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A study of functional and radiological outcome of intertrochanteric femur fractures at a tertiary health care centre

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Abstract

Background and Objectives: Intertrochanteric fractures of the femur are extremely common fractures occurring in elderly osteoporotic individuals. Recumbency following a hip fracture is known to be associated with increased mortality in this group of patients

Methods: This study is a prospective clinical study comprising of patients identified for surgical treatment of fracture in the intertrochanteric region of femur admitted to our tertiary medical college hospital.

The statistical analysis was done by ANOVA test and calculated by SPSS 19 version software

Results: In Our study, majority of the patients were in the age group of 61-80, followed by 81-100. No. of mobile individual were significantly higher in the Grade I as compared to Grade II and Grade III ($p < 0.05$) but the mobility does not significantly differ in II and Grade III ($p > 0.05$) calculated by Two-way ANOVA (Bonferroni posttests) respectively at 6 Wk., 2 Month and 6 Month. In average the Grade I patients required 9 Weeks; Grade II patients required 8.6 Weeks; Grade III patients required 11 Weeks; Grade IV required 13 Weeks for union of the fractures radiologically. Malunion was found in 04%, Nonunion with Implant failure found in 08%; No Wound infection found in any patient. Overall the Excellent results found in 68%, Good results in 24% and Poor results found in 8%.

Conclusion: It can be concluded from our study that the mobility of the patients with simple fracture with Grade I was significantly more as compared to Grade II and Grade III, on radiology the various complications observed were Malunion, Overall the Excellent results found in 68% of the patients.

Keywords: Intertrochanteric femur, grades of fracture of intertrochanteric femur, Malunion

Introduction

Intertrochanteric fractures of the femur are extremely common fractures occurring in elderly osteoporotic individuals. Recumbency following a hip fracture is known to be associated with increased mortality in this group of patients. Surgical treatment is now the accepted standard of management to attain acceptable reduction and early mobilization in the elderly osteoporotic individual^[1]. Obtaining a successful fixation is of paramount importance in this group of patients because implant failure has disastrous complications and revision surgery is a highly morbid procedure owing to these patients' poor general condition; thus, evidence regarding the ideal implant that would provide enduring fixation for such fractures, has continued to be a topic of on-going research for several years. The dynamic hip screw, which has become the gold standard treatment of stable fractures, was found to be inappropriate to treat the unstable class of intertrochanteric fractures^[2]. For fixation of unstable fractures, the use of an intramedullary nail coupled with a dynamic femoral head/neck stabilization implant is the ideal method^[3].

Proximal femur fractures are amongst the most common injuries encountered by the orthopedic surgeon. The incidence of these fractures in the US alone is expected to reach 500,000 per year in 2040.^[4] Intertrochanteric fractures account for about half of all proximal femur fractures^[5].

So, we have studied the functional and radiological outcome of Intertrochanteric femur fractures at tertiary health care centre.

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Methodology

This study was conducted in from April 2016 to April 2018 where 25 patients with intertrochanteric fractures of femur were selected.

A prospective study comprising of patients identified for surgical treatment of fracture in the intertrochanteric region of femur admitted to our hospital.

All patients in the study after undergoing routine clinical examination would be subjected to following battery of investigations, Complete hemogram with ESR, Chest X ray PA view, Electrocardiogram, 2D echocardiogram (If age >55yrs), AP X ray of pelvis with both hip joints and proximal half femur. Lateral view of the hip was done in patients if pain permits. The patients were then put on skin traction over a Bucks frame.

Inter trochanteric Fractures included into study while Intracapsular Fracture Neck of Femur, inter trochanteric Fractures with shaft of femur fracture, Non-union, Mal union were excluded from study. The mode of injury resulting in intertrochanteric fracture was classified under 3 different categories taking into consideration whether the injury was due to a road traffic accident, trivial fall or a fall from height. The youngest patient in this series was aged 24 years and the oldest was 90 years. 20 of our patients were older than 60 years and presented with a history of trivial fall. Schatzker and Lambert Scoring System used for grading overall results of the fractures. All the patients undergone all surgical intervention with adequate post-operative care. The patients were assessed post-operatively.

Walking ability of each patient was recorded at the end of 6wks and compared with pre-injury walking ability using the Sahlstrand grading. Post-operative pain was evaluated using the four-point pain score as also used by Sudan.

The statistical analysis was done by ANOVA test and calculated by SPSS 19 version software.

Results

Table 1: Distribution of Patients as per Age

Age group	No.	Percentage (%)
21-40	3	12%
41-60	2	8%
61-80	15	60%
81-100	5	20%
Total	25	100%

The majority of the patients were in the age group of 61-80 i.e. 60% followed by in the age group of 81-100 were 20%; in 21-40 were 12% and in 41-60 were 8%

Table 2: Distribution of the Patients as per Sex

Sex	No.	Percentage (%)
Male	11	44.00%
Female	14	66.00%
Total	25	100.00%

The majority of the patients were Females i.e.66.00% followed by Males 44.00%

Table 3: Distribution of the patients as per the Post-operative mobility

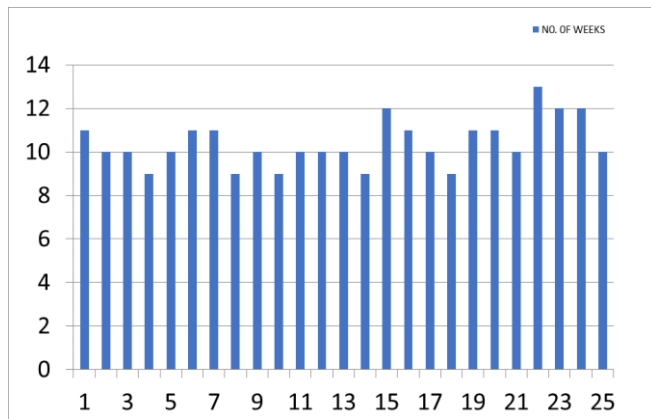
Duration	No. of Patients		
	Grade 1	Grade 2	Grade 3
6 weeks	18	5	2
2months	22	1	2
3months	22	1	2

Table 3A: Analysis of Mobility by ANOVA (Bonferroni posttests) with respect to Grade of Fracture and Mobility

Grade 1 vs. Grade 2				
Row Factor	Grade 1	Grade 2	Difference	95% CI of diff.
6 Wk.	18.00	5.000	-13.00	-30.76 to 4.756
2 M	22.00	1.000	-21.00	-38.76 to -3.244
6 M	22.00	1.000	-21.00	-38.76 to -3.244
Row Factor	Difference	t	P value	Summary
6 Wk.	-13.00	3.980	<i>P</i> < 0.05	*
2 M	-21.00	6.430	<i>P</i> < 0.01	**
6 M	-21.00	6.430	<i>P</i> < 0.01	**
Grade 1 vs. Grade 3				
Row Factor	Grade 1	Grade 3	Difference	95% CI of diff.
6 Wk.	18.00	2.000	-16.00	-33.76 to 1.756
2 M	22.00	2.000	-20.00	-37.76 to -2.244
6 M	22.00	2.000	-20.00	-37.76 to -2.244
Row Factor	Difference	t	P value	Summary
6 Wk.	-16.00	4.899	<i>P</i> < 0.05	*
2 M	-20.00	6.124	<i>P</i> < 0.05	*
6 M	-20.00	6.124	<i>P</i> < 0.05	*
Grade 2 vs. Grade 3				
Row Factor	Grade 2	Grade 3	Difference	95% CI of diff.
6 Wk.	5.000	2.000	-3.000	-20.76 to 14.76
2 M	1.000	2.000	1.000	-16.76 to 18.76
6 M	1.000	2.000	1.000	-16.76 to 18.76
Row Factor	Difference	T	P value	Summary
6 Wk.	-3.000	0.9186	<i>P</i> > 0.05	ns
2 M	1.000	0.3062	<i>P</i> > 0.05	ns
6 M	1.000	0.3062	<i>P</i> > 0.05	ns

From above table it is clear that the No. of mobile individual were significantly higher in the Grade I as compared to Grade II and Grade III (*p* < 0.05) but the mobility does not

significantly differ in II and Grade III (*p* > 0.05) calculated by Two-way ANOVA (Bonferroni posttests) respectively at 6 Wk., 2 Month and 6 Month.



Graph 1: Distribution as per the duration required for healing

From above Graph 1: Time for fracture union, in 23 patients the fracture united at an average of 10.4 weeks. In 02 patients the implant failed as the fracture did not unite.

Table 4: Distribution of the patients as per the Type of Fracture with respect to Union time

Type of fracture	No. of patients	Average union time
Grade I	01	9
Grade II	14	8.6
Grade III	03	11
Grade IV	07	13

In average the Grade I patients required 9 Weeks; Grade II patients required 8.6 Weeks; Grade III patients required 11 Weeks; Grade IV required 13 Weeks for union of the fractures radiologically.

Table 5: Distribution of the patients as per the Post-op complication

Complication	No. of patients
Malunion	01 (04%)
Nonunion with Implant failure	02 (08%)
Wound infections	00

On radiology the various complications observed were Malunion found in 04%, Nonunion with Implant failure found in 08%; No Wound infection found in any patient.

Table 6: Distribution of the patients as per overall results of the patient

Results	No. of patients	Percentage (%)
Excellent	17	68
Good	06	24
Poor	02	8

Overall the Excellent results found in 68% of the patients; Good results in 24% of the patients and Poor results found in 8% of the patients

Discussion

Fixation devices for intertrochanteric fractures include intramedullary devices (e.g., Gamma nail, intramedullary hip screws, etc.) and extramedullary devices, mainly sliding screws and plates (e.g., dynamic hip screws). The former showed an advantage in fixation of unstable intertrochanteric fractures and the latter yielded better results for fixation of stable intertrochanteric fractures [6-11]. The correct insertion and positioning of both intra- and extramedullary devices are known to prevent implant failure and cutout. Baumgartner *et al.* (1995) had shown that small tip apex distance, i.e., less

than 25 mm, is associated with a lower probability for cutout. [12] Other authors have divided the femoral head into nine areas, and recommended head screw insertion at the middle-middle or lower-middle area [13]. However, these works focused either on dynamic hip screws or Gamma nails, and other designs of intramedullary nails are currently available, such as is the proximal femoral nail (PFN), which has a different design by virtue of its additional antirotation hip screw proximal to the main lag screw. This design was shown to have biomechanical properties that are different from those of a single-head screw [14].

In Our study we have seen that the majority of the patients were in the age group of 61-80 i.e. 60% followed by in the age group of 81-100 were 20%; in 21-40 were 12% and in 41-60 were 8%. The majority of the patients were Females i.e. 66.00% followed by Males 44.00%

No. of mobile individual were significantly higher in the Grade I as compared to Grade II and Grade III ($p < 0.05$) but the mobility does not significantly differ in II and Grade III ($p > 0.05$) calculated by Two-way ANOVA (Bonferroni posttests) respectively at 6 Wk., 2 Month and 6 Month.

Time for fracture union, in 23 patients the fracture united at an average of 10.4 weeks. In 02 patients the implant failed as the fracture did not unite. In average the Grade I patients required 9 Weeks; Grade II patients required 8.6 Weeks; Grade III patients required 11 Weeks; Grade IV required 13 Weeks for union of the fractures radiologically. On radiology the various complications observed were Malunion found in 04%, Nonunion with Implant failure found in 08%; No Wound infection found in any patient. Overall the Excellent results found in 68% of the patients; Good results in 24% of the patients and Poor results found in 8% of the patients

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It can be concluded from our study that the mobility of the patients with simple fracture with Grade I was significantly more as compared to Grade II and Grade III, on radiology the various complications observed were Malunion, Overall the Excellent results found in 68% of the patients.

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