Original Article

Comparison of unstable inter-trochanteric femur fracture treated with Dynamic Hip Screw and Proximal Femur Nail

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Objective: To compare the outcome of unstable intertrochanteric fractures managed by proximal femoral nail (PFN) and dynamic hip screw (DHS).

Methodology: The comparative study was done, over the period of two years, involving a total of 108 patients of unstable inter-trochanteric fractures randomly allocated in two groups. One group was treated with DHS, while second with PFN. The outcomes were evaluated in terms of the duration of fracture, duration of surgery, amount of blood loss, limb shortening, union time, wound infection and non-union in both groups.

Results: The mean age of the patients in group A was 60.2±11.37years and in group B was 58.54±11.43 years. The mean duration of fracture in group A and B was 3.61±2.02 and 4.02±1.65 days, respectively. The right side was affected in 36 patients group A and B had 33 patients, while left side in 18 and 21 patients, respectively. Mean duration of surgical procedure in group A was 78.34±17.12 minutes and 70.19±16.14 I group B. Mean time taken for union in group A was 16.85±2.18 weeks while for group B it was 13.67±1.72weeks.

Conclusion: Our study favors PFN over DHS in the treatment of unstable intertrochanteric fractures because PFN fixation significantly reduces intraoperative blood loss, operative time, shortening, infection and union time. (Rawal Med J 202;45:648-651).

Keywords: Dynamic hip screw, intertrochanteric fractures, proximal femoral nail.

INTRODUCTION

Intertrochanteric fractures are most common fractures in senile patients, accounting almost half of the fractures around the hip and almost 50% of them are unstable.[1,2] Asian population in 1990 accounted for about 26% of hip fractures, this figure is anticipated to increase to 37% by 2025 and 45% by 2050.[1] These fractures have bimodal distribution as they are associated with low energy in elderly patients and high-energy trauma in younger patients.[3] Intertrochanteric fractures are classified into stable and unstable fractures.[4] AO system has classified them into Type A1 (stable trochanteric), Type A2 (unstable trochanteric), and Type A3 (fracture at lesser trochanter and sub trochanteric fractures).

Closed reduction and internal fixation by an extra medullary or intramedullary are the treatment options.[4-7] DHS and PFN fixation devices are two leading fixation methods for these fractures. The DHS is the conventional implant used to stabilize trochanteric fractures. However, a biomechanical disadvantage compared with intramedullary implants as the weight-bearing axis is more distant from implants.[8] DHS is even more advantageous with lower rates of complication in stable trochanteric fractures. Conversely, PFN could have several benefits in unstable intertrochanteric fractures, although there is not satisfactory proof to support them.[9] This study compared intramedullary devices (proximal femoral nail) with the conventional DHS for unstable intertrochanteric fracture fixation.

METHODOLOGY

This comparative study was conducted from January 1, 2017 to January 15, 2019 at Creek General Hospital, Korangi and Shaheed Muhatarma Benazir Bhutto Medical College, Lyari Karachi. The patients were aged 40-80 years, with radiological (conventional x-rays) evidence of unstable inter-trochanteric fracture of not more than

three weeks old and willing to provide informed consent. Those patients with pathological fracture secondary to metastatic disease, primary tumor, compound fractures, associated with shaft of femur, unfit for general anesthesia and non-ambulating prior to injury were excluded.

After obtaining the ethical approval from the ethical review committee, a total of 108 patients of unstable inter-trochanteric fracture, were equally divided into two groups randomly by using a sealed envelope method. Group A was operated with DHS while group B with PFN. On 5th postoperative day, they discharged and reviewed in the outpatient department at the interval of 3 weeks till 24 weeks' post-surgery.

Statistical Analysis: Collected data were entered and analyzed using SPSS version 20. Shapiro-Wilk test used to assess the normality of data. T-test was applied to compare the duration of fracture, duration of surgery, amount of blood loss, limb shortening, and union achieved in both groups. Chi-square was applied to compare the wound infection and non-union in both groups. $p<0.05$ was taken as significant.

RESULTS

A total of 108 patients were divided equally with 54 patients each group. The mean age of the patients in group A was 60.2±11.37 years and in group B was 58.54±11.43 years. In group A, 37 patients were male (68.5%) and in group B number of male patients were 31(57.4%). The mean duration of fracture in group A and B was 3.61±2.02 and 4.02±1.65 days, respectively.

The right side was affected in both group A and B was 36 and 33 patients respectively, while left side 18 and 21 patients respectively. Road traffic accident (RTA) and trivial fall were commonest cause of fracture. Mean duration of surgical procedure in group A was 78.34±17.12 minutes, while the duration noted in group B was 70.19±16.14 minutes. With respect to intraoperative blood loss the mean blood loss in group A was 290.93±73.82 ml while in group B it was 84.66 ±48.66, which was highly significant (Table 1).

Table 1. Demographic variables.

Variable (n= 108)		Group A (n=54)	Group B (n=54)
		Mean±SD/ Frequency	Mean±SD/ Frequency
Age (years)		60.2 ±11.37	58.54 ± 11.43
Sex	**Male**	37 (68.5%)	31(57.4%)
	Female	17 (31.5%)	23(42.6%)
Side of injury	Right	36 (66.7%)	33 (61.1%)
	Left	18 (33.3%)	21 (38.9%)
Mode of Injury	RTA	21 (38.9%)	25 (46.3%)
	Trivial fall	21 (38.9%)	23 (42.6%)
	Fall from height	12 (22.2%)	6 (11.1%)

Table 2. Outcome variables.

Variable (n= 108)		Group A (DHS)	Group B (PFN)	p-value
Duration of fractures (days)		3.61 ±2.02	4.02 ± 1.65	
Duration of the surgery (minutes)		78.34±17.12	70.19 ± 16.4	0.013
Intra-operative blood loss (ml)		290.93 ± 73.82	84.17 ± 48.66	<0.0000001
Limb shortening (mm)		4.44 ± 3.46	0.83±2.33	<0.0000001
Union achieved (weeks)		16.85 ±2.18	13.67 ± 1.72	<0.0000001
Wound infection	Yes	7 (13%)	0 (0%)	0.06
	No	47 (87%)	54 (100%)	
Non union	Yes	3 (5.56%)	0	0.79
	NO	51 (94.44%)	54(100%)	

Nonunion was observed in 3 out of 54 patients in group A while no patient had a non-union in group B. Mean time taken for union in group A was 16.85±2.18 weeks while the same for group B was 13.67±1.72weeks. The significant difference was observed when the mean duration of surgery, mean intraoperative blood loss, limb shortening, the incidence of wound infection, and time taken to union was compared between two groups (Table 2).

DISCUSSION

Inter-trochanteric fractures represent almost 50% of hip fractures. Though DHS is considered a gold standard for stable inter-trochanteric fractures, controversies for unstable fracture fixation methods and their outcomes still prevail.[10] Currently, failure rates for the surgery of intertrochanteric hip fractures are 9% to 16%.[11] Successful union frequently comes at the expense of substantial femoral neck shortening. Implants devised to

restore and maintain the hip's anatomy in the past have led to high rates of failure.[12-14] The mean age of patients in our study in both groups is almost identical and comparable to other studies.[15,16]

However, in our study ratio of male to female was about 2:1, which is in contrast to other similar studies.[16-18] While analyzing mode of injury, our study has equivalent number of RTA and trivial falls contributing to majority of factures which is in contrast to other studies where trivial fall is the commonest.[19,20]

In an RCT, estimated blood loss in DHS surgery was ranging approximately 395-450ml which almost matches with our study.[21] This blood loss is almost three times more compared to patients operated with PFN, considering its minimally invasive technique as also studied in several meta-analyses.[22,23]

Operative time in our study was substantially lesser in PFN then to its counterpart making it more advantageous as demonstrated in other similar studies.[15,16,17,20] A study by Haider et al reported shortening associated with DHS, which is though not affecting the overall functional outcome of patient correlating with our research.[24]

CONCLUSION

In conclusion, the choice of implant depends upon pattern of fracture and quality of bone. The quality of the reduction and proper positioning of the implant are the keys to achieving the best postoperative outcome. Our study favours PFN over DHS in unstable Intertrochanteric fractures in terms of time of surgery, intra operative blood loss, limb shortening, wound infection, and union was compared between two groups.

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