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Original Article

Early Functional Outcome of Total Hip Arthroplasty in Elder Patients with Displaced Femoral Neck Fractures

Muhammad Saeed[1], Muhammad Waqar[1]*, Muhammad Arif[2]

[1]Assistant Professor, Orthopedic and Spine Unit, Hayatabad Medical Complex, Peshawar, Pakistan.

[2]Professor, Orthopedic and spine unit, Hayatabad Medical Complex, Peshawar, Pakistan.

Corresponding Author: Muhammad Waqar, Assistant Professor; Email: wkhan43@gmail.com

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ABSTRACT

Background: Displaced femoral neck fractures in elderly patients pose a significant orthopedic challenge due to their association with high morbidity and mortality rates. Effective management of these fractures is crucial to improving patient outcomes and quality of life. Total hip arthroplasty (THA) is considered a beneficial surgical intervention, offering superior functional outcomes and lower complication rates compared to other treatments.

Objective: To determine the early functional outcome of total hip arthroplasty in elderly patients with displaced femoral neck fractures.

Methods: This descriptive study included sixty patients aged 50 to 80 years with displaced femoral neck fractures, treated with total hip arthroplasty at Hayatabad Medical Complex from October 2023 to April 2024. Preoperative assessments included radiographs and various blood tests. Functional outcomes were measured using the Harris Hip Score (HHS) at six months postoperatively. Data were analyzed using SPSS version 26, and the paired t-test was used to compare preoperative and postoperative HHS scores, with $P \leq 0.05$ considered significant.

Results: The mean age of the sixty patients was 64.80±9.08 years. The mean preoperative HHS was 74.42±10.49, which significantly increased to 84.95±8.65 at the six-month follow-up ($P = 0.0001$). Postoperative complications included infections in 2 patients (3.3%) and hip dislocations in 3 patients (5%). No complications were observed in 55 patients (91.7%).

Conclusion: Total hip arthroplasty is an effective procedure for elderly patients with displaced femoral neck fractures, demonstrating significant improvements in functional outcomes and a low incidence of complications.

Keywords: Femoral neck fracture, Functional outcome, Harris Hip Score, Total hip arthroplasty, Treatment.

INTRODUCTION

Displaced femoral neck fracture represents a significant orthopedic challenge, predominantly affecting older individuals. This fracture, characterized by the displacement of broken bone fragments in the upper part of the thigh bone, leads to substantial functional impairment and adverse health outcomes (1). The elderly population is particularly vulnerable due to age-related changes in bone density, increased susceptibility to falls, and the presence of comorbidities, all of which complicate both the fracture and its treatment (3).

Globally, femoral neck fractures pose a major health risk, with projections indicating an increase in annual cases from 1.7 million to 6.3 million by 2050 (4). Osteopenia, defined as bone mass reduction at one standard deviation below the norm at the hip, doubles the risk of hip fractures (5). Effective management of displaced femoral neck fractures in older adults requires a multidisciplinary approach that encompasses orthopedic surgery, geriatric medicine, rehabilitation, and social support (6).

Total hip arthroplasty (THA) offers several advantages over other treatment modalities such as internal fixation, including improved long-term outcomes, increased durability, and enhanced functional recovery. Additionally, THA addresses underlying osteoarthritic changes and reduces the likelihood of future hip-related issues, providing a comprehensive solution to the challenges presented by displaced femoral neck fractures in the elderly (7, 8). Despite the efficacy of THA, it is crucial to consider patient-specific factors such as comorbidities, bone quality, functional status, and surgical risk to optimize outcomes and minimize postoperative complications (9, 10).

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Decision-making regarding THA in elderly patients with displaced femoral neck fractures necessitates a collaborative approach. With demographic shifts and increased life expectancy, the demand for THA as an effective treatment for these fractures is expected to rise. This underscores the importance of ongoing research, innovation, and collaborative care models to enhance surgical outcomes and improve the quality of life for this vulnerable patient population.

The objective of this study was to evaluate the early functional outcomes of total hip arthroplasty in elder patients with displaced femoral neck fractures, aiming to provide evidence-based insights for improving patient care and outcomes in this growing demographic.

METHODS

A descriptive study was conducted at the Department of Orthopedics, Hayatabad Medical Complex, Peshawar, from October 2023 to April 2024, following ethical approval from the hospital. The study included sixty elderly patients aged 50 to 80 years, of either gender, presenting with displaced femoral neck fractures. Prior to surgery, all patients underwent a series of preoperative assessments, including radiographs of the pelvis and chest, bilateral hip radiographs, coagulation function tests, complete blood counts, and biochemical indicators.

The surgical procedure for all patients was performed using a transgluteal lateral approach. A cemented collarless polished tapered femoral component was inserted, followed by the implantation of a cobalt chrome femoral head of the appropriate size. This femoral head articulated with an all-polyethylene cemented acetabular component. The femoral head size was determined intraoperatively using hemispherical templates, available in 2 mm increments.

Postoperatively, rehabilitation medicine physicians played a crucial role in assisting patients to improve muscular endurance and joint mobility, emphasizing early mobilization. Isometric quadriceps contractions and ankle pump exercises were initiated 6 hours post-surgery. This was followed by knee flexion and straight leg elevation exercises after one day, and walking training with a walker after two days. All patients received oral bisphosphonates as antiresorptive therapy.

The functional outcomes were evaluated at the six-month mark using the Harris Hip Score (HHS), a comprehensive 100-point scoring system. This system assesses pain, function, absence of deformity, and range of motion (11). Data analysis was performed using SPSS version 26. The preoperative and postoperative HHS scores were compared using a paired t-test, with statistical significance set at $P \leq 0.05$.

RESULTS

The study included sixty patients with a mean age of 64.80±9.08 years. The gender distribution indicated a higher frequency of male patients compared to female patients, suggesting that displaced femoral neck fractures are more prevalent in males. Of the patients, 29 (48.3%) presented with fractures on the right side, while 31 (51.7%) had fractures on the left side.

The outcomes were assessed six months postoperatively using the Harris Hip Score (HHS). The preoperative HHS was 74.42±10.49, which significantly improved to 84.95±8.65 after total hip arthroplasty ($P = 0.0001$). Postoperative complications were minimal, with only 2 (3.3%) patients developing infections and 3 (5%) experiencing hip dislocations. The majority of patients, 55 (91.7%), exhibited no postoperative complications. These findings underscore the effectiveness of total hip arthroplasty in improving functional outcomes for elderly patients with displaced femoral neck fractures.

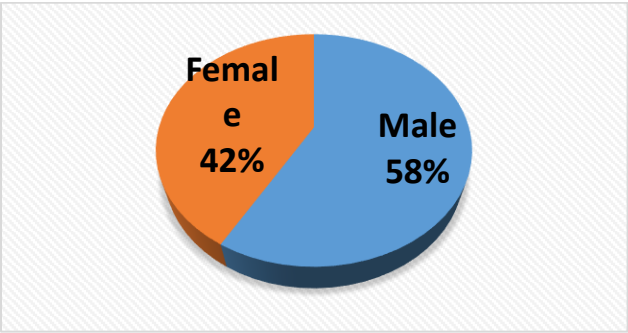

Figure 1 Gender distribution

Table 1: Comparison of preoperative and postoperative Harris Hip Score (HHS) score

Harris Hip Score (HHS)	Mean	N	Std. Deviation	P value
HSS preoperative	74.42	60	10.498	0.0001

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Harris Hip Score (HHS)	Mean	N	Std. Deviation	P value
HSS at 6 months	84.95	60	8.654	

Table 2: Postoperative complications

Postoperative complications	Frequency	Percent
None	55	91.7
Infection	2	3.3
Hips dislocation	3	5.0
Total	60	100.0

DISCUSSION

Hip fractures represent a significant concern in medical practice due to their high mortality and morbidity rates among elderly patients. As life expectancy increases and osteoporosis becomes more prevalent, the incidence of hip fractures is expected to rise. Untreated femoral neck fractures can lead to various comorbidities, ultimately resulting in death, underscoring the necessity of surgical intervention in managing these injuries in older patients. While the optimal treatment method remains a topic of debate, numerous studies have indicated that total hip arthroplasty (THA) offers superior functional outcomes and lower revision surgery rates compared to hemiarthroplasty (HA). The adoption of THA for femoral neck fracture management is anticipated to grow as the elderly population becomes more active and independent (12, 13).

This study included sixty patients with a mean age of 64.80±9.08 years, and a higher prevalence of male patients was observed. These findings align with a previous study that reported a mean age of 62.37±5.918 years and a predominance of male patients (14). The mean Harris Hip Score (HHS) in this study increased significantly from a baseline of 74.42±10.49 to 84.95±8.65 at the six-month follow-up (P = 0.0001). This improvement is consistent with findings from another study, which documented a significant increase in HHS scores at 6 days, 6 weeks, and 6 months post-THA (14). Furthermore, a comparative study of THA and HA in elderly patients with displaced femoral neck fractures reported significantly higher postoperative HHS scores in the THA group, supporting our results (15). A randomized controlled trial also demonstrated significantly higher HHS scores in the THA group compared to the HA group at one year postoperatively (13).

Postoperative complications in this study were minimal, with only 2 patients developing infections and 3 patients experiencing hip dislocations. These findings are comparable to the aforementioned study, which reported no complications in the majority of patients, with only 2.4% experiencing infections and 2.4% having hip dislocations (14,16).

The strengths of this study include a well-defined patient population and a standardized approach to both surgical procedure and postoperative rehabilitation, contributing to the reliability of the findings. However, limitations include a relatively small sample size and the short follow-up period, which may not capture long-term outcomes and complications. Further research with larger cohorts and extended follow-up is necessary to validate these findings and provide more comprehensive insights into the long-term benefits and risks of THA in elderly patients with displaced femoral neck fractures (17-19).

This study highlights the effectiveness of THA in improving functional outcomes and minimizing complications in elderly patients with displaced femoral neck fractures. As the demand for THA continues to rise with the aging population, ongoing research and innovation in surgical techniques and postoperative care are essential to optimize patient outcomes and enhance the quality of life for this vulnerable group (20).

CONCLUSION

Total hip arthroplasty in elderly patients with displaced femoral neck fractures proves to be an effective intervention, significantly improving functional outcomes as measured by the Harris Hip Score and exhibiting a low incidence of postoperative complications. The positive results highlight the procedure's potential to enhance the quality of life in this vulnerable population. However, the study's findings underscore the necessity for comprehensive preoperative assessments and meticulous postoperative care to maximize benefits and minimize risks. These conclusions support the broader adoption of total hip arthroplasty in suitable elderly patients, while also emphasizing the need for ongoing research and innovation to further refine surgical techniques and postoperative rehabilitation protocols, ensuring sustained improvements in patient care and outcomes.

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