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FUNCTIONAL RECOVERY AND PAIN OUTCOMES: A COMPARISON OF POSTERIOR AND LATERAL APPROACHES IN HIP HEMIARTHROPLASTY.

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Abstract:
Aim: This study aimed to compare the functional outcomes of hip hemiarthroplasty performed using posterior and lateral surgical approaches, specifically evaluating outcomes at immediate postoperative, 4-week, 8-week, 3-month, and 6-month follow-up periods.
Background: Hip fractures, particularly in the elderly, are a significant health concern. Hemiarthroplasty is a common surgical option for femoral neck fractures, with posterior and lateral approaches being frequently used. This study investigates the comparative effectiveness of these two approaches.
Methods: A retrospective analysis was conducted on 83 patients who underwent hip hemiarthroplasty at GIMSH, Durgapur, between January 2018 and March 2019. Data collected included perioperative blood loss, operative time, length of hospital stay, Harris Hip Score (HHS) at specified follow-up intervals, and complication rates. Statistical analysis was performed to compare outcomes between the posterior (n=52) and lateral (n=32) approach groups.
Results: The majority of patients were elderly (90.36% aged ≥60 years), with a near-equal distribution of males and females. The posterior approach demonstrated marginally better outcomes in terms of intraoperative blood loss, operative time, initiation of weight-bearing, and HHS scores at final follow-up. The lateral approach showed a slight advantage in length of hospital stay. However, no statistically significant differences were observed between the two approaches for any measured parameter.
Conclusion: This study found no statistically significant difference in functional outcomes or complication rates between posterior and lateral approaches in hip hemiarthroplasty. Therefore, the choice of surgical approach should be determined by surgeon preference and experience.

Introduction

Hip fractures, particularly those of the femoral neck, represent a significant and growing public health challenge, especially within aging populations. The projected rise in fracture incidence, from 1.6 million in 2000 to an estimated 6.26 million by 2050, underscores the urgency of optimizing treatment strategies. This escalating burden is intrinsically linked to demographic shifts, specifically the increasing prevalence of osteoporosis and age-related frailty. In the elderly, even minor falls resulting from diminished bone density can lead to severe femoral neck fractures, while younger individuals often sustain these injuries due to high-energy trauma. Prompt and effective management of femoral neck fractures is crucial to minimize morbidity, mortality, and functional decline. Surgical

intervention is typically the preferred course of treatment, with two primary options available: hemiarthroplasty and total hip arthroplasty. Hemiarthroplasty, involving the replacement of the femoral head with a prosthesis, is frequently favored for elderly patients due to its relatively shorter operative time, reduced surgical trauma, and accelerated recovery compared to total hip arthroplasty. This is particularly advantageous in patients with comorbidities, where prolonged anesthesia and extensive surgical procedures pose increased risks. The choice of surgical approach in hemiarthroplasty is a critical determinant of postoperative outcomes. Two commonly employed approaches are the posterior and lateral techniques. The posterior approach, traditionally favored for its extensile exposure and ease of femoral component insertion, involves dissection through the posterior soft tissues, including the short external rotators. Conversely, the lateral approach, often preferred for its reduced risk of posterior dislocation, utilizes a more direct lateral exposure, typically involving splitting the gluteus medius muscle. Each approach has its inherent advantages and disadvantages, sparking ongoing debate regarding their comparative effectiveness. The posterior approach, while providing excellent visualization and access to the hip joint, has been associated with a higher risk of postoperative dislocation due to the disruption of posterior soft tissues. Conversely, the lateral approach, while potentially reducing dislocation risk, may lead to increased muscle damage and subsequent functional limitations. The debate surrounding these approaches is further complicated by variations in surgical technique, implant design, and patient-specific factors. Evaluating functional outcomes following hip hemiarthroplasty is paramount to determine the optimal surgical approach. The Harris Hip Score (HHS), a widely recognized and validated tool, is commonly used to assess pain, function, and range of motion. This score provides a comprehensive evaluation of patient recovery and is essential for comparing outcomes between different surgical techniques. Despite the widespread use of both posterior and lateral approaches, there remains a lack of consensus regarding their relative merits. Existing literature presents conflicting results, with some studies favoring one approach over the other, while others report no significant differences. Furthermore, many studies are limited by small sample sizes, retrospective designs, and heterogeneous patient populations, making it difficult to draw definitive conclusions. Therefore, this prospective study aims to comprehensively evaluate the functional outcomes of hip hemiarthroplasty performed using posterior and lateral surgical approaches. By analyzing a cohort of patients undergoing hemiarthroplasty at a tertiary care center, this study seeks to provide valuable insights into the comparative effectiveness of these two commonly used techniques. Specifically, the study will assess perioperative parameters, including blood loss and operative time, as well as postoperative functional outcomes, including Harris Hip Score at various time points and complication rates. The findings of this study are expected to contribute to the existing body of knowledge and inform clinical decision-making regarding the optimal surgical approach for hip hemiarthroplasty. By providing evidence-based recommendations, this research will ultimately improve patient outcomes and enhance the quality of care for individuals with femoral neck fractures. Addressing the ongoing debate regarding surgical approaches will allow surgeons to make informed choices based on concrete data, ultimately leading to better patient recovery and quality of life.

Materials and Methods:

Study Design and Setting:

This prospective observational study was conducted at the Department of Orthopaedics, GIMSH, Durgapur, India, from January 1, 2018, to March 31, 2019.

Patient Selection:

Patients admitted with a diagnosis of femoral neck fracture who underwent hemiarthroplasty were included. Informed consent was obtained from all participants.

- **Inclusion Criteria:**
  - Diagnosed femoral neck fracture.

- Hemiarthroplasty performed using either a posterior or lateral surgical approach.
- Patient consent and willingness to participate in follow-up.
- Ability to complete 6 months of follow-up.

- **Exclusion Criteria:**
- Revision hip surgery.
- Contralateral hip surgery.
- Pathological fractures.
- Hemiarthroplasty performed using surgical approaches other than posterior or lateral.

Surgical Procedure and Postoperative Care: Patients presenting with femoral neck fractures were initially managed according to Advanced Trauma Life Support (ATLS) protocols. Following stabilization and pre-operative evaluation, hemiarthroplasty was performed. The surgical approach (posterior or lateral) and implant type (cemented or uncemented) were recorded. Postoperatively, patients received physiotherapy, including early weight-bearing with support and quadriceps exercises.

Data Collection: Data were collected using a standardized proforma. The following variables were recorded:

- Demographics: Age, sex, employment status.
- Injury Characteristics: Mode of injury, ASA grade, Garden classification of fracture, time from injury to surgery.
- Surgical Details: Surgical approach (posterior or lateral), implant type (cemented or uncemented), operative time, intraoperative blood loss.
- Postoperative Outcomes: Time to initiation of full weight-bearing (with and without support), Harris Hip Score (HHS) at <5 days, 4 weeks, 8 weeks, 3 months, and 6 months postoperatively, functional outcome grade based on final HHS, and incidence of complications.

Follow-up: Patients were followed up at 4 weeks, 8 weeks, 3 months, and 6 months postoperatively. HHS scores and complication data were recorded at each visit.

Statistical Analysis: Collected data were compiled and subjected to appropriate statistical analysis to compare outcomes between the posterior and lateral surgical approach groups.

Results

A total of 83 patients were included in the final analysis. 52 patients underwent hemiarthroplasty using the posterior approach, while 32 patients underwent the lateral approach. The majority of patients were elderly, with 90.36% aged 60 years or older. There was a near-equal distribution of sex, with 43 females (51.80%) and 40 males (48.19%). The mean age was 70.74 years (SD 10.51) in the lateral approach group and 73.54 years (SD 10.25) in the posterior approach group. A domestic fall or fall on level ground was the predominant mode of injury, accounting for 95.18% (79 patients) of cases. Garden type 4 fractures were more prevalent (66.26%, 55 patients) than Garden type 3 fractures (33.73%, 28 patients). Patients with better initial ASA grades demonstrated a trend towards improved functional outcomes, approaching statistical significance. Cemented bipolar implants were used in 86.74% (72 patients), while uncemented implants were used in 13.25% (11 patients). Patients experiencing any postoperative complications had statistically significantly poorer functional outcomes compared to those without complications.

Comparative Analysis of Surgical Approaches: The posterior approach demonstrated marginally better results in terms of intraoperative blood loss, operative time, time to initiation of weight-bearing (with and without support), and Harris Hip Score (HHS) at all follow-up intervals, including the final assessment. However, these differences were not statistically significant. The lateral approach showed

a slight advantage in terms of hospital stay duration, but this difference was also not statistically significant. There was no statistically significant difference in the overall incidence of complications between the two surgical approaches. Notably, the only observed cases of foot drop and hip dislocation occurred in patients who underwent the posterior approach.

Case Illustrations:

- **Case 1:** A 63-year-old female with a Garden type 4 fracture sustained from a fall on level ground underwent hemiarthroplasty using the posterior approach with a cemented implant. The operative time was 115 minutes, with 500 ml of intraoperative blood loss. The patient achieved a good functional outcome.
- **Case 2:** A 69-year-old female with a Garden type 4 fracture from a fall on level ground underwent hemiarthroplasty using the posterior approach with a cemented implant. The operative time was 135 minutes, with 400 ml of intraoperative blood loss. The patient achieved a good functional outcome.
- **Case 3:** An 82-year-old male with a Garden type 4 fracture from a fall on level ground underwent hemiarthroplasty using the lateral approach with a cemented implant. The operative time was 120 minutes, with 500 ml of intraoperative blood loss. The patient achieved a good functional outcome.

Discussion

This prospective study evaluated the functional outcomes of hip hemiarthroplasty using posterior and lateral surgical approaches in 83 patients with femoral neck fractures. The study population predominantly comprised elderly individuals, reflecting the established association between age, osteoporosis, and fracture risk.

The demographic profile of our cohort aligns with previous research. The mean age of 72.49 years and the predominance of level ground falls as the mechanism of injury underscore the vulnerability of the elderly population to these fractures. Similar findings were reported in studies by Prasad et al., Hongisto et al., and Parker et al., reinforcing the consistency of these observations across diverse patient populations.

Our study found no significant difference in functional outcomes between the posterior and lateral approaches, as assessed by the Harris Hip Score (HHS) at 6 months. While the posterior approach demonstrated a slight numerical advantage in achieving good outcomes, this difference was not statistically significant. This finding is consistent with prior studies that have reported no clinically relevant differences between the two approaches.

The lack of significant differences in intraoperative blood loss and operative time between the two approaches further supports the notion that surgical approach may not substantially influence these perioperative parameters. This aligns with findings from studies by Parker et al., Hongisto et al., and Prasad et al., which also reported no significant differences in blood transfusion requirements or operative time between the approaches.

The impact of patient-related factors on functional outcomes was also explored. We found that gender, fracture displacement (Garden type), and age did not significantly influence outcomes. However, patients with better initial ASA grades demonstrated a trend towards improved functional outcomes, approaching statistical significance. This highlights the importance of patient comorbidities in predicting postoperative recovery. Furthermore, the occurrence of postoperative complications significantly impacted functional outcomes, emphasizing the need for meticulous surgical technique and postoperative care to minimize complications.

Our study revealed that the overall incidence of complications was similar between the two approaches, although the only instances of foot drop and hip dislocation occurred in the posterior approach group. This observation aligns with previous reports suggesting a potentially higher risk of dislocation with the posterior approach. However, the overall difference in complication rates was not statistically significant.

The lack of statistically significant differences between the posterior and lateral approaches in our study suggests that surgeon preference and experience may play a crucial role in determining the optimal approach for individual patients. The choice of approach should be tailored to the patient's

specific needs and the surgeon's expertise to maximize functional outcomes and minimize complications.

Limitations of this study include its single-center design and relatively modest sample size. Future multicenter studies with larger cohorts are warranted to further investigate the comparative effectiveness of these surgical approaches and to identify patient subgroups that may benefit from one approach over the other. Additionally, long-term follow-up studies are needed to assess the durability of functional outcomes and the incidence of late complications.

In conclusion, our study found no statistically significant difference in functional outcomes, perioperative parameters, or overall complication rates between the posterior and lateral approaches in hip hemiarthroplasty. The choice of surgical approach should be individualized based on patient factors and surgeon experience.

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