Comparison of Clinical Function Outcomes of Patients Performed with Cemented and Uncemented Bipolar Hemiarthroplasty Surgery on Femoral Neck Fractures Using Modified Harris Hip Score and Proportion of Dislocations after Hip Joint Replacement Surgery in Medan

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Abstract

Introduction

Fractures of the neck femur that occur in the elderly are caused by minor trauma with most common age more than 50 years old. While in young adult patients, fractures of the neck femur are caused by severe trauma such as a fall from a height or a traffic accident. Hemiarthroplasty cemented or uncemented are the most common methods of treatment neck femur fracture in elderly patients. Modified Harris Hip Score (MHHS) is a tool to measure the functional capacity and pain to assess the conditions of the patients before and after surgical procedures

Methodology

This is an observational analytic research study with a case control design at Adam Malik Hospital Medan and several network hospitals in Medan. Total of 32 patients with age more than 50 years old were diagnosed with femoral neck fracture with 16 patients underwent cemented bipolar hemiarthroplasty and 16 patients underwent uncemented bipolar hemiarthroplasty surgery during the period September 2021 until August 2022 assessed clinical functional outcome with MHHS scores and the proportion of dislocation 1 month postoperative.

Result

Mean MHHS value for cemented bipolar hemiarthroplasty was 79.00±5.40 and uncemented bipolar hemiarthroplasty 78.81±7.43 and there were no dislocations 1 month post operation.

Discussion

Statistical analytic using independent T-Test showing there was no significant different between MHHS scores in cemented bipolar arthroplasty and uncemented bipolar hemiarthroplasty 1 months post operative with P Value 0.935 (>0.05) without any dislocations was found.

Keywords: Neck Femur Fracture, Modified Harris Hip Score, Bipolar Hemiarthroplasty

1. Introduction

Hip fracture is the most common injury and is found in geriatric patients so it can affect the health system as a whole. Despite the lack of support from the development of implants, surgical techniques and patient care, hip fractures still have a major impact on the existing health system. As many as 250,000 hip fractures in America occur each year and this number will double by 2050 as the geriatric population increases. With the development of the world of science and technology, the mobility of the Indonesian people is also getting higher and this can be seen by the increasing number of motorized vehicle users in Indonesia. (Bucholz et al, 2020).

The hip fracture mortality rate increases by 1 person in 1 year with a mortality range of around 14-36%. According to the journal that has been studied, one of the problems with fractures in the proximal femur is the patient's ability to return to activities before the trauma. 50% of these patients require assistance in carrying out their daily activities and as many as 25% require assistance in the long term to carry out daily activities. In addition, the type of proximal femoral fracture injury also has a significant increase in areas that have a trauma center. (Bucholz et al, 2020; Blomfeldt et al, 2007, p160-165)

Femoral neck and intertrochanteric fractures of the femur are the most common fractures in the elderly. This fracture is closely related to osteoporosis that occurs in the elderly. Fractures of the hip bone also often

occur at a young age that are not associated with osteoporosis but are associated with traffic accidents or falls from a height. (Dilogo IH et al, 2013, p1-15).

Arthroplasty has then become the method of choice in the majority of fractures of the hip region and in several prospective studies it has shown a better outcome and a lower ratio for reoperation. In old age hemiarthroplasty is more considered because it provides a shorter operating time, a simpler surgical technique and a lower risk of dislocation.

However, there is a risk of loss of the acetabular cartilage surface due to friction with metal material from the prosthetic femoral head so that in the future it requires conversion to a total hip arthroplasty. Several risk factors for acetabular joint cartilage erosion are young age, high activity and long follow-up period. (Blomfeldt et al,2007,p160-165).

In a study conducted by Gupta et al in 2019 in India, cemented bipolar hemiarthroplasty was performed on 9 patients and uncemented bipolar hemiarthroplasty in 10 patients with a diagnosis of femoral neck fracture, evaluated for 6 weeks, 12 weeks and 1 year. At 6 weeks postoperatively there was no significant difference, but at 1 year after surgery, the clinical outcome of MHHS in the cemented group was better than the uncemented group.(gupta et al,2019, p622-626).

2. Experimental Methodology

This research is an observational analytic with case control design, to evaluate Comparison of Clinical Function Outcomes of Patients Performed with Cemented and Uncemented Bipolar Hemiarthroplasty Surgery on Femoral Neck Fractures Using Modified Harris Hip Score and Proportion of Dislocations after Hip Joint Replacement Surgery in Medan. This research was conducted at Haji Adam Malik General Hospital and several network hospitals of the Department of Orthopedics and Traumatology, USU Medical Faculty, located in Medan. This research was conducted from September 2021 to August 2022. There were a total of 32 samples included in this study, which were divided into 2 groups, namely cemented and uncemented who met the inclusion and exclusion criteria. The inclusion criteria for this study were all patients with closed neck femur fracture age more than 50 years old and exclusion criteria for this study are patients with fracture of both legs, osteomyelitis, malunion fracture, history of malignancy and currenty undergoing chemotherapy treatment, sepsis, and total paralysis due to spinal cord injury or stroke.

3. Results

A total of 32 subjects were assessed for eligibility and met the inclusion criteria. Respondents were generally female (62.5%). All descriptive parameter data are presented in table 1.

Table 1. Basic Characteristics of Respondents

Characteristic	n		%
Sex			
Male	12		37.5%
Female	20		62.5%
Age (years)			
Rerata ± SD		72.21±10.24	
Usia Termuda		54	
Usia Tertua		91	
Location			
Right	15		46.9%
Left	17		53.1%
Surgery Methods			
Bipolar Cemented	16		50%
Bipolar Uncemented	16		50%
Dislocation Post Operation			
Bipolar Cemented	0		
Bipolar Uncemented	0		

To analyze the clinical function assessment of MHHS from cemented bipolar hemiarthroplasty with uncemented bipolar hemiarthroplasty, a distribution test was conducted to determine the distribution of the data obtained using the Shapiro-Wilk test. The results of the normality test using Saphiro Wilk showed that the research data were normally distributed with p-values of 0.458 and 0.810 (>0.05) respectively.

Table 2. Normality test results Modified Harris Hip Score

Surgery Methods	P Value
Bipolar Hemiarthroplasty Cemented	0.458
Bipolar Hemiarthroplasty Uncemented	0.810

From the results of the data normality test, it was found that the research data were normally distributed. Because the study data were normally distributed, the statistical test used to identify the presence of an external relationship between clinical function modified harris hip score in femoral neck fractures was the Independent T-Test (unpaired T-Test).

Statistical analysis of the clinical outcome assessment of modified harris hip score from cemented bipolar hemiarthroplasty and uncemented bipolar hemiarthroplasty in femoral neck fractures showed that there was no significant difference in modified harris hip score between cemented bipolar hemiarthroplasty and uncemented bipolar hemiarthroplasty with a significance value of 0.935 (> 0.05).

Table 3. Differences modified harris hip score in cemented and uncemented bipolar hemiarthroplasty

		Mean	P value
Modified Harris Hip Score	Bipolar Hemiarthroplasty Cemented	79.00±5.40	0.935
	Bipolar Hemiarthroplasty Uncemented	78.81±7.43	

4. Discussion

The incidence of fractures in the hip joint, both intracapsular and extracapsular, increases with age because bone mass will gradually decrease with age, causing osteoporosis. found in women. This can be related to hormonal transitions, especially during menopause, several studies have also shown that the risk factor for falling is greater in women than men, losing muscle mass in women occurs more quickly than men, especially after menopause. Women are also more susceptible to psychological disorders such as depression and often use various drugs that can increase the risk of falling.

Other groupings were made based on the location of the femoral neck fracture and the type of surgery (Table 1) and from this data it was obtained that the distribution of the number of samples based on the location of the fracture of the right femoral neck was 15 (46.9%) and the location of the fracture of the left femoral neck was 17 (53.1). %). Based on the type of operation made consecutively proportional that is half of each group. Of the 32 subjects 16 underwent cemented bipolar hemiarthroplasty and 16 underwent uncemented bipolar hemiarthroplasty surgery and no dislocation was found in the group that underwent cemented or uncemented bipolar hemiarthroplasty surgery.

To be able to analyze the comparison of MHHS function assessments from bipolar cemented hemiarthroplasty and uncemented hemiarthroplasty measures, the step that must be passed is testing the distribution of the samples obtained. The normality test of the data in this study was carried out using the Shapiro Wilk test, this test was carried out because the number of subjects obtained in the study was less than 50 subjects.

The results of this study showed that there was no significant difference in the comparison of clinical function outcomes of modified Harris hip score from cemented bipolar hemiarthroplasty and uncemented bipolar hemiarthroplasty in femoral neck fractures (p=0.935).

In a study conducted by Gupta et al in 2019 in India, cemented bipolar hemiarthroplasty was performed on 9 patients and uncemented bipolar hemiarthroplasty in 10 patients with a diagnosis of femoral neck fracture, evaluated for 6 weeks, 12 weeks and 1 year. At 6 weeks postoperatively there was no significant difference, but at 1 year after surgery, the clinical outcome of MHHS in the cemented group was better than the uncemented group.

In a study conducted by Bashir et al in 2020 in India, a study was conducted on 20 men and 30 women with a diagnosis of femoral neck fracture aged 61-88 years using uncemented modular bipolar hemiarthroplasty with a posterior approach evaluated at 6-11 months with a mean MHHS 88.96 and no postoperative dislocation.

In a study conducted by Movrin Igor in Slovenia in 2018 of 135 patients over the age of 76 years with femoral neck fractures were divided into 2 groups treated with cemented bipolar hemiarthroplasty and uncemented bipolar hemiarthroplasty, the two groups of patients above were divided not based on certain guidelines but based on considerations separately from the orthopedic specialist. The clinical outcome of HHS in the cemented group 6 weeks postoperatively 77.1± 13.1 and uncemented 71.3± 16.3, at 24 months postoperative cemented group 81.2± 9.5 and uncemented group 79.6± 8.4.

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