SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Orthopedic Surgery

Complications of Bipolar Hemiarthoplasty: An Observational Study

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DOI: 10.36347/sasjs.2024.v10i07.003 | **Received:** 04.05.2024 | **Accepted:** 10.06.2024 | **Published:** 02.07.2024

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Abstract **Original Research Article**

***Background*:** The femoral neck fracture remains an uncovered fracture, and therapy guidelines are constantly improving. Hip fractures are a common injury in emergency rooms, particularly among the elderly. It is also seen in young patients who participate in athletics or suffer from high-energy injuries. To avoid problems, immediate diagnosis and treatment are necessary. ***Aim of the Study*:** The goal of this study was to investigate the complications of bipolar hemiarthoplasty for femoral neck fractures in the elderly. ***Methods*:** This study was conducted in 250 Bedded General Hospital, Pabna, Bangladesh, from January 2023 to January 2024. The study included patients who were admitted and underwent bipolar hemiarthroplasty. All collected data was entered into a Microsoft Excel Work Sheet and analyzed descriptively using SPSS 11.5. ***Results*:** The patients' ages varied from 60 to 85 years, with a mean of 66.5 years. Out of 100 patients, 55 (55%) were females and 45 (45%) were males. Of the 100 patients, 32 (32%) had fractures on the left side and 68 (68%) had fractures on the right side. In our study, 75 patients (75%) received injuries from falls on the ground, 19 patients (19%) from road traffic accidents, and 6 patients (6%) from assault. Out of 100 patients, 44 (44%) underwent surgery within <10 days of injury, 22 (22%) within 10-30 days, 7 (7%) within 30-50 days, 16 (16%) within 50-70 days, and 11 (11%) within >70 days. Out of 100 patients, 4 (4%) had a prosthesis with a 39 mm head size, 12 (12%) had a prosthesis with a 41 mm head size, 18 (18%) had a prosthesis with a 43 mm head size, 27 (27%) had a prosthesis with a 45 mm head size, 17 (17%) had a prosthesis with a 47 mm head size, and 18 (18%) had a prosthesis with a 49 mm head size. ***Conclusion*:** According to the study, even if the incidence of other complications was comparable to that reported in the literature, hemiarthroplasty was not a good procedure for patients with a longer life expectancy.

Keywords: Bipolar hemiarthoplasty, Femoral neck fractures, Harris hip score, Mini mental status.

INTRODUCTION

Femoral neck fractures, a common traumatic injury among the elderly, are on the rise due to global population aging and urbanization. With global economic volatility, health systems may need to spend more on fracture care. Current treatment standards may require revision and optimization [1]. Hip fractures globally are projected to grow from 1.7 million in 1990 to 6.3 million by 2050. Assuming a 1% annual rise in age-related incidence, the global number of hip fractures will reach 8.2 million by 2050 [2]. Hip hemiarthroplasty is preferred over internal fixation for older patients with displaced femoral neck fractures due to better pain relief, early ambulation, decreased re-operation rates, and other benefits [3]. Internal fixation is deemed preferable for younger patients [4]. Some publications have documented a significant re-operation rate for elderly patients with un-displaced fractures due to fixation failure, avascular necrosis of the femoral head, and other factors [5]. Bipolar hemiarthroplasty has several advantages over total hip arthroplasty, including a simpler surgical process, a smaller volume of blood, and a lower rate of dislocation [6]. Another explanation is that Asians are accustomed to civilizations that do not require seats. Naturally, people sit on the floor with their legs crossed, and most jobs for farmers and workers require them to squat for the majority of their labor. These habits require a greater range of motion for their hip joint, which should not be dislocated. Despite numerous reports of unacceptably high rates of discomfort and migration [7], bipolar hemiarthroplasty

remains popular in Asia. Hemiarthroplasty is the preferred surgical procedure for managing displaced intracapsular femoral neck fractures in older patients, as it restores mobility and prevents problems from limited ambulation [8]. However, there is a risk of morbidity and mortality during the perioperative period with this surgical technique [9]. This retrospective study examines the mortality rate and functional result of cemented bipolar hemiarthroplasty for femoral neck fractures in the elderly.

METHODOLOGY

This study was conducted in 250 Bedded General Hospital, Pabna, Bangladesh, from January 2023 to January 2024. The study included 100 patients aged 60 years or above of either sexes who had undergone bipolar hemiarthroplasty for fracture neck of femur and were admitted to the study institution. Each participant supplied written informed consent, and the research hospital's ethical review committee approved the study. Patients' functional and clinical outcomes were examined using Harris hip score (HHS), squatting and crossing legged tests, brief mental state evaluation, and timed up and go test. All collected data was entered into a Microsoft Excel Work Sheet and analyzed descriptively using SPSS 11.5.

RESULT

The patients' ages varied from 60 to 85 years, with a mean of 66.5 years (Table-1). Out of 100 patients, 55 (55%) were females and 45 (45%) were males (Table-2). Of the 100 patients, 32 (32%) had fractures on the left side and 68 (68%) had fractures on the right side (Table-3). In our study, 75 patients (75%) received injuries from falls on the ground, 19 patients (19%) from road traffic accidents, and 6 patients (6%) from assault (Table-4). Out of 100 patients, 44 (44%) underwent surgery within <10 days of injury, 22 (22%) within 10-30 days, 7 (7%) within 30-50 days, 16 (16%) within 50-70 days, and 11 (11%) within >70 days (Table-5). Out of 100 patients, 4 (4%) had a prosthesis with a 39 mm head size, 12 (12%) had a prosthesis with a 41 mm head size, 18 (18%) had a prosthesis with a 43 mm head size, 27 (27%) had a prosthesis with a 45 mm head size, 17 (17%) had a prosthesis with a 47 mm head size, and 18 (18%) had a prosthesis with a 49 mm head size (Table-6). Out of 100 patients, 19 died during follow-up, and two underwent total hip replacement. 79 patients were examined for functional outcome. Among 79 patients, 4 (4%) had great results, 10 (10%) had good results, 34 (34%) had medium results, and 52 (52%) had bad results (Figure-1). The mini-mental status evaluation revealed that 56 patients had no cognitive impairment, 22 had mild cognitive impairment, and 1 had severe cognitive impairment (Figure-2).

Table -1: Age of the patients (N=100)

Age in years	Frequency	Percent
60-70	70	70
71-80	25	25
81-85	5	5
Total	100	100
Mean	66.5	

Table-2: Sex of the patients (N=100)

Sex	Frequency	Percent
Male	45	45
Female	55	55
Total	100	100

Table-3: Side affected of the patients (N=100)

Side	Frequency	Percent
Left	32	32
Right	68	68
Total	100	100

Table-4: Mode of injury of the patients (N=100)

Mode of Injury	Frequency	Percent
Fall on ground	75	75
Road traffic accident	19	19
Assault	6	6
Total	100	100

Table-5: Duration from injury to surgery of the patients (N=100)

Duration from injury to surgery	Frequency	Percent
<10 days	44	44
10-30 days	22	22
30-50 days	7	7
50-70 days	16	16
>70 days	11	11
Total	100	100

Table-6: Size of prosthesis used in surgery among patients (N=100)

Head size (mm)	Frequency	Percent
39	4	4
41	12	12
43	18	18
45	27	27
47	17	17
49	18	18
51	4	4
Total	100	100

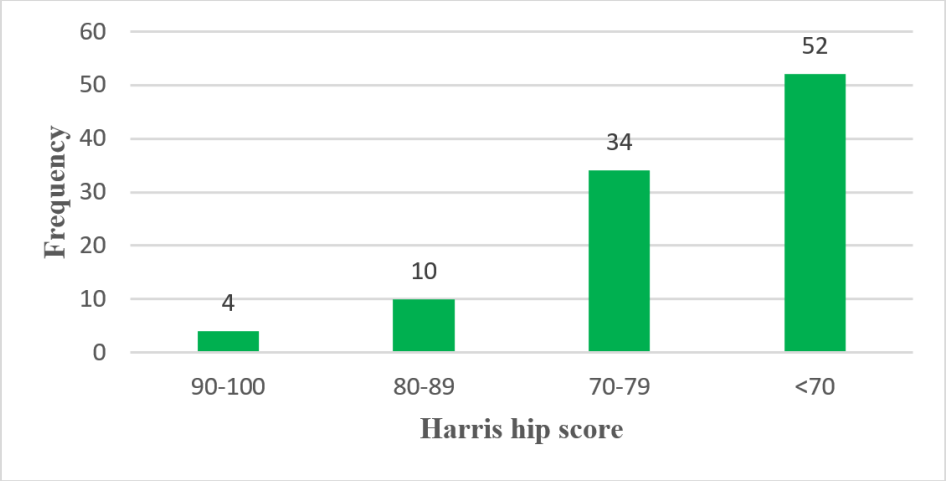

Figure-1: Harris hip score

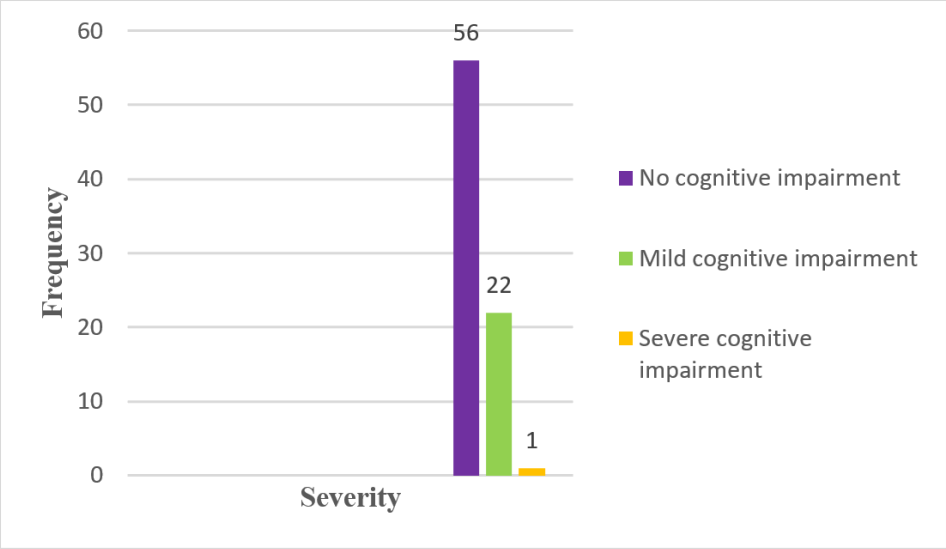

Figure-2: Mini mental status examination score

DISCUSSION

This study included 100 elderly patients with fracture neck femurs treated with cemented bipolar hemiarthroplasty. Our study included all patients over the age of 60, with the majority falling between the ages of 61 and 70. Out of 100 patients, 19 died during follow-up, and two had total hip replacements. 79 patients were evaluated for functional outcomes. Among the 79 patients, 4 (4%) had excellent results, 10 (10%) had good results, 34 (34%) had average results, and 52 (52%) had poor results. HHSs averaged 70.2 after one year, 66.8 after two, 66.9 after three, 66.9 after four, and 65.9 after five years. In a research by Benjamin Buecking *et al.*, (2016) [10], 126 elderly patients with displaced femoral neck fractures underwent bipolar hemiarthroplasty. The study found a mean HHS of 73. In a 6-month study of 30 patients undergoing bipolar hemiarthroplasty for intracapsular femoral neck fractures, Rajak *et al.*, reported a mean HHS of 83.1 [11]. In a 20-year prospective analysis of cemented bipolar hemiarthroplasty, von Roth *et al.*, [12] discovered a mean HHS of 63 ± 22 among 339 patients who were alive and did not require revision surgery. Bezwada *et al.*, [13] studied 246 cementless bipolar hemiarthroplasty patients and reported that after 2 years of follow-up, HHSs averaged 82 points (range 54-92). Seventeen patients (10%) scored 90-100, whereas 93 patients (55%) scored 80-89, 50 patients (30%) scored 70-79, and 8 patients (5%) scored <70. Out of all patients, 4 (4%) had deep infection, 6 (6%) had prosthesis dislocation after surgery, 1 patient (1%) had periprosthetic fracture, 2 patients (2%) had contralateral fracture, 1 patient (1%) had cognitive dysfunction, and 2 patients (2%) had revision surgery. 49 patients (49%) reported painful gait but walked independently, while 35 patients (35%) were unable to walk without support. In a study of 40 patients, Chaplin *et al.*, [14] discovered 11 periprosthetic fractures, 10 aseptic loosenings, 10 unexplained pains, 8 deep infections, and 1 dislocation. In a study of 150 elderly patients undergoing bipolar hemiarthroplasty for femoral neck fracture, Saberi *et al.*, [15] discovered 34 complications, including 11 deaths, 10 prosthesis dislocations, 6 infections, 4 wound infections, 2 systemic infections, 4 pulmonary emboli, 2 bed sores, and 1 heterotropic ossific fracture. Buecking *et al.*, (2015) [10] analyzed 126 elderly patients for displaced femoral neck fracture by bipolar hemiarthroplasty and reported surgical complications in 16 patients, including 5 hematomas, 4 seromas, 2 deep infections, 3 dislocations, 1 periprosthetic fracture, and 1 wound dehiscence. Out of 100 patients, 5 died within one month (5%), 7 died between two and six months (7%), and 10 died between seven months and a year. In 1993, Lennox and McLauchlan [16] conducted a research to investigate perioperative mortality in cemented hemiarthroplasty and discovered 6 fatalities out of 150 patients (4%) in <48 hours. Hannan *et al.*, [17] conducted a study in 2001 to identify and assess prefracture determinants of functional status and death at 6 months for patients hospitalized with a hip fracture. They also compared risk-adjusted outcomes for hospitals providing initial care. The inpatient mortality rate was 1.6%. At 6 months, the death rate was 13.5%, and another 12.8% required complete help to ambulate. Lim *et al.*, [18] conducted a study in 2009 to assess the death rate and associated risk variables in elderly patients with acute and monotraumatic femoral neck fractures. This study comprised 241 individuals who suffered femoral neck fractures following bipolar hemiarthroplasty. The postoperative mortality rate one and three years after surgery was 11.2% and 19.5%, respectively. There was a correlation found between postoperative mortality and age, surgery time, and the society of anesthesiologists score. They advised against delaying surgery and cautioning individuals in the high-risk group.

Limitation of the Study:

The study featured a single point of focus and minimal sample sizes. As a result, the study's conclusions may not completely reflect the entire situation.

CONCLUSION & RECOMMENDATION

According to the study, even if the incidence of other complications was comparable to that reported in the literature, hemiarthroplasty was not a good procedure for patients with a longer life expectancy.

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