Dislocation of Bipolar Hip Hemiarthroplasty in the Elderly: Comparison of the Posterolateral and Anterolateral Approaches

Arturo Aguilar Maldonado, José Luis Lecca Zavaleta
Pelvis and Hip Unit, Traumatology Service, Hospital Guillermo Almenara Irigoyen, Lima, Peru

ABSTRACT

Objective: To compare the risk of bipolar hip hemiarthroplasty dislocation after femoral neck fracture using the posterolateral versus the anterolateral approach. **Materials and Methods:** Patients older than 60 years who underwent bipolar hip hemiarthroplasty for femoral neck fracture between 2020 and 2021 were included. The number of dislocations following the posterolateral or anterolateral approach was recorded. **Results:** Seventy-nine cases were included: 46 (58.8%) were treated with the posterolateral approach and 33 (41.8%) with the anterolateral approach. There were 3 dislocations in the posterolateral group and 2 in the anterolateral group; no significant differences were found (p = 0.655). **Conclusions:** There were no differences in the risk of bipolar hemiarthroplasty dislocation between the posterolateral and anterolateral approaches in the treatment of femoral neck fractures in the elderly.

Keywords: Hip prosthesis; hip dislocation; femoral neck fracture; elderly.
Level of Evidence: III

Luxación de la prótesis bipolar de cadera en adultos mayores. Comparación de los abordajes posterolateral y anterolateral

RESUMEN

Objetivo: Comparar el riesgo de luxación de la prótesis bipolar de cadera con los abordajes posterolateral y anterolateral en el tratamiento de una fractura de cuello femoral. **Materiales y Métodos:** Se incluyó a pacientes >60 años operados con una prótesis bipolar de cadera por fractura de cuello femoral durante 2021 y 2022. Se determinó la cantidad de luxaciones de prótesis colocadas con los abordajes posterolateral o anterolateral. **Resultados:** Se incluyeron 79 casos: 46 (58,8%) operados con un abordaje posterolateral y 33 (41,8%) con un abordaje anterolateral. Se produjeron 3 luxaciones con el abordaje posterolateral y 2 con el anterolateral, no se hallaron diferencias significativas (p = 0,655). **Conclusiones:** No se hallaron diferencias entre los abordajes posterolateral y anterolateral respecto del riesgo de luxación de la prótesis bipolar en el tratamiento de una fractura de cuello femoral en el adulto mayor.

Palabras clave: Prótesis de cadera; luxación de cadera; fracturas de cuello femoral; adulto mayor.
Nivel de Evidencia: III

INTRODUCTION

Femoral neck fractures can be classified by degree of displacement; the most commonly used system is the Garden classification,[1] which divides them into nondisplaced and displaced to improve interobserver agreement.[2] The incidence of avascular necrosis and nonunion is higher in older adults with displaced fractures;[3] therefore, hip arthroplasty is the treatment of choice, and bipolar hemiarthroplasty is an option in older adults with low functional demand.[4]

Hip prostheses can be implanted through several approaches, such as anterior, anterolateral, and posterolateral.[5,6] At our institution, the posterolateral and anterolateral approaches are currently used.

Received on May 27th, 2024. Accepted after evaluation on June 17th, 2025 • Dr. ARTURO AGUILAR MALDONADO • aam_md@hotmail.com https://orcid.org/0000-0002-6721-9803
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In a meta-analysis of five randomized trials and 26 cohort studies, Shuai et al.[7] compared different surgical approaches for hemiarthroplasty and found that the posterolateral approach was associated with more prosthetic dislocations (odds ratio [OR] 3.00). In another meta-analysis by Van der Sijp et al.[8] on surgical approaches for hemiarthroplasty, the risk of dislocation was higher after the posterolateral approach than after the anterolateral approach (OR 2.90; p = 0.003). Notably, both meta-analyses included studies of posterolateral, anterolateral, and anterior approaches. However, Parker's randomized study of 216 patients, included in both meta-analyses, is the only one that compares solely the anterolateral versus the posterolateral approach for hemiarthroplasty, and it found no significant differences in prosthetic dislocation.[9]

At our institution, the anterolateral and posterolateral approaches are used for bipolar hip prosthesis surgery. As we consider the available information inconclusive, we conducted a study to evaluate bipolar prosthesis dislocation with both approaches.

MATERIALS AND METHODS

A retrospective cross-sectional study was conducted including patients >60 years of age with femoral neck fractures who underwent bipolar hemiarthroplasty during 2021 and 2022. Patients with a history or sequelae of Parkinson's disease, cerebrovascular disorder, or disorders of consciousness were excluded.

For the anterolateral approach, the patient was placed in the lateral decubitus position; the technique consisted of dissection through the gluteus medius and minimus tendons with an anterior capsulotomy of the hip joint. For the posterolateral approach, the patient was also placed in lateral decubitus; dissection proceeded through the short external rotators (pelvitrochanteric muscles) with capsulotomy, and both capsule and short external rotators were repaired at the end of the procedure. A bipolar prosthesis was used with a polished straight cemented stem and a modular bipolar cup. Dislocation of the hip prosthesis was defined as loss of continuity between the bipolar cup component and the acetabulum.

Patient data were retrieved from medical records and radiographs in the hospital information system. A data collection form captured: surgical approach, age, sex, comorbidities, postoperative complications, management after dislocation, time from fracture to surgery, and mortality (in months) from the date of surgery. Data were entered into a database for statistical analysis in compliance with patient confidentiality and privacy protocols.

Records were collected confidentially, anonymized, and protected using numeric identifiers, with security measures to prevent unauthorized access. Individual informed consent was not required because no additional data were collected from participants. The study was approved by the Hospital Ethics Committee.

Statistical Analysis

To assess the association between surgical approach (anterolateral vs. posterolateral) and postoperative dislocation, we used contingency analysis. A two-way contingency table was constructed and a χ^2 test of independence was performed; when expected cell counts were low, Fisher's exact test was applied. This determined whether a significant relationship existed between approach and postoperative dislocation.

Age, sex, comorbidity, management after dislocation, and the number and experience of participating surgeons were also analyzed. These variables were summarized descriptively (frequencies and percentages) and their association with approach was explored. Kaplan-Meier survival curves were constructed to analyze mortality with a minimum follow-up of 1 year; months-to-mortality were obtained from the medical record.

Statistical analyses were performed with SPSS version 25. A p value <0.05 was considered statistically significant.

RESULTS

During 2021-2022, eighty-two bipolar prostheses were implanted for femoral neck fractures. Seventy-nine patients met inclusion criteria and were analyzed. Mean age was 89 years (range 64–96); 56 were women (70.9%) and 23 men (29.1%). A posterolateral approach was used in 58.8% and an anterolateral approach in 41.8%. The dislocation rate of bipolar hip prostheses was 6.3% (three cases after the posterolateral approach and two after the anterolateral approach; p = 0.655).

Two patients sustained periprosthetic fractures (2.5%), and three (3.8%) developed periprosthetic joint infection (Table).

Comorbidities were: diabetes mellitus (18 cases; 22.8%), chronic kidney disease (7; 8.9%), hypertension (33; 41.8%), cancer (1; 1.3%), Parkinson's disease (4; 5.1%), and sequelae of cerebrovascular disorder (5; 6.3%).

Table. Indicators for the posterolateral and anterolateral approaches.

	Posterolateral approach		Anterolateral approach		p
Number of patients	**46**		**33**		
Age (years)	83.8 (63-96)		83.4 (65-95)		0.342
Female	32	69.6%	24	72.7%	0.481
Dislocation	3	6.5%	2	6.1%	0.655
Infection	3	6.5%	0	0%	0.192
Periprosthetic fracture	1	2.2%	1	3.0%	0.664
Cumulative mortality	16	34.8%	10	30.3%	0.432

The 1-year mortality rate was 21.51% overall (11 deaths after the posterolateral approach [23.91%] and 6 after the anterolateral approach [18.18%]). Mean time from fracture to surgery was 14.91 days (range 2–51). Survival was lower when surgery was performed more than 7 days after the fracture, although this difference was not statistically significant (p = 0.627) (Figure).

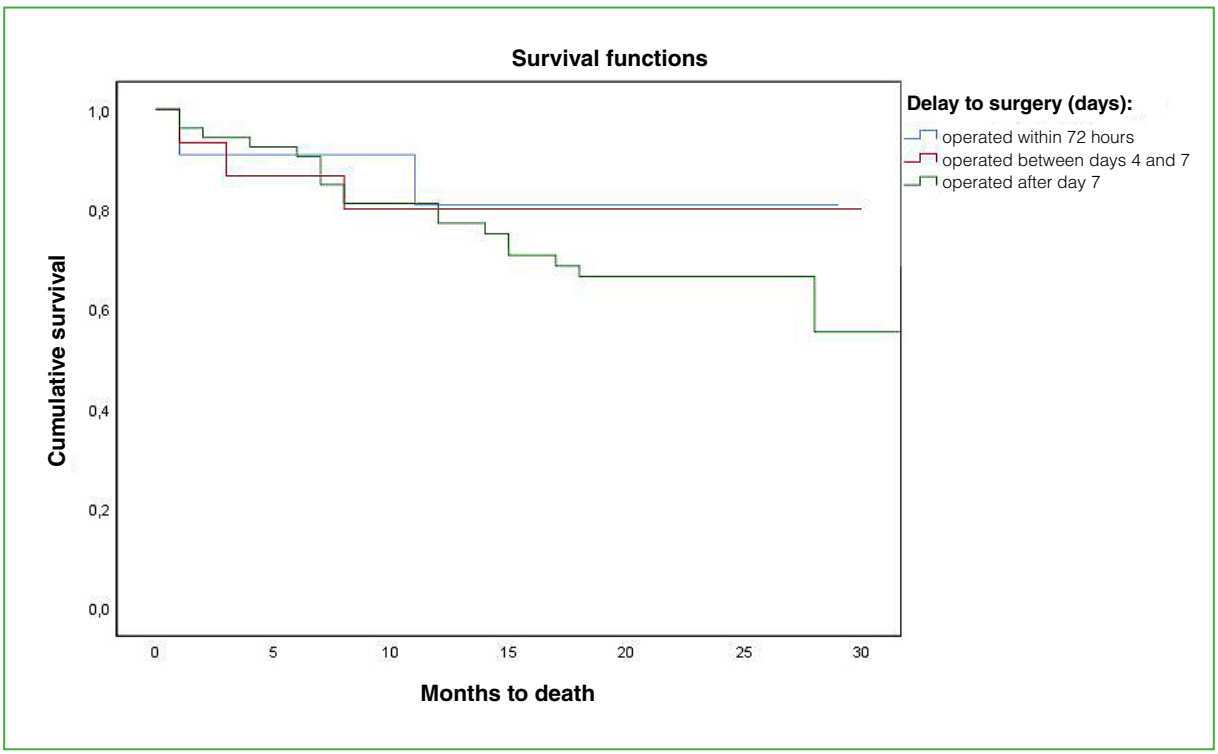

Figure. Cumulative survival in months. Deaths among those operated on within 72 hours, between the 4th and 7th day, and after the 7th day.

Fifteen surgeons from the Hip Unit participated. Twenty-six operations were performed by surgeons with <10 years' experience (five surgeons). Four of the five dislocation episodes of the bipolar prosthesis (two after anterolateral and two after posterolateral approach) occurred in this setting; dislocation risk was higher with less-experienced surgeons ($p = 0.038$).

DISCUSSION

In this study, there were no differences in dislocation episodes between the posterolateral and anterolateral approaches for treating femoral neck fractures with bipolar hemiarthroplasty. Likewise, Parker[9] found no differences in dislocation when comparing anterolateral versus posterolateral approaches for hemiarthroplasty. Mukka et al. conducted a prospective cohort including 102 patients operated through an anterolateral approach and 83 through a posterolateral approach; there were two single dislocation events after the posterolateral approach and only one after the anterolateral approach.[10] Enocson et al., in a retrospective study of 739 hemiarthroplasties, reported an increased risk of hip prosthesis dislocation with the posterolateral approach (OR 3.9).[11]

In our series, the 1-year mortality rate was 21.51%. Survival was higher in those who underwent surgery within the first 7 days after fracture, although this difference was not significant. Guzon-Illescas et al., in a retrospective cohort of 3,992 hip-fracture patients, reported a cumulative mortality of 33%.[12] In the NOREPOS study,[13] 1-year mortality after hip fracture was 33% in men and 21% in women. In our study, 1-year mortality by sex was 39.1% and 30.4%, respectively. Parker reported 1-year mortality of 18.5% with the posterolateral approach and 9% with the anterolateral approach for hemiarthroplasty;[9] in our series, 1-year mortality was similar to Parker's (23.91% with the posterolateral approach vs. 18.18% with the anterolateral approach).

Timing of surgery has also been extensively studied. In a systematic review and meta-analysis, Chang et al. found that surgery performed after 2 days was associated with significantly increased mortality (OR 1.91).[14] Rae et al. reported 30-day mortality of 5.8% in those operated within 2 days versus 9.4% after 2 days, although without significant differences. [15] In our study, survival was significantly higher in patients operated within 7 days of the fracture.

According to our findings, surgeon experience is related to dislocation incidence ($p = 0.038$). Hedlundh et al. also found a relationship between dislocation and surgeon experience.[16]

This study has limitations: its retrospective design, small sample size, and non-homogeneous approach groups. Other factors may have influenced outcomes, such as the wide range in time-to-surgery attributable to hospital processes. Additional morbidity variables that can affect morbidity and mortality (e.g., *American Society of Anesthesiologists* classification, type of anesthesia, operative time, and nutritional status) were not analyzed.

CONCLUSIONS

There are no differences between posterolateral and anterolateral approaches regarding the risk of bipolar prosthesis dislocation in the treatment of femoral neck fractures in older adults. This finding should be interpreted with caution due to the small sample size over the study period, which precludes statistical significance. The prosthesis dislocation rate was higher among patients operated on by surgeons with fewer than 10 years of experience.

Conflicts of interest: The authors declare no conflicts of interest.

J. L. Lecca Zavaleta ORCID ID: https://orcid.org/0000-0002-3658-5309

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