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Case Report

Comparison between the results of bipolar hemiarthroplasty with lateral approach and posterior approach in Sanglah General Hospital in 2018: a case series

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ABSTRACT

The purpose of this study was to compare the preoperative, intraoperative and postoperative parameters of Bipolar Hemiarthroplasty procedure using lateral approach and posterior approach in Sanglah General Hospital in 2018. Thirty-five patients diagnosed with femoral neck fracture or intertrochanter fracture underwent Bipolar Hemiarthroplasty using either lateral approach or posterior approach at our institution between January 2018 and December 2018. The primary outcome measures were postoperative complication and hip function. The secondary outcome measures were surgical time, transfusion rate, length of hospital stay, intraoperative blood loss and postoperative haemoglobin. There were 14 patients in Lateral Approach group and 21 patients Posterior Approach group included for analysis. There were no significant differences between the two groups regarding to the Harris Hip Score at 6 months follow up. Significant differences were found between Bipolar Hemiarthroplasty with Lateral Approach and Bipolar Hemiarthroplasty with Posterior Approach group in comparison of intraoperative blood loss ($p<0.05$) and length of stay ($p<0.05$). The present study concluded that both lateral and posterior approaches are comparable in terms of functional outcomes and complications. However, there is a tendency of longer hospital of length of stay and more of intraoperative blood loss using posterior approach which should be kept in mind when orthopaedic surgeon is performing a bipolar hemiarthroplasty.

Keywords: Bipolar hemiarthroplasty, Femoral neck fracture, Intertrochanter femur fracture, Lateral approach, Posterior approach

INTRODUCTION

Hemiarthroplasty is a common treatment choice for displaced fragility hip fractures. Hemiarthroplasty has many advantages since it allows the immediate return to daily activities and avoids bed rest complications. This procedure carries a relatively short duration of operation and reasonable clinical outcomes. One important issue when treating patients with hemiarthroplasty is the type of surgical approach. The best approach for hip joint arthroplasty, however, remains controversial. The anterior approach (Smith-Petersen) utilizes the tissue plane between the sartorius and tensor fasciae latae superficially and between the rectus femoris and gluteus Medius. The anterolateral approach (Watson-Jones) utilizes the intermuscular plane between the tensor fasciae latae and gluteus Medius. The lateral approach includes separating the gluteus Medius and vastus lateralis insertions from the greater trochanteric insertions, which are attached after prosthesis implantation into their original position. All modifications of the lateral approach involve the division and later repair of the gluteus Medius. The posterior approach includes separating the gluteus maximus muscle following the release of external rotators from the femoral insertion. Each approach has

advantages and a different spectrum of complications.[1] Previously conducted studies of hip fracture patients treated with hemiarthroplasty indicate that the posterior approach increases the risk of hip dislocation and reoperation compared to the lateral approach. The lateral approach, however, may predispose to hematoma, rates of infection, seroma, and perioperative fractures are similar after both approaches.[2-4]

The comparison of both approaches is well documented in literature, yet the results are often contrasting.[4-7] The aim of this paper is to determine the preferred approach for bipolar hemiarthroplasty with lateral approach or posterior approach to minimize the operative and postoperative complications.

CASE REPORT

This study was conducted in accordance with the principles of the Declaration of Helsinki. A total of 35 patients (11 males, 24 females; mean age 67.8 years; range 55 to 87 years) who were operated in Sanglah Hospital between January 2018 and December 2018 because of femoral neck fractures or intertrochanter femur fractures were assessed retrospectively. Each patient was graded according to ASA physical status score preoperatively. All patients were operated under regional anaesthesia. A standard operative procedure was followed for all cases of bipolar hemiarthroplasty with lateral approach or posterior approach. Out of the 35 patients, 14(40%) were treated with bipolar hemiarthroplasty with lateral approach (group I), and 21(60%) with bipolar hemiarthroplasty with posterior approach (group II).

Inclusion criteria are ability to walk and perform daily activities before the trauma to the hip area, and a minimum of 6 months follow-up.

At hospital admission, anterior-posterior radiographs, lateral radiographs of affected hip were taken to assess the femoral neck fractures or intertrochanter femur fractures. If there was no contraindication, all patients underwent operation.

Prophylactic third generation cephalosporin (according to their weight) were administered 30 minutes preoperatively. Patients were placed in supinated or lateral decubitus position according to lateral or posterior approach, respectively. Postoperatively, all patients were able to walk with the help of a walker on full weight bearing in first day and started passive exercises on bed.

Authors collected data of all patients, including age, gender, side of fracture, energy of trauma, comorbidity, ASA, duration of operation, transfusion rate, hospital stay, intraoperative blood loss and functional outcome according to Harris Hip Score. SPSS version 15.0 (SPSS Inc., Chicago, IL, USA) program was used to assess the data statistically. Statistics of percentage frequency were used for categorical data. Chi-square test and Mann-Whitney U were used for group comparisons. Also, means for data that were collected by measurement, standard deviation, minimum-maximum statistics, and T-Test for independent samples were used.

Operations were performed by one orthopedic surgeon in lower division in Sanglah Hospital. There's no mortality during the operation in both groups.

Table 1: Demographic and preoperative data.

Parameter	Lateral		Posterior		Statistic	Significance
Total number	14		21			
Gender	Male	Female	Male	Female	Chi-square	0.461
	3	11 (47,1%)	8 ()	13 (52,2%)		
Side of fracture	Right	Left	Right	Left	Chi-square	0,737
	9	5	12	9		
Trauma energy	Low	High	Low	High		
	14	0	21	0		
Cerebrovascular disease	1		2		Fisher's exact test	1.000
Heart disease	3		12		Chi-square	0.80
Pulmonary	0		3		Fisher's exact test	0,259
Endocrine	3		4		Fisher's exact test	1.000
Neoplasma	1		1		Fisher's exact test	1.000
Hematologic	1		6		Ficher's exact test	0,203
ASA	ASA1	1	ASA1	0	Ficher's exact test	0,185
	ASA2	6	ASA2	5		
	ASA3	14	ASA3	21		

Assessment of anesthesia risk was performed using ASA Score: for bipolar hemiarthroplasty with lateral approach (group I), there were 1 patient with ASA 1, 6 patients with ASA 2, and 7 patients with ASA 3; for posterior group (group II), there were 5 patients with ASA 2 and 16 patients with (Table 1). There was no statistically significant difference (p=0.185).

Mean duration of surgery were 106.79 minutes (range, 30-225 minutes) and 128.52 minutes (range, 60-255 minutes) in the bipolar hemiarthroplasty with lateral approach and posterior approach, respectively (Table 2). Mean total of transfusion rate were 0.43 units (range 0-2 units) and 0.76 units (range 0-3 units) in lateral approach group and posterior approach group, respectively (Table 2). The length of hospital stay was statistically significantly shorter in lateral approach group, compared to posterior approach groups ($p<0.05$) (Table 2). There was a significant difference in terms of blood loss during operation between the groups ($p<0.05$), with bipolar hemiarthroplasty with lateral approach group requiring lower amount of blood transfusion (Table 2). Harris Hip Score of patients were calculated using physical examination and anamnesis. Harris Hip Scores were 70.21 and 67.71 in bipolar hemiarthroplasty with lateral approach and bipolar hemiarthroplasty with posterior approach groups, respectively. There was no significant difference between two groups ($p>0.05$) (Table 2).

Table 2: Data of patients during and after operation.

	Lateral Approach		Posterior Approach		p
	Range	Mean	Range	Mean	
Duration of Operation (min)	30-255	106.79	60-255	128.52	0.133
Transfusion (units)	0-2	0.43	0-3	0.76	0.328
Duration of hospitality	6-25	10.21	6-41	14.24	0.028
Intraoperative blood loss	10-500	192.14	150-500	288.10	0.028
Harris Hip Score	49-82	70.21	41-89	67.71	0.371

DISCUSSION

The result in this current study might help orthopedic surgeons to decide which surgical approach would be best to use when treating patients with hip fractures. The observations clearly indicated that both approaches are comparable in terms of primary and secondary outcome measures. The primary outcome measures were postoperative complication and hip function. The secondary outcome measures were surgical time, transfusion rate, hospital stay, intraoperative blood loss and post-operative hemoglobin. However, we found no significant difference in overall complication rates between two groups. These findings are consistent with the literature, indicating the need to further optimize femoral neck fractures or intertrochanter femur fractures treatment in elderly trauma patients. Remarkably, the patterns of surgical complications were not equally distributed in the two groups. This was particularly true for dislocation. Consistent with the literature we found that the risk for dislocation was reduced by 3 to 4% after lateral approach (Figure 1).[3]

As for the baseline characteristic of patients, female formed the majority of patients. The female preponderance in the series can be attributed to the fact that the estrogen level decreases after menopause which in turn predisposes elderly females to osteoporosis. Also, females tend to have low BMI and poor exposure to sunlight. The involvement of right side of the neck femur was more common than left side in both approaches but it doesn't affect the outcome of the study. The low energy injuries which include falling at home, falling from bed, slipping in bathroom were most common cause of fracture as compared to high energy injuries like road traffic accidents. The distribution between two groups was almost same with 100% low energy injuries in posterior and lateral approaches respectively. The distribution in our study was comparable to studies performed by other authors.[3-5]

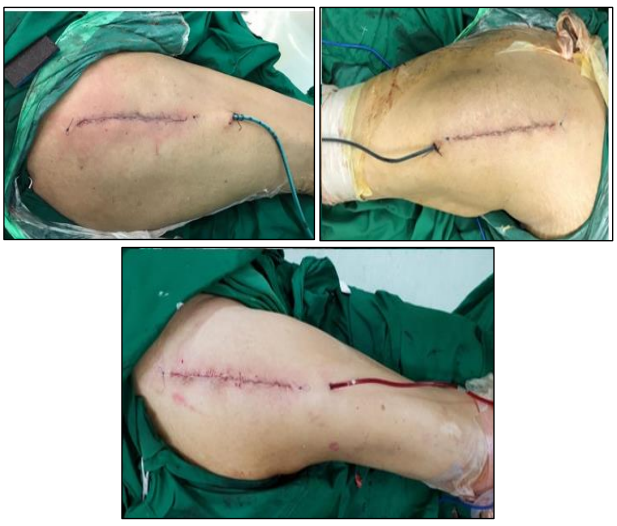

Figure 1: Incision of lateral approach.

Authors also compared the surgical duration in both surgical approaches and difference was statically insignificant, with the mean duration of operation was 106.79 minutes in lateral approach and 128.52 minutes in posterior approach. Intraoperative blood loss was calculated according to amount blood collected in suction machine at the end of procedure. The mean intraoperative blood loss was 192.14 ml in lateral approach and 288.[10] in posterior approach. The difference of hospital length of stay was significant. The mean duration of hospitality was 10.21 days in lateral approach and 14.24 days in posterior approach. This is possibly due to the more extensive procedure with posterior approach (Figure 2).

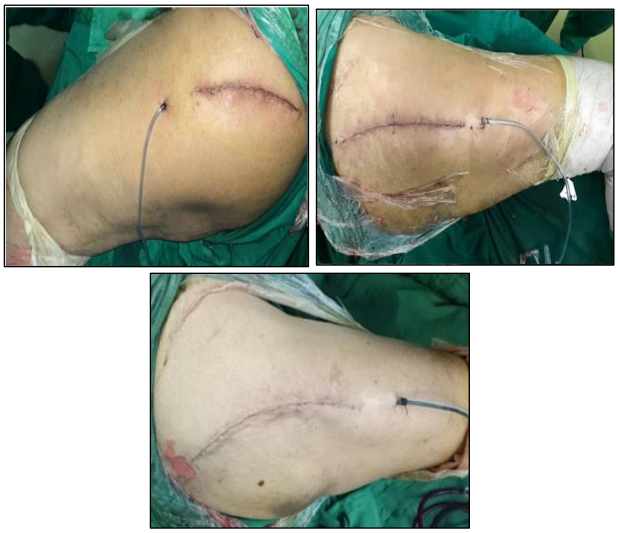

Figure 2: Incision of posterior approach.

In this study no patients had dislocation or infection after the surgery. Most of the studies done in the past indicate that posterior approach as compared to lateral approach carries an increased risk of prosthetic dislocation. Thus, use of lateral approach prevents dislocation related reoperations.[2,3] There were no other postoperative complications observed such as sciatic nerve injury, periprosthetic fracture, mortality, aseptic loosening of prosthesis, acetabular erosion, deep vein thrombosis, or pulmonary embolism.

In terms of functional outcome, most studies assessed the functional outcome using Harris hip score. In our study, the average Harris Hip Score at 1 year follow up was 70.21 in lateral surgical approach and 67.71 in posterior approach. Patients in both groups had good average Harris Hip Score and difference was statically insignificant. This is in accordance with previous study (Figure 3).[8]

The limitation of this study is the short follow up period and the limited outcome parameters. Therefore, a larger study involving more centers with longer follow up period is needed in order to assess the emergence of short- and long-term complications and other functional outcome parameters.[9,10]

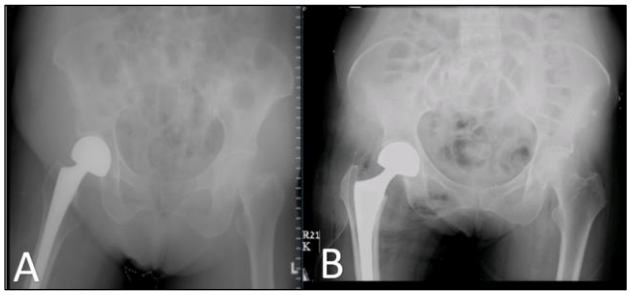

Figure 3: (A) x-ray post op with lateral approach; (B) x-ray post op with posterior approach.

The present study concluded that both lateral and posterior approaches are comparable in terms of functional outcomes and complications. However, there is a tendency of longer hospital of length of stay and more of intraoperative blood loss using posterior approach which should be kept in mind when orthopedic surgeon is performing a bipolar hemiarthroplasty.

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