing geriatric population, making it a significant public health problem. These fractures are linked to high morbidity, mortality, long hospital stays, reduced mobility, dependency in daily activities and higher socioeconomic costs for families and health systems [2]. In addition, older patients often have several comorbidities, including diabetes mellitus,

hypertension, cardiovascular disease, and osteoporosis, that further complicate the management and rehabilitation of patients after injury. The burden of proximal femur fractures is projected to increase significantly in the next few decades worldwide due to population ageing and better health care facilities resulting in higher survival rates among older people. Most of these fractures happen in people over 60 years old, and are more common in women because of postmenopausal osteoporosis [3].

The impact of these fractures can be significant, with many patients not achieving their pre-injury functional status following treatment. Proximal femur fractures can cause psychological distress, social isolation and poor quality of life as well as physical disability. Thus, best management practices that focus on early mobilization,

restoration of function, and prevention of complications are crucial to enhance patient outcomes. The treatment of proximal femur fractures can be classified into surgical and conservative treatment [4]. Surgical management is now the preferred treatment for most extracapsular proximal femoral fractures, as it enables early mobilisation, stable fixation, pain relief and rapid functional recovery. These fractures can be treated with a variety of surgical fixation methods, such as Dynamic Hip Screw (DHS), Proximal Femoral Nail (PFN), intramedullary nails, and locking plate systems [5]. The selection of implant depends on several factors such as fracture configuration, bone quality, patient age, associated comorbidities, and surgeon expertise. PFN has become popular due to its biomechanical benefits, minimal soft tissue dissection, low blood loss, and early weight bearing. Likewise, DHS is a common and effective fixation technique, especially for stable intertrochanteric fractures.

Although surgical techniques and implant design have improved, conservative management remains a viable option in certain elderly patients. Conservative treatment typically involves bed rest, traction, analgesics, physiotherapy, and progressive mobilization. It is usually used in patients who are not medically suitable for surgery, have severe systemic diseases, do not wish to have surgery, or have a short life expectancy [6]. However, prolonged immobilisation associated with conservative treatment may lead to complications such as deep vein thrombosis, pressure sores, urinary tract infections, pneumonia, muscle wasting, joint stiffness, and increased mortality. Thus, functional recovery in conservatively treated patients is frequently delayed and less complete than in surgically treated patients.

Functional outcome assessment is an important part of the evaluation of the effectiveness of treatment strategies for proximal femur fractures [7]. The primary goals of management are restoration of mobility, independence in activities of daily living, pain reduction, and return to pre-fracture functional status.

The Martin Parker Universal Functional Score (UFS) is one of the most commonly used assessment tools and is a reliable and validated tool to assess mobility and functional independence in elderly patients with hip fracture. The score evaluates the patient's ability to walk independently in the house, outside the house, and to shop, giving a comprehensive assessment of the functional status and quality of life after treatment. Such validated scoring systems facilitate objective comparison of outcomes between treatment modalities and identify the most effective management approach.

Earlier ambulation and lower complication rates have been shown in several studies to be beneficial with surgical intervention [8]. In elderly patients, however, the decision to operate or not is difficult, as the fracture type must be balanced with the overall physiological status, cognitive function, nutritional status, and socioeconomic factors. Conservative treatment may still be practiced in resource-limited settings and peripheral healthcare centres due to delayed presentation, financial constraints, or lack of surgical facilities. Moreover, there remains variability in clinical outcomes across different healthcare settings and populations.

There is limited literature available in India on long-term functional outcome of proximal femur fracture in elderly patients, especially in tier-2 and tier-3 healthcare institutions where the resources and rehabilitation services may vary from tertiary care institutions. Regional data is significant for the understanding of the effectiveness of current treatment practices and improvement of patient care protocols. Comparative evaluation of surgical and conservative treatment in elderly patients with proximal femur fracture is therefore necessary to identify which treatment provides better functional recovery, fewer complications and better quality of life.

The purpose of the present study is to compare the functional results of surgical and conservative treatment of proximal femur fractures in elderly patients. This study aims to give valuable insights into the most appropriate treatment strategy for this vulnerable population by analysing parameters related to mobility, independence and recovery, based on validated functional scoring systems.

Materials and Methods

Study Design: The present study was a prospective comparative observational study conducted to evaluate and compare the functional outcomes of surgical and conservative management in elderly patients with proximal femur fractures. The study compared patients treated surgically with hemiarthroplasty or Dynamic Hip Screw (DHS) fixation and those managed conservatively. Functional outcomes were assessed using the Harris Hip Score during follow-up.

Study Area: The study was conducted in the Department of Orthopaedics, Government Medical College & Hospital, Bettiah, West Champaran, and Bihar, India.

Study Duration: The duration of the study was 6 months.

Study Participants: The study included elderly patients diagnosed with proximal femur fractures who attended the Orthopaedics department during the study period. Patients were divided into two groups according to the treatment modality

received: surgical management and conservative management.

Inclusion Criteria

1. Patients aged 60 years and above
2. Patients diagnosed with proximal femur fractures including intertrochanteric and subtrochanteric fractures
3. Patients managed either surgically (hemiarthroplasty/DHS) or conservatively
4. Patients admitted within 7 days of injury
5. Patients willing to participate and provide informed consent
6. Patients available for follow-up at 3 months and 6 months

Exclusion Criteria

1. Pathological fractures other than osteoporotic fractures
2. Polytrauma patients with severe life-threatening injuries
3. Patients with pre-existing severe neurological or psychiatric disorders affecting mobility
4. Patients with previous surgery around the hip joint
5. Patients with incomplete clinical records or lost to follow-up
6. Patients unwilling to participate in the study

Sample Size: A total of 60 patients fulfilling the inclusion criteria were included in the study. Among them, 30 patients underwent surgical management and 30 patients received conservative treatment.

Procedure: Eligible patients presenting with proximal femur fractures were enrolled in the study. Detailed clinical history, demographic profile, mode of injury, associated comorbidities, and radiological findings were recorded in a predesigned proforma. Fractures were classified based on radiographic assessment. Patients were managed either surgically or conservatively according to clinical condition, fracture type, anaesthetic fitness, and surgeon's decision. Surgical treatment included hemiarthroplasty or Dynamic Hip Screw (DHS) fixation performed

under standard operative protocols. Conservative treatment consisted of bed rest, traction, analgesics, physiotherapy, and gradual mobilization as tolerated.

Post-treatment rehabilitation protocols were explained to all patients. Clinical evaluation and follow-up assessments were performed at 3 months and 6 months after treatment. Functional outcomes were assessed using the Harris Hip Score, which evaluated pain, function, deformity, and range of motion. Complications such as infection, implant failure, bed sores, deep vein thrombosis, malunion, nonunion, and mortality were also recorded during the follow-up period.

Statistical Analysis: The collected data were compiled, tabulated, and analyzed using Statistical Package for Social Sciences (SPSS) version 27.0. Continuous variables were expressed as mean \pm standard deviation (SD), while categorical variables were represented as frequencies and percentages. Comparison between surgical and conservative treatment groups was performed using the independent t-test for continuous variables and Chi-square test for categorical variables. Functional outcome scores at different follow-up intervals were compared using repeated measures analysis where appropriate. A p-value of less than 0.05 was considered statistically significant.

Result

Table 1 shows the distribution of patients according to treatment modality among the total study population of 60 elderly patients with proximal femur fractures. Out of the 60 patients, 30 patients (50%) underwent surgical management, including procedures such as hemiarthroplasty and dynamic hip screw (DHS) fixation, while the remaining 30 patients (50%) were treated with conservative management. The equal distribution of patients in both treatment groups ensured balanced comparison and minimized selection bias, thereby allowing a more reliable assessment of functional outcomes between surgical and conservative treatment approaches.

Table 1: Distribution of Patients According to Treatment Modality

Treatment Modality	Number of Patients (n=60)	Percentage (%)
Surgical Management (Hemiarthroplasty/DHS)	30	50
Conservative Management	30	50

Table 2 shows the distribution of patients according to different age groups among the surgical and conservative management groups. Out of the total 60 patients included in the study, the highest number of patients belonged to the 66–70 years age group, comprising 20 patients (33.3%), followed by the 60–65 years age group with 18 patients (30%). The 71–75 years age group included 13 patients (21.7%), while patients aged more than 75 years

constituted the smallest proportion with 9 patients (15%). In the surgical group, the majority of patients were in the 60–65 years age group (10 patients), whereas in the conservative group, the highest number of patients belonged to the 66–70 years age group (11 patients). Overall, the age distribution between both groups was relatively comparable, indicating a balanced representation of elderly patients across the study population.

Table 2: Distribution of Patients According to Age Group

Age Group (Years)	Surgical Group (n=30)	Conservative Group (n=30)	Total	Percentage (%)
60-65	10	8	18	30
66-70	9	11	20	33.3
71-75	7	6	13	21.7
>75	4	5	9	15
Total	30	30	60	100

Table 3 shows the distribution of patients according to the type of proximal femur fracture among the surgical and conservative management groups. Out of the total 60 patients included in the study, 40 patients (66.7%) had intertrochanteric fractures, while 20 patients (33.3%) had subtrochanteric fractures. In the surgical group, 21 patients had intertrochanteric fractures and 9 patients had subtrochanteric fractures. Similarly, in the

conservative group, 19 patients had intertrochanteric fractures and 11 patients had subtrochanteric fractures.

The findings indicate that intertrochanteric fractures were more common than subtrochanteric fractures in both groups, accounting for nearly two-thirds of the total study population.

Table 3: Distribution of Patients According to Type of Fracture

Type of Fracture	Surgical Group (n=30)	Conservative Group (n=30)	Total	Percentage (%)
Intertrochanteric Fracture	21	19	40	66.7
Subtrochanteric Fracture	9	11	20	33.3
Total	30	30	60	100

Table 4 shows the comparison of mean Harris Hip Score between the surgical and conservative management groups at different follow-up durations.

At 3 months, the surgical group demonstrated a significantly higher mean Harris Hip Score (72.4 ± 8.5) compared to the conservative group (58.7 ± 9.2), with a highly significant p-value of <0.001 . Similarly, at 6 months follow-up, the surgical group continued to show better functional

outcomes with a mean score of 84.6 ± 7.1 , whereas the conservative group had a mean score of 66.9 ± 8.4 , and the difference remained statistically highly significant ($p < 0.001$).

These findings indicate that surgical management provided superior hip function and improved recovery outcomes compared to conservative treatment among elderly patients with proximal femur fractures.

Table 4: Comparison of Mean Harris Hip Score at Follow-up

Follow-up Duration	Surgical Group (Mean \pm SD)	Conservative Group (Mean \pm SD)	p-value
3 Months	72.4 ± 8.5	58.7 ± 9.2	<0.001
6 Months	84.6 ± 7.1	66.9 ± 8.4	<0.001

Table 5 shows the distribution of post-treatment complications among study participants in both the surgical and conservative management groups. Joint stiffness was the most common complication, observed in 4 patients in the surgical group and 9 patients in the conservative group, followed by bed sores, which were reported in 2 patients in the surgical group and 8 patients in the conservative group. Malunion/nonunion was more frequent in the conservative group (5 cases) compared to the

surgical group (1 case). Deep vein thrombosis and mortality were also higher among conservatively managed patients, with 3 cases each, whereas the surgical group reported 1 case each. Infection was noted only in the surgical group in 3 patients. Importantly, the majority of patients in the surgical group (18 out of 30) experienced no complications compared to only 2 patients in the conservative group, indicating comparatively better post-treatment outcomes in surgically managed patients.

Table 5: Distribution of Post-treatment Complications among Study Participants

Complications	Surgical Group (n=30)	Conservative Group (n=30)	Total
Bed Sores	2	8	10
Deep Vein Thrombosis	1	3	4
Infection	3	0	3
Malunion/Nonunion	1	5	6
Joint Stiffness	4	9	13
Mortality	1	3	4
No Complications	18	2	20

Discussion

The results in this study showed that the surgical approach gave much better functional outcomes than the conservative one among older adults with proximal femur fractures. In this particular study, 50% of the patients went for surgical treatment and the remaining 50% got conservative management, so in the end there was a pretty even comparison between the two modalities. Most of the participants were in the 66–70 years bracket, and this lines up with what Koval KJ et al. (1998) [9] reported, that hip fractures tend to show up more often in the elderly because of osteoporosis, poorer balance and a higher probability of falls. In the same way, Johnell O and Kanis (1997) [10] noted that as age keeps increasing, the likelihood of proximal femur fractures rises notably, mainly due to diminished bone mineral density and general frailty. Overall, these findings back up the same kind of age pattern seen here, where elderly patients clearly formed the main group that was affected.

In our present study, intertrochanteric fractures account for most of the fracture types, while subtrochanteric fractures were comparatively fewer. We observed results that line up with what Saudan M et al. (2002) [11] had already reported, where they found a higher frequency of intertrochanteric fractures in elderly patients with osteoporotic bone. This tendency toward intertrochanteric fractures can be tied to low-energy injuries such as a fall from standing height, which is pretty common among older adults. In contrast, younger individuals tend to experience proximal femur fractures, because the mechanism of injury tends to be more high-energy, not merely an ordinary misstep. Since the distribution of fracture types appeared fairly similar between the surgical and conservative groups in this work, the likelihood of treatment bias was lower, so the comparisons of functional outcomes became more trustable, or at least more dependable.

In this present study, the evaluation of functional outcomes by way of the Harris Hip Score, seemed to show that surgically treated patients recovered much better, for both the 3 month and 6 month follow up times. The mean functional gain in the operative group, was tied to an earlier ability to get moving, better pain alleviation, and a more complete return to day to day living. Comparable results were also described by Holt G et al. (2008) [12], where they found that elderly patients who were treated surgically had improved mobility and functional independence, compared with those managed without an operation. Similarly, Arinzon Z et al. (2005) [13] reported that older patients who had operative fixation, reached higher recovery scores and returned to walking sooner than the non-surgical group. Here, most of the surgically

managed patients seemed to regain satisfactory hip function by 6 months, while the conservatively managed cohort still dealt with reduced range of motion and a greater need for caregiver help.

The current study also showed that surgical fixation seemed to help, in a kind of earlier way, with rehabilitation and it improved overall quality of life. People treated surgically had a steady, gradual improvement in their Harris Hip Scores at each follow-up visit, which suggested that the rehab effort really worked. Similar conclusions were also noted by Liu J et al. (2019) [14], they said that early mobilization after surgery significantly supported postoperative recovery and it lowered the chance of long-term disability in elderly patients with hip fractures. Their results pointed out that early ambulation wards off muscle wasting and sharpens balance which is consistent with what we found here, where patients receiving surgical management better functional progress than those had treated conservatively.

Complications were noticed quite a bit more often in the conservative management group in this study. Joint stiffness showed up as the main issue, with 9 patients in the conservative group, while the surgical group had just 4. In a similar way, bed sores appeared in 8 conservatively treated patients, compared with 2 who were treated surgically. Deep vein thrombosis was also seen more frequently in the conservative group, with 3 cases versus only 1 case in the surgical group. These observations match the work of Panula J et al. (2011) [15], where it was stated that longer immobilization under conservative management can noticeably raise the probability of complications like pressure sores, thromboembolism, and poorer functional independence. Also, Klestil T et al. (2017) [16] highlighted that slower mobilization and prolonged bed rest in older hip fracture patients tend to hurt rehabilitation progress and add to postoperative morbidity.

In the current study, malunion and nonunion were also noticeably higher among conservatively managed patients, with 5 cases showing up there compared to just 1 case in the surgical group. Similar results were mentioned by Xu H et al. (2022) [17], they suggested that stable surgical fixation with a proximal femoral nail or a dynamic hip screw gives a better fracture union and stronger mechanical stability than conservative management. The idea is that surgical stabilization helps keep the anatomical alignment on track and it enables controlled weight-bearing, which in turn lowers the chance of deformity and delayed union. On the other hand, conservative treatment can end up with weak or insufficient stabilization, longer healing duration, and generally inferior functional recovery. Even though postoperative infection was seen in 3 patients treated surgically in this study,

the overall gains from surgery still appear to outweigh those risks. The present study showed that most surgically handled patients stayed free of complications, while only a few conservatively managed patients seemed to recover without any issues. This kind of note lines up with what Grigoryan KV et al. (2014) [18] reported, where they basically stressed that early surgical management, plus multidisciplinary rehabilitation, substantially helps patients get better and also cuts down morbidity especially in elderly people with hip fractures. In practice, an early operative approach encourages independence, gives psychological self-assurance, and supports a smoother return to everyday tasks. Those points matter a lot, because quality of life in older individuals really depends on those everyday functions and how they feel overall.

Overall, the results of this present study strongly support surgical management as the more suitable treatment approach for proximal femur fractures in elderly patients whenever it is medically feasible. In other words, patients who underwent surgery showed better functional outcomes and achieved higher Harris Hip Scores, plus earlier mobilization and less in the way of complications, when compared with conservative management. On the other hand, conservative care seemed tied to prolonged immobilization and delayed rehabilitation; it also came with more complications and a weaker functional recovery in general.

Conclusion

The present study demonstrated that surgical management provides significantly better functional outcomes than conservative treatment in elderly patients with proximal femur fractures. Surgically treated patients showed higher Harris Hip Scores at both 3 and 6 months follow-up, indicating better mobility, pain relief, and functional recovery. Early mobilization following surgery also contributed to improved rehabilitation and reduced dependency. In contrast, conservative management was associated with delayed recovery, prolonged immobilization, and higher rates of complications such as bed sores, joint stiffness, deep vein thrombosis, malunion, and mortality.

Although postoperative infection occurred in a few surgical cases, the overall benefits of surgery were superior. Therefore, whenever medically feasible, surgical management should be considered the preferred treatment approach for proximal femur fractures in elderly patients to achieve better functional outcomes, fewer complications, and improved quality of life.

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