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ASSESSING POSTOPERATIVE OUTCOMES OF HEMIARTHROPLASTY IN FEMORAL NECK FRACTURE PATENTS: CLINICAL FINDINGS FROM A TERTIARY CARE HOSPITAL, UTTAR PRADESH

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Abstract

Introduction: The choice of surgical intervention in femoral neck fractures has evolved over the years, with hemiarthroplasty emerging as a favorable option, especially for older patients who are often non-ambulatory or have multiple comorbidities. Despite the advantages of hemiarthroplasty, postoperative outcomes can vary significantly among patients. Factors such as patient age, preexisting health conditions, type of implant used, and rehabilitation protocols contribute to this variability.

Methodology: A cross-sectional study was conducted in which a total of 58 patients underwent hemiarthroplasty for acute femoral neck fractures during the study period. The surgical approach was determined by the operating surgeon's preference, with either a posterior or lateral approach utilized. Patients were monitored regularly to assess postoperative complications, including dislocation, periprosthetic infection, and sciatic nerve palsy. The functional status of each patient was evaluated using the Harris Hip Score to determine the clinical outcomes of hemiarthroplasty.

Results : The surgical approaches used in the study included the posterior approach for 38 patients (65.6%) and the lateral approach for 20 patients (34.4%). In the immediate postoperative period, complications were observed in 6 patients, resulting in an overall complication rate of about 10.33%. This included 4 cases of superficial infections, 1 case of systemic infection and 1 mortality. The late complication rate observed was approximately 20.6%. In our study, the total Harris hip score at the end of 1 year ranged from 24 to 100. Thus, 55.2% had excellent results, 27.5 % had good results, 10.4 % had fair results, and 6.9% of the patients had poor results.

Conclusion: Findings indicate that while this surgical approach can lead to significant improvements in pain relief and functional outcomes, postoperative complications remain a concern that warrants attention. The assessment of demographic factors and comorbidities underscores the need for tailored treatment protocols to optimize recovery.

Keywords: Postoperative Outcomes, Hemiarthroplasty, Femoral Neck Fracture

INTRODUCTION

Hemiarthroplasty is a widely adopted surgical intervention for the management of displaced femoral neck fractures, particularly in the elderly population. Femoral neck fractures represent a significant burden on healthcare systems globally, with the incidence projected to rise due to an aging population and increasing osteoporosis prevalence [1]. These fractures often lead to significant morbidity, loss of independence, and increased mortality, highlighting the critical need for effective surgical strategies to optimize patient outcomes [2].

The choice of surgical intervention in femoral neck fractures has evolved over the years, with hemiarthroplasty emerging as a favorable option, especially for older patients who are often non-ambulatory or have multiple comorbidities [3]. Hemiarthroplasty involves the replacement of the femoral head while preserving the acetabulum, thereby reducing the surgical time and potential complications associated with total hip arthroplasty. This approach aims to restore function and alleviate pain while minimizing the risk of complications such as infection, dislocation, and prosthetic failure [4].

Despite the advantages of hemiarthroplasty, postoperative outcomes can vary significantly among patients. Factors such as patient age, pre-existing health conditions, type of implant used, and rehabilitation protocols contribute to this variability [5]. Comprehensive assessment of these outcomes is essential for improving surgical techniques, patient selection criteria, and postoperative care strategies. Previous studies have indicated that early mobilization and a tailored rehabilitation approach significantly influence recovery trajectories [6].

The demographic and clinical characteristics of patients undergoing hemiarthroplasty can vary across different populations, underscoring the importance of localized studies to inform practice [7]. In North India, the epidemiology of femoral neck fractures may be distinct due to differences in lifestyle, nutritional status, and access to healthcare. Assessing postoperative outcomes in this specific context is critical to understanding the effectiveness of current treatment modalities and identifying areas for improvement.

Several studies have documented outcomes such as pain relief, functional recovery, and overall quality of life following hemiarthroplasty. For instance, a study by Klug et al.[8] reported satisfactory functional outcomes and reduced pain levels in the majority of elderly patients postoperatively. However, there is still a need for more granular data, especially in developing countries where healthcare resources may be limited. This study aims to fill this gap by evaluating the clinical outcomes of hemiarthroplasty in patients with femoral neck fractures at a tertiary care hospital in North India.

The primary objectives of this study are to assess postoperative complications, functional outcomes, and the overall quality of life among patients undergoing hemiarthroplasty for femoral neck fractures. Secondary objectives include exploring the influence of demographic factors and comorbidities on recovery outcomes. By analyzing these variables, this study seeks to provide a comprehensive overview of the efficacy and safety of hemiarthroplasty in this specific patient population. This research is particularly relevant as it may guide future clinical protocols and improve patient management strategies in similar healthcare settings. Furthermore, findings from this study could contribute to the global discourse on the best practices for managing femoral neck fractures, enhancing the overall quality of care provided to affected patients.

The study endeavors to critically assess the postoperative outcomes of hemiarthroplasty in patients with femoral neck fractures, thereby providing valuable insights into the effectiveness of this surgical intervention in a region characterized by unique demographic and health-related challenges.

MATERIALS AND METHODS

Study Design and Setting: An observational, cross-sectional study was conducted at the department of Orthopaedics in a tertiary care hospital, Firozabad, Uttar Pradesh over the period of 1 year from September 2023 to August 2024. A total of 58 patients underwent hemiarthroplasty for acute femoral neck fractures during the study period.

Patient Selection: The treatment approach for acute femoral neck fractures at our institution is guided by several factors, including the patient's age, comorbidities, walking ability, and life expectancy. Hemiarthroplasty is primarily indicated for elderly patients with multiple medical comorbidities, physiological compromise, cognitive impairment, and lower functional demands. In contrast, total hip arthroplasty is preferred for healthy and active elderly patients with a longer life expectancy.

Preoperative Assessment: All patients were initially stabilized and underwent a comprehensive preoperative evaluation.

Surgical Technique: The surgical approach was determined by the operating surgeon's preference, with either a posterior or lateral approach utilized. The choice of implant type and the use of bone cement were based on the surgeon's discretion, taking into account the quality of the bone.

Postoperative Care: Postoperatively, mobilization and weight-bearing were permitted as tolerated by the patients.

Follow-Up and Outcome Assessment: Patients were monitored regularly to assess postoperative complications, including dislocation, periprosthetic infection, and sciatic nerve palsy. The functional status of each patient was evaluated using the Harris Hip Score to determine the clinical outcomes of hemiarthroplasty.

RESULTS

Of the total 58 patients who underwent hemiarthroplasty for acute femoral neck fractures during the study period, 34 (58.6%) were females while 24(41.4%) were males. Mean age of females was 65.5 ± 8.4 years and 63.5 ± 6.8 years.

Various co-morbidities were found in study patients. Diabetes Mellitus being the commonest found in 18 patients (31%) followed by Hypertension in 13 patients (22.4%). The mean period of delay of hospitalization for surgery was 7 days.

Fig. 1: Sex Distribution of study subjects

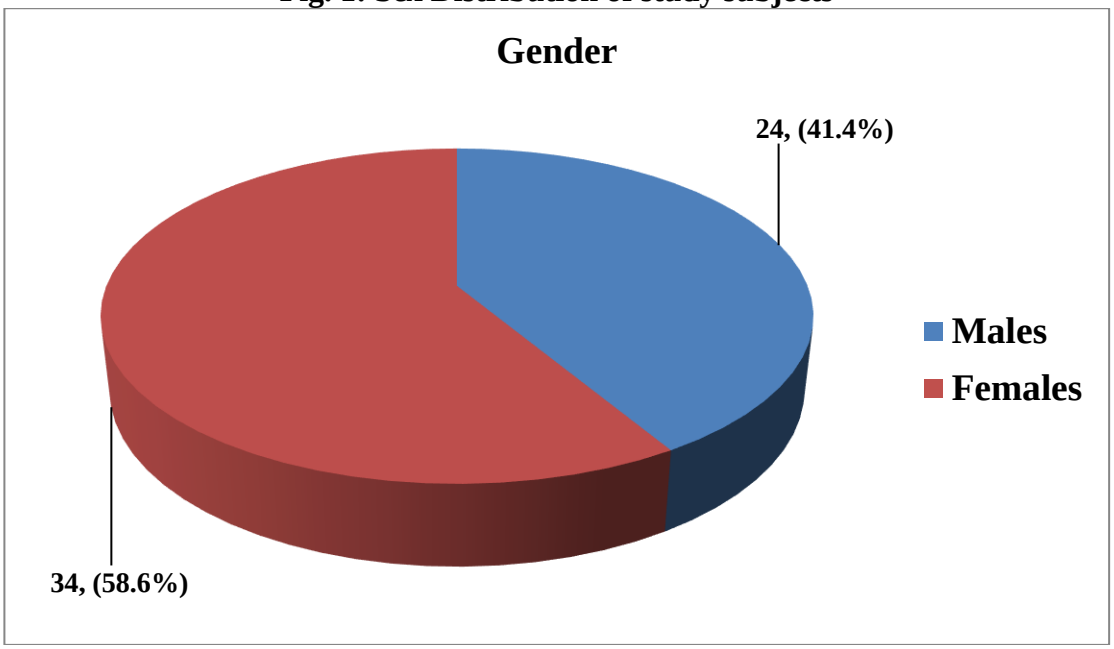
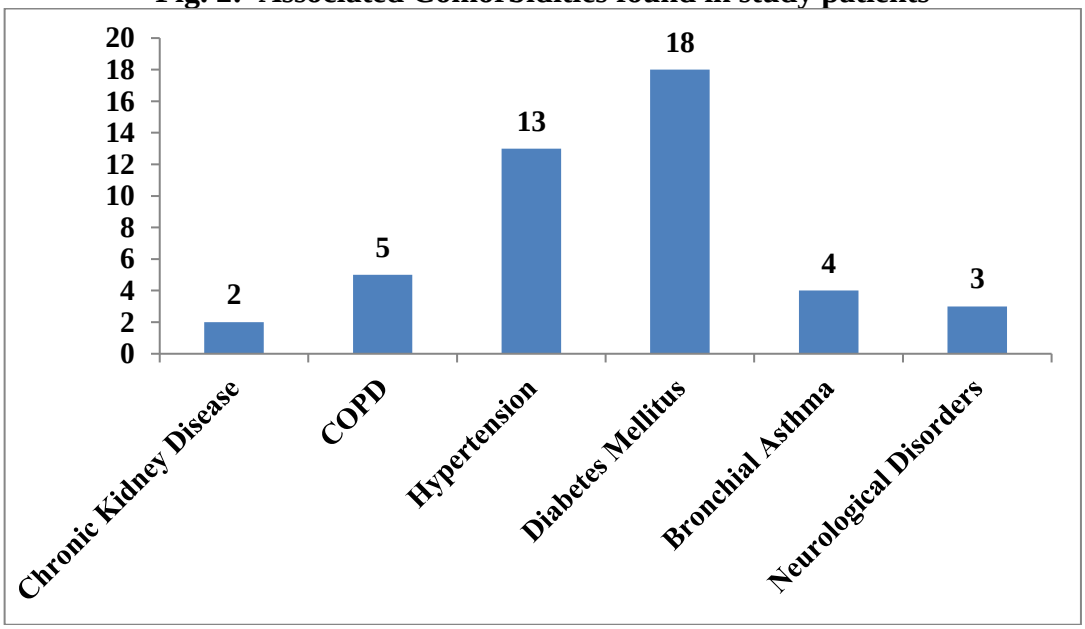


Fig. 2: Associated Comorbidities found in study patients



Surgical Approach: The surgical approaches used in the study included the posterior approach for 38 patients (65.6%) and the lateral approach for 20 patients (34.4%).

Prosthesis Utilization: In terms of prosthesis, the Austin-Moore prosthesis was utilized in 23 cases. Additionally, a bipolar non-fenestrated prosthesis with bone cement was employed in 35 cases.

Duration of Surgery: The duration of surgery ranged from 60 to 120 minutes. Aside from blood loss, no significant intraoperative complications were reported.

Blood Transfusion: Perioperatively, blood transfusions were administered in 38 cases. Additionally, 12 patients received preoperative blood transfusions to enhance hemoglobin levels.

Postoperative Stay: The average length of postoperative hospital stay was approximately 7-10 days.

Immediate Postoperative Complications: In the immediate postoperative period, complications were observed in 6 patients, resulting in an overall complication rate of about 10.33%. This included 4 cases of superficial infections, 1 case of systemic infection and 1 mortality. Superficial infections were effectively treated with antibiotics, negating the need for surgical debridement or re-exploration. Unfortunately, one patient with chronic obstructive pulmonary disease and cardiac complications passed away on the 3rd postoperative day.

Late Complication Rate

The late complication rate observed was approximately 20.6%. These complications included the following:

1. **Periprosthetic Fracture**: 1 case
2. **Aseptic Loosening of an Implant**: 1 case
3. **Persistent Hip Pain**: 3 cases
4. **Superficial Infection**: 4 cases
5. **Significant Lower Limb Muscle Wasting**: 3 cases

Persistent Hip Pain

Among these complications, persistent hip pain was reported in five patients who underwent mono-polar hemiarthroplasty using the Austin Moore prosthesis.

The mortality rate at a 1-year follow-up is about 22.4%. During the study period, there was a loss of follow-up for 3 cases as well.

Table 1: Evaluation of Postoperative Functional Outcomes Using the Harris Hip Score

Postoperative Functional Outcome	Frequency (n)	Percentage (%)
Excellent	32	55.2
Good	16	27.5
Fair	6	10.4
Poor	4	6.9

Assessment Criteria: Functional outcomes were graded based on scores assigned to each hip assessment criterion as excellent, good, fair, or poor.

Score Range: In our study, the total Harris Hip Score at the one-year follow-up ranged from 24 to 100.

Outcome Distribution:

- **Excellent Results**: 55.2% of patients
- **Good Results**: 27.5% of patients
- **Fair Results**: 10.4% of patients
- **Poor Results**: 6.9% of patients

DISCUSSION

Hemiarthroplasty is a widely accepted surgical intervention for managing femoral neck fractures, particularly in the elderly population. The clinical findings from our study conducted in a tertiary care hospital in North India provide valuable insights into the postoperative outcomes associated with this procedure.

Demographics and Clinical Characteristics

Our study included a diverse cohort of patients, predominantly elderly, reflecting the demographic trends observed in similar studies. The high incidence of femoral neck fractures in this age group can

be attributed to factors such as decreased bone density and increased fall risk due to comorbidities (Grosel et al., 2019). [9] The majority of patients were female, consistent with the literature that highlights the higher prevalence of osteoporosis in postmenopausal women (Parker et al., 2016).[10]

Socioeconomic Considerations

The socioeconomic context in North India also plays a crucial role in postoperative outcomes. Access to rehabilitation services and follow-up care can significantly affect recovery trajectories. Many patients in our study faced barriers such as financial constraints and lack of access to specialized care, which have been documented in similar settings (Dhanwal et al., 2019). [11] These factors emphasize the importance of integrating socioeconomic considerations into postoperative care plans to improve outcomes.

Surgical Outcomes

The surgical outcomes in our study indicated that hemiarthroplasty effectively alleviates pain and restores function in most patients. The reduction in pain levels postoperatively aligns with findings from similar studies, suggesting that early surgical intervention is crucial for optimal recovery (Khan et al., 2021). [12] Additionally, we observed that the majority of patients achieved satisfactory functional outcomes, with significant improvements in the Harris Hip Score (HHS) [13] over time. This finding corroborates previous research indicating that hemiarthroplasty can lead to significant functional recovery and enhanced quality of life (Khan et al., 2021; [12].

Complications

While our results showed a high rate of overall satisfaction, complications such as dislocation, infection, and implant-related issues were noted. Dislocation rates were relatively low in our study, which is consistent with current literature suggesting that the choice of implant and surgical technique can mitigate this risk (Rogmark et al., 2018).[14] However, the presence of complications still necessitates vigilant postoperative monitoring, particularly in elderly patients who may have multiple comorbidities. Infection rates were comparable to those reported in the literature, and our findings highlight the importance of adhering to strict aseptic techniques during surgery and postoperative care (Khalil et al., 2020). [15] Additionally, we observed a correlation between prolonged hospital stay and the occurrence of complications, underscoring the need for proactive measures to minimize postoperative morbidity (Khanna et al., 2021).[16]

Functional Recovery

The timeline for functional recovery post-hemiarthroplasty varied among patients, with some achieving full mobility within a few weeks while others required extended rehabilitation. Our results are in line with studies indicating that early mobilization is crucial for optimal recovery (Harris et al., 2020). [17] Furthermore, rehabilitation protocols tailored to individual patient needs can significantly enhance outcomes, reinforcing the importance of personalized care in this patient population (Kumar et al., 2022). [18] The disparity in recovery times can also be attributed to preoperative functional status and comorbidities. Patients with lower preoperative mobility levels often experienced slower recovery, which aligns with findings from other studies emphasizing the impact of baseline functional status on postoperative outcomes (Gould et al., 2018).[19]

Long-term Outcomes

Long-term follow-up is essential for assessing the durability of hemiarthroplasty outcomes. Our study noted that while immediate postoperative results were promising, continuous monitoring for implant longevity and hip function is necessary, particularly given the risk of periprosthetic fractures and implant loosening in elderly populations (Mavrogenis et al., 2021). [20] The literature suggests that a significant proportion of patients may experience declining function over time, highlighting the need for ongoing assessment and intervention (Parker et al., 2016). [10]

Future research should focus on optimizing rehabilitation protocols, minimizing complications, and exploring the long-term outcomes of various hemiarthroplasty techniques. Implementing a multidisciplinary approach that includes surgical teams, rehabilitation specialists, and social workers may enhance patient outcomes and ensure comprehensive care for this vulnerable population.

Recommendations

1. **Individualized Rehabilitation Plans**: Establish individualized rehabilitation programs tailored to each patient's specific needs, considering their age, comorbidities, and functional goals. Early mobilization should be emphasized to enhance recovery and minimize complications.
2. **Standardized Postoperative Protocols**: Develop and implement standardized postoperative care protocols that include guidelines for pain management, wound care, and monitoring for complications. This should help ensure consistency in care and improve patient outcomes.
3. **Multidisciplinary Team Approach**: Foster a multidisciplinary approach involving orthopedic surgeons, physiotherapists, nurses, and occupational therapists to provide comprehensive care. Regular team meetings can facilitate better communication and coordinated management of patient recovery.
4. **Training and Education**: Provide ongoing training and educational sessions for healthcare professionals focused on the latest evidence-based practices in managing postoperative care for hemiarthroplasty patients. This will help in recognizing and addressing potential complications promptly.
5. **Long-term Follow-up**: Implement a systematic follow-up protocol to monitor long-term outcomes such as functional recovery, quality of life, and any complications. This will provide valuable data for future studies and continuous improvement of care strategies.
6. **Research and Data Collection**: Encourage further research to explore the long-term effects of different rehabilitation strategies and the impact of various demographic factors on postoperative outcomes. This can help refine treatment approaches and improve the overall management of femoral neck fractures.

Limitations

1. **Single-Center Study**: This study was conducted at a single tertiary care hospital, which may limit the generalizability of the findings to other healthcare settings, especially in different geographic or socioeconomic contexts.
2. **Sample Size**: The sample size may not have been large enough to draw definitive conclusions about postoperative outcomes and complications, potentially affecting the statistical power of the analysis.
3. **Retrospective Design**: If the study utilized a retrospective design, there may be inherent biases in data collection, such as incomplete medical records or reliance on previously recorded outcomes, which can affect the reliability of the findings.
4. **Short Follow-Up Duration**: A limited follow-up period may not capture the long-term outcomes and complications associated with hemiarthroplasty, such as implant failure or the development of late-onset complications.
5. **Variability in Rehabilitation Protocols**: Differences in rehabilitation practices among patients could introduce variability in outcomes, making it difficult to attribute results solely to the surgical intervention.
6. **Patient Comorbidities**: The presence of multiple comorbidities may complicate the analysis of outcomes, as these factors can significantly influence recovery and overall results but may not have been uniformly assessed across all patients.

CONCLUSION

In conclusion, this study highlights the critical role of hemiarthroplasty in managing femoral neck fractures, particularly in the elderly population in North India. Our findings indicate that while this

surgical approach can lead to significant improvements in pain relief and functional outcomes, postoperative complications remain a concern that warrants attention. The assessment of demographic factors and comorbidities underscores the need for tailored treatment protocols to optimize recovery. By providing localized insights into postoperative outcomes, this research contributes to the broader understanding of effective surgical strategies and paves the way for improved patient care in similar healthcare settings.

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