

Outcomes between Conventional versus Minimal Invasive Dynamic Hip Screw in Fixation of Intertrochanteric Fracture of Femur

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ABSTRACT

Objective: To compare the outcomes between conventional versus Minimal invasive dynamic hip screw in fixation of intertrochanteric fracture of femur

Materials and Methods: This is randomized control trial, conducted at Department of Orthopedic Surgery, Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU), Larkana, Pakistan from November 9, 2020 to May 8, 2021. All patients who fulfilled the inclusion criteria and visited to SMBBMU, Larkana were included in the study. After taken Informed consent, exclusion criteria were followed strictly.

Results: Mean±SD of age in MIDHS group was 54.6±9.5 and CONDHS group was 55.8±9.8 years. Mean ± Standard Deviation of blood loss & duration of surgery was noted as (51.3±16.4 v/s 145.1±26.4; [P=0.0001] ml) and (54.5±11.4 v/s 76.2±17.7; [P=0.0001] mins) among MIDHS and CONDHS groups respectively. While duration of hospital stay was noted as 3.6±2.2 and 8.1±4.9 in MIDHS v/s CONDHS groups respectively with a highly significant difference i.e., (P=0.0001).

Conclusion: It is to be concluded that highly significant difference was noted in comparison of outcomes between conventional v/s Minimally invasive dynamic hip screw for the fixation of intertrochanteric fractures of femur.

Keywords: Conventional, Femur, Intertrochanteric Fractures, Hip Screw, Outcomes

INTRODUCTION

When we look at the statistics of fracture, hip fracture is one of commonly fractured bone during trauma leading to disability, morbidity and mortality in elderly age group. Fracture of upper part of femur concludes 25-30% of hospital admissions having mortality rate of 12-18% globally.^{1,2} Among proximal fractures of femur, intertrochanteric fracture has more mortality with advanced age due to repeated UTI, thrombi formation and emboli because of immobilization,³ nowadays due to increase in life expectancy overall, prevalence of hip fracture has increased leading to more mortality and death.^{3,4} Overall incidence of hip fracture is 5-7% and 15-20% respectively for male and female gender in developed world.⁵ This is due to slippage leading to fall, road traffic accidents, poor vision due to aging and abnormal gait.⁶ As these patients are mostly of advanced age having associated comorbid making it difficulties for orthopedic surgeons to manage.⁹ Previously these patients were treated non operatively, but it further increase difficulties and more associated complications like repeated respiratory and urinary tract infections, developing bad sores and increased tendency for myocardial infarction and Deep vein thrombosis, that's why non operative management is mostly disliked by many orthopedics.⁹ On other when these patients were operated it also increased risk, as risk for anesthesia and various comorbid like diabetes mellitus and hypertension needs efficient management. Operative management options like dynamic hip screw and various types of plates were used to fix fracture and with enhancing early mobilization of patients.¹⁰ Dynamic hip screws can be fixed with older techniques conventionally or with modern method of minimal invasive method. Both can be performed but conventional technique require large incision, leading to more trauma to underlying soft tissue with more bleeding and delayed mobilization of patient. While these above mentioned factors almost reduced using minimal invasive technique.^{11,12} A study reported mean surgical duration (53.6±13.6 v/s 77.6±16.19) min, Intra operative blood loss (47.58±23.07 v/s 142.67±57.77) ml and duration of hospital stay (3.2±0.43 v/s 7.7±1.2) days in minimally invasive DHS v/s conventional DHS treated patients respectively.¹³

Recently several studies have reported on their application of MIS in DHS fixation for intertrochanteric femoral fracture, but

actually there are not well organized, local data of prospective randomized, controlled trials of this combination of techniques. The goal of this study is to provide an efficient and pragmatic surgical technique for surgical decision making to reduce the complications.

METHODOLOGY

This is randomized control trial, conducted at Department of Orthopedics department, Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU), Larkana, Pakistan from November 9, 2020 to May 8, 2021. Total 60 patients with 30 in each group, By using Open epi sample size calculator using mean surgical duration (53.6±13.6 v/s 77.6±16.19)[13] min in minimally invasive DHS v/s conventional DHS treated patients. Level of significance (α)=5%, Power of Test (1- β)=80%. All patients who fulfilled the inclusion criteria like Patients with age group 40-80 years, Either gender with intertrochanteric fractures of femur, AO type A-1 and A-2 fractures which were easily reducible and without sagging of the distal fragment, duration of fracture \leq 21 days with ASA I, II & III were included. Patients with history and medical record of bone malignancy, immunocompromised, patients presented with multiple fractures as evident on clinical examination and radiological evidence, skeletal dystrophy or congenital anomaly, patients with UTI were excluded. Whole procedure explained to patients with pros and cons then informed written consent taken.

Patient's in-group A were managed by MIDHS and group B patients by CONDHS. In both groups same implant used and surgery was performed by consultant orthopedic having experience of more than 5 years. Hemoglobin level was measured before and after operation to assess blood loss and all patients received prophylactic single dose of antibiotic preoperatively.

We measured operative time, amount of blood loss in drain and mobilization in the form of weight bearing movements in both groups. The length of hospital stay was noted for each case by researcher himself.

The data was entered and analyze into statistical packages for social science (SPSS Version 21). Mean ± SD was calculated for age, duration of fracture, blood loss, duration of hospital stay and duration of surgery. Frequency and percentage were calculated for gender, operated side (right / left) mode of injury i.e. (Slip on ground/floor, RTA fall from height). Independent sample t-

test was applied to compare the outcomes in both groups by using $P \leq 0.05$ as significant. Both groups were compared by age, gender and mode of injury wise stratification by using independent sample t-test test to see the impact of these on outcome variable considered $P \leq 0.05$ as significant.

RESULTS

In this randomized control trial, the total of 60 patients were divided randomly by envelop method into two equal groups A (MIDHS) and

B (CONDHS) to compare the outcomes between conventional v/s minimally invasive dynamic hip screw for fixation of intertrochanteric fractures of femur and the results were analyzed as: Mean±SD of age in MIDHS group was 54.6±9.5 with C.I (51.05---57.99) and in CONDHS group was 55.8±9.8 with C.I (52.14---59.45) years, as shown in Table No: 1.

Table 1: Descriptive Statistics of age n=160

Age [Years]	N	Minimum	Maximum	Mean	+ SD	95% C.I	
Group	Broad Dynamic Compression Plate	80	18	55	36.8	8.8	34.84---38.75
	Sign Nail	80	18	55	37.9	8.5	36.00---39.79

Table 2: Descriptive Statistics of Body Mass Index n=160

BMI [Kg/m ²]	N	Minimum	Maximum	Mean	+ SD	95% C.I	
Group	Broad Dynamic Compression Plate	80	18	34	26.2	5.6	24.95---27.44
	Sign Nail	80	19	34	26.4	5.4	25.19---27.60

Mean±SD of duration of hospital stay in MIDHS and CONDHS group was 3.6±2.2 and 8.1±4.9 with C.I (2.37---4.02) and (6.27---9.92) days, respectively as shown in Table No: 2.

DISCUSSION

With advance in medical field, nowadays conventional techniques to manage patients are decreasing and superseded by minimally invasive or non-invasive procedures. Same is scenario with orthopedic surgeons; they also prefer non-invasive or minimal invasive procedure for the humerus, tibia and femoral fracture in the form of plates and screw. Even though these procedures needs learning curve along with cost, but with the passage of time, technique, experience and expertise, most became familiar and adopt them from conventional to modern procedures. Same situation is with minimally invasive DHS (MIDHS).

Many surgeons has compared Minimal invasive DHS with conventional, Ho et al in his study mentioned that hospital stay, duration of surgery were favoring minimal invasive technique¹⁴ which were similar to our results. ($p < 0.0001$ for both variables). But few differences were noted firstly, as blood loss was not significant in there study in comparison to our study group, secondly in Ho study 2 patients reported with wound infection in conventional technique, while in our study group 03 patients presented with superficial wound infections, but all responded well while keeping them on culture specific antibiotics.

Other study conducted by Wong et al in which results shown that in MIDHS group there significant drop in blood hemoglobin level that requires need for blood transfusion like our study¹⁵. But drawback of his study was that there was no considerable significant decrease in hospital stay in MIDHS group, but our study results shown Significant decrease in hospital stay in minimal invasive DHS with $p < 0.0001$. It was notes that hospital stay was higher in MIDHS in first 3 days but it was not noted at 3 months. Similarly in our study HHS at 10 days was statistically significant ($p < 0.05$) but not at 6 weeks.

Most of studies done on minimal invasive DHS, but no data seen in literature while comparing it with other techniques, and many surgeons were using 2- or 3-hole DHS or have not standardized the length of plate in their study.¹⁶

The results of our study correlate with multiple studies conducted worldwide by various researchers. Some of them are discussed here with our findings.

In our study, mean age was 54.6±9.5 years in MIDHS group however, in CONDHS group it was noted as 55.8±9.8. Finding of our study was consistent with previous studies which reported the average age group 67.9±9.12 and 66.3±9.54 in CONDHS and MIDHS respectively.¹⁷

In our study, mean duration of fracture was 16.1±3.6 days in MIDHS group however, mean duration of fracture was 15.9±3.8 in CONDHS group.

In our study, mean blood loss (ml) was 51.3±16.4 in MIDHS category while mean blood loss (ml) was 145.1±26.4 in CONDHS group (p -value = 0.0001) and was statistically significant.

CONCLUSION

It is to be concluded that highly significant difference was noted in comparison of outcomes between conventional v/s Minimally invasive dynamic hip screw for the fixation of intertrochanteric fractures of femur.

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