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ORIGINAL RESEARCH

Direct superior approach for hemi replacement arthroplasty of hip in elderly patients with neck of femur fracture: VAS SCORE (Pain Outcome)

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ABSTRACT
Neck of femur fractures are common injuries, especially seen in the elderly people. The common modality of treatment for neck of femur fracture in elderly people is hemiarthroplasty of hip. This study was performed to evaluate the functional outcome of the bipolar hemiarthroplasty by direct superior approach among elderly paents with femoral neck fracture. Tradional posterior approaches to the hip, posterolateral and mini-posterior, violate the iliobial band and the short external rotators, specifically the quadratusfemoris and obturatorexternus muscles. A prospective study in 31 patients aged more than 65years with neck of femur fracture and treated with hemiarthroplasty of hip by direct superior approach was undertaken and post operavely was assessed at 6,12,24 weeks using Harris hip score and Visual analogue scale. Mobilization day post op and cessation of walking aids in weeks post op was also observed. Pain outcomes assessed by the Visual Analog Scale (VAS) indicated a progressive decrease in pain; at 6 weeks, 9.7% of patients had a VAS score of 0, 38.7% a score of 1, 29.0% a score of 2, 16.1% a score of 3, and 6.5% a score of 4; at 12 weeks, the distribution shifted to 61.3% with a score of 0, 29.0% with a score of 1, 6.5% with a score of 2, and 3.2% with a score of 3; and at 24 weeks, 67.7% reported a score of 0, 29.0% a score of 1, and 3.2% a score of 3.

Key words: Hemireplacementarthroplasty of hip, direct superior approach, functional outcome, harriship score, visual analogue scale

INTRODUCTION

Hip fractures, particularly femoral neck fractures, are a significant concern among the elderly population due to their high morbidity and mortality rates. These fractures often result from minor falls in individuals with osteoporotic bone conditions, making them a substantial public health issue. The management of femoral neck fractures has evolved over the years,withvarioussurgicalapproachesbeingexploredto optimize functional outcomes and minimize complications [1]. Among these, hemiarthroplasty has emerged as a preferred treatment modality for displaced femoral neck fractures in elderly patients, offering pain relief and early mobilization. Traditionally, the posterior and anterolateral approaches have been the most commonly employed surgical techniques for hemiarthroplasty. However, these approaches are associated with specific complications such as dislocation, abductor muscle damage, and prolonged rehabilitation. In recent years, the direct superior approach has gained attention as an alternative that may potentially enhance functional outcomes in elderly patients undergoing hemiarthroplasty[2].

The direct superior approach is a muscle-sparing technique that aims to reduce soft tissue trauma

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whileproviding adequate exposure for femoral component implantation. Unlike the traditional posterior approach, which necessitates detachment of the short external rotators, or the anterolateral approach, which involves disruption of the abductor mechanism, the direct superior approach preserves the integrity of these critical muscle groups [3]. By minimizing muscle damage, this approach is theorized to facilitate a more stable hip construct, reduce the risk of dislocation, and accelerate postoperative rehabilitation. Given that elderly patients often have limited physiological reserves and a reduced capacity for prolonged rehabilitation, a surgical approach that enhances early recovery and functional independence is highly desirable [4].

One of the fundamental aspects of successful hemiarthroplasty is the restoration of hip biomechanics, including joint stability, leg length equality, and optimal range of motion. The direct superior approach allows for precise implantation of the femoral prosthesis with minimal soft tissue disruption, thereby promoting biomechanical stability. The preservation of the external rotators and posterior capsule is particularly advantageous in reducing the risk of postoperative dislocation, which remains a significant concern in hemiarthroplasty procedures. Moreover, the superior capsular preservation provided by this approach contributes to a more natural hip kinematics, potentially improving patient satisfaction and long-term functional outcomes [5].

Pain management is another crucial factor influencing postoperative recovery and overall functional outcome. The direct superior approach, by virtue of its muscle-sparing nature, is associated with reduced intraoperative bleeding, lowerpostoperativepainscores,anddecreasedopioid requirements. These advantages are particularly relevant in the elderly population, where excessive opioid use can lead to delirium, respiratory depression, and prolonged hospitalization. By minimizing surgical trauma and postoperative pain, the direct superior approach may facilitate early mobilization, thereby reducing the risk of complications such as deep vein thrombosis, pressure ulcers, and pneumonia, which are common concerns in elderly patients undergoing hip surgery [5,6].

METHODOLOGY

STUDY DESIGN

The study was designed as a prospective observational study. This approach was chosen to evaluate the functional outcomes of the direct superior approach for hemireplacementarthroplasty of the hip in elderly patients with neck of femur fractures. The prospective nature allowed for systematic data collection and follow-up assessments over time.

INCLUSION CRITERIA

1. Patients aged above 65 years of either sex.
2. Patients diagnosed radiologically with a neck of femur fracture.
3. Patientswillingtoprovideinformedconsent for participation.

EXCLUSION CRITERIA

1. Patients with active systemic or local infection.
2. Patientswithfracturesaroundthehip or ipsilateral/contralateral lower limb injuries.

STUDY SAMPLING

A non-random purposive sampling technique was employed for participant selection. Patients meeting the eligibility criteria were recruited consecutively from the orthopedic department's inpatient admissions.

STUDY SAMPLE SIZE

The sample size was calculated based on a previous study by Hu W. *et al*., where the Harris Hip Score at 24 weeks after surgery was 86.42 ± 1.89. Using the standard formula for sample size calculation and assuming a 10% loss to follow-up, a minimum of 31 patients was required for the study.

STUDY GROUPS

Since this was a single-arm observational study, all participants underwent hemireplacementarthroplasty using the direct superior approach. No comparative groups were established.

RESULTS

At 6 weeks postoperatively, the Visual Analog Scale (VAS) data for pain assessment among 31 patients indicates varying levels of pain intensity. Only 9.7% (3 patients) reported no pain (VAS score 0), while the majority experienced mild pain, with 38.7% (12 patients) scoring 1 and 29.0% (9 patients) scoring 2. Moderate pain was observed in 16.1% (5 patients) at a score of 3, and a small fraction (6.5%, 2 patients) reporteda score of 4. This distribution suggests that most patients were managing relatively low pain levels at this early recovery stage, supporting effective pain management strategies following the surgery.

Table 1: Frequency Distribution-6W VAS Scores

6W VAS	Frequency	Percent
0	3	9.7
1	12	38.7
2	9	29.0
3	5	16.1
4	2	6.5

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Total	31	100.0

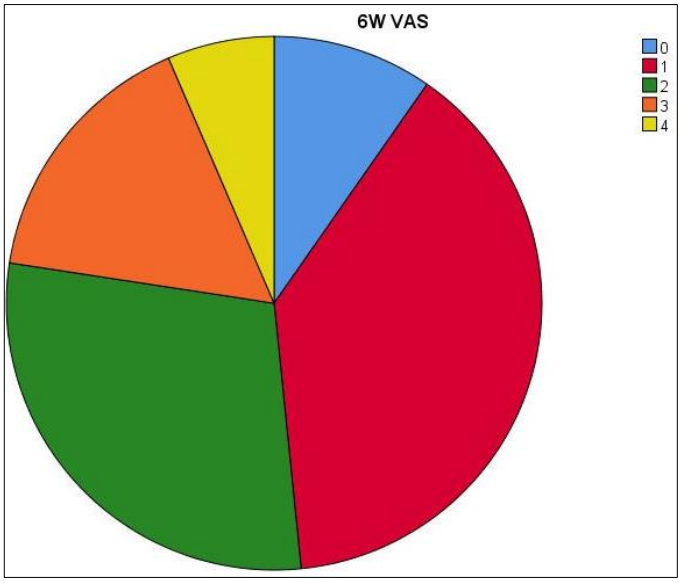

Figure 1: Pie chart showing frequency distribution-6W VAS Scores

At 12 weeks postoperatively, the Visual Analog Scale (VAS) scores for pain assessment reveal a significant improvement compared to earlier time points. The majority of patients (61.3%, or 19 patients) reported no pain with a VAS score of 0, indicating effective pain relief and recovery. Additionally, 29.0% (9 patients) experienced minimal pain with a score of 1, while only 6.5% (2 patients) and 3.2% (1 patient) reported scores of 2 and 3, respectively. This distribution suggests that most patients achieved substantial pain reduction by the 12-week mark, reflecting positive outcomes of the surgical intervention and postoperative pain management strategies.

Table 2: Frequency Distribution-12W VAS Scores

12W VAS	Frequency	Percent
0	19	61.3
1	9	29.0
2	2	6.5
3	1	3.2
4	2	6.5
Total	31	100.0

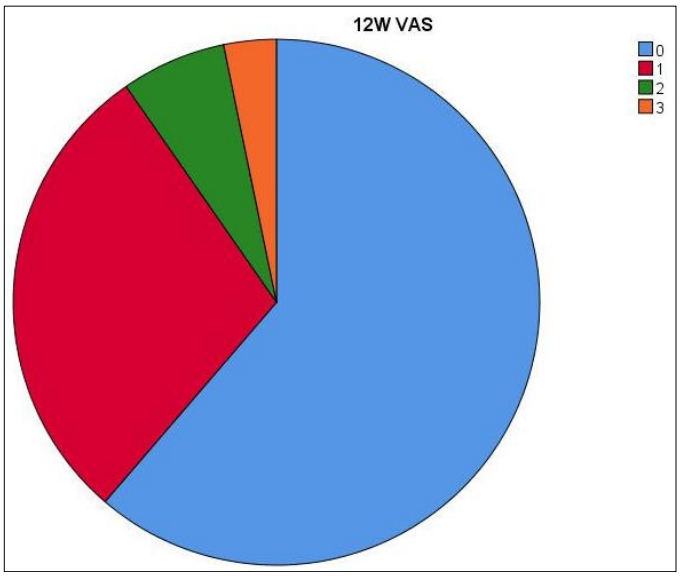

Figure 2: Pie chart showing frequency distribution-12W VAS Scores

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At 24 weeks postoperatively, the VAS scores indicate further improvement in pain management compared to earlier evaluations. A substantial majority of the patients, 67.7% (21 patients), reported no pain (VAS score 0), which highlights the success of the surgical intervention and rehabilitation protocols. Minimal pain was still experienced by 29.0% (9 patients) with a score of 1, while only one patient (3.2%) reported moderate pain (VAS score 3). These results suggest that the majority of patients continued to benefit from effective pain relief over time, with the pain levels significantly diminishing as recovery progressed.

Table 3: Frequency Distribution-24W VAS Scores

12W VAS	Frequency	Percent
0	21	67.7
1	9	29.0
2	1	3.2
Total	31	100.0

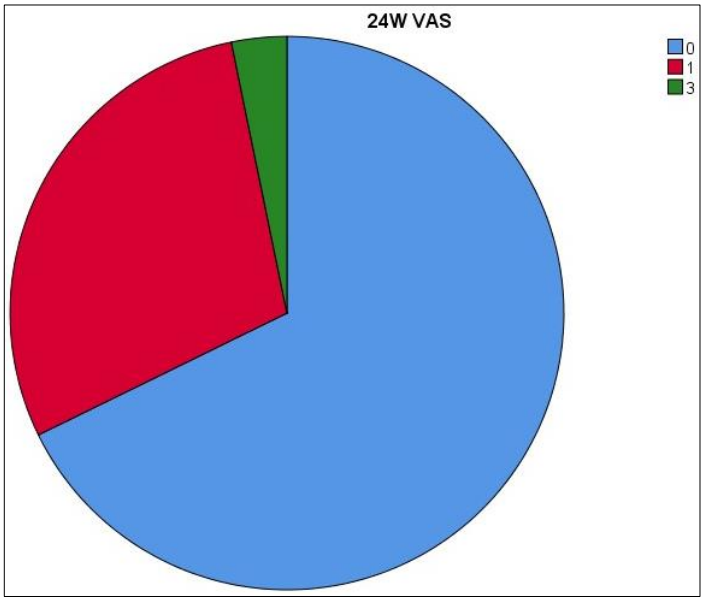

Figure 3: Pie chart showing frequency distribution-24W

VAS Scores

Thepairedt-testforVASscoresindicatesasignificantreduction in pain levels over the study period. Comparing the 6-week and 12-week assessments, a mean difference of 1.194 (t = 7.616, df = 30, p = 0.000) was found, signifying a marked decrease in pain early in the recovery process. The subsequent comparison between 12-week and 24-week scores, although showing a smaller mean difference of 0.129, remained statistically significant (t = 2.108, df = 30, p = 0.043). These results demonstrate that pain management was effective and that patients experienced progressive relief over time. The improvement in VAS scores supports the overall success of the surgical intervention and rehabilitation strategy.

Table 4: Paired t-Test Analysis-VAS Scores

		Mean	Std.	Deviation t	df	Pvalue
Pair1	6WVAS	1.194	0.873	7.616	30	0.000
	12WVAS					
Pair2	12W VAS	0.129	0.341	2.108	30	0.043
	24WVAS					

DISCUSSION

Pain management, as assessed by the Visual Analog Scale (VAS), showed significant improvement in our study. At 6 weeks, only 9.7% of patients reported a VAS score of 0, while scores of 1, 2, 3, and 4 were observed in 38.7%,29.0%, 16.1%, and 6.5% of patients, respectively. By 12 weeks, the percentage of patients with no pain (VAS score0) increased to 61.3%, with minimal scores observed thereafter; at 24 weeks, 67.7% of patients reported no pain, and the remaining patients exhibited only minimal discomfort (VAS scores 1 and 3). The paired t-test analysis further confirmed significant reductions in pain between 6 and 12 weeks (mean difference of 1.194, p = 0.000) and a smaller yet statistically significant improvement from 12 to 24 weeks (mean difference

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of 0.129, p = 0.043). These findings are in agreement with previous reports; Mallegowda*et al*. (2020) demonstrated that 95% of patients experienced slight or no pain postoperatively [7]. Additionally, studies by Peng*et al*. (2023) [8] and Hu *et al*. (2023) [9] have shown that minimally invasive approaches, like the direct superior approach used in our study, result in rapid pain reduction. Furthermore, Saiyam*et al*. (2023) reported that total hip replacement yielded significantly lower pain scores compared to bipolar hemiarthroplasty[10], although our focus on consistent pain alleviation acrossthe follow-upperiod alignswith these observations. The uniform reduction in VAS scores throughout the postoperative period underscores the effectiveness of our pain management protocols and rehabilitation regimen, thereby contributing to improved overall patient outcomes and enhanced functional recovery in elderly patients.

CONCLUSION

Pain outcomes assessed by the Visual Analog Scale (VAS) indicated a progressive decrease in pain; at 6 weeks, 9.7% of patients had a VAS score of 0, 38.7% a score of 1, 29.0% a score of 2, 16.1% a score of 3, and 6.5% a score of 4; at 12 weeks, the distribution shifted to 61.3% with a score of 0, 29.0% with a score of 1, 6.5% with a score of 2, and 3.2% with a score of 3; and at 24 weeks, 67.7% reported a score of 0, 29.0% a score of 1, and 3.2% a score of 3.

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