ASSESSMENT OF LOWER EXTREMITY FUNCTIONAL SCALE (LEFS) SCORE IN PATIENTS OF UNSTABLE INTERTROCHANTERIC FEMUR FRACTURE MANAGED BY PROXIMAL FEMORAL NAIL – A PROSPECTIVE STUDY

Abstract:

Background: Intertrochanteric femur fractures are disabling injuries frequently occur in elderly population and also in young ones. The incidence has increased due to the advancing mean age of the population and high energy trauma in younger population. Internal fixation is the modality of choice for treating intertrochanteric fractures as most of these fractures are highly unstable. Treatment of Unstable fractures is difficult with conventional operative modalities & may result in complications like non-union, malunion and implant failure. With the use of intramedullary devices (like PFN), the above mentioned complications can be reduced especially in unstable patterns. Being a closed technique, biology at fracture site is not disturbed and allows earlier weight bearing and better rehabilitation. Thus proximal femoral Nail (PFN) has increasing popularity for the treatment of intertrochanteric femur fractures.

Material And Methods: A prospective cohort study of 30 patients of unstable intertrochanteric femur fracture managed with proximal femoral nail (PFN) was done from March 2013 to April 2014 at NORTH DMC MEDICAL COLLEGE AND HINDURAO HOSPITAL DELHI-07. Patients were followed up for 1 year. Check x ray was taken at every visit and patient was clinically and radiologically assessed for fracture union, functional outcome and complications. At every visit patients were assessed using LEFS questionnaire. All the data were collected as per Performa and results were assessed.

Results: In our study the mean age of patients was 66 years; self fall as the mode of trauma in majority of cases (73.33%). The mean time for radiological union was 12.70 weeks. The mean pre injury Lower extremity functional scale (LEFS) score was 68.37 and at 12 months the mean score was 67.63.

Conclusion: Proximal Femoral nail (PFN) is an excellent modality for the management of unstable intertrochanteric femur fractures having lesser operating time, lesser blood loss, allows early weight bearing, less chances of complications and significant improvement in post operative Lower extremity functional scale (LEFS) score. With our study we would like to recommend this as a modality of choice for unstable type fractures.

Keywords: Intertrochanteric femur fractures, Proximal Femoral Nail (PFN), Lower extremity functional scale (LEFS).
Introduction

The incidence of intertrochanteric femur fractures has been increased significantly during recent years due to advancing mean age of the population. In young individuals, injury results from high energy trauma, whereas in the older age group, most of the fractures resulting from trivial fall at home attributed to age related osteoporosis. In earlier days these fractures were managed conservatively either by derotation boot or upper tibial skeletal traction for 6-8 weeks. Thus because of prolonged immobilization complications like deep vein thrombosis (DVT), hypostatic pneumonia, pressure sores, dehydration etc. increases the morbidity and mortality. Healing of the fracture was also accompanied by varus deformity and shortening of the limb, as inability of the traction force to counteract deforming muscular forces effectively. Thus intertrochanteric fractures are almost always treated by early fixation, not because they fail to unite with conservative treatment (union rate is good) but (a) To obtain best possible position to unite (b) To get the patient up and walking as soon as possible and thereby reducing the complications associated with prolonged recumbence.

Internal fixation is the treatment of choice for treating Intertrochanteric fractures of femur as most of these fractures are highly unstable. Various methods like Dynamic Hip Screw (DHS), proximal femoral nail (PFN) are being used. Intertrochanteric fractures when treated with an intramedullary device (like PFN); the above mentioned compilations can be reduced especially in unstable fracture patterns. It allows earlier weight bearing and better rehabilitation. Thus the proximal femoral Nail (PFN) has increased popularity in management of Intertrochanteric femur fractures. The major aim of using PFN is bringing the neck and head into correct relationship with the femoral shaft to restore length, correct neck shaft angle and avoid rotational deformity. When compared to lateral fixed side plate device, an intramedullary device decreases the forces on implant across the hip joint by 25 to 30%. This has advantage especially in elderly patients, in whom the primary goal is early weight bearing and mobilization. The proximal femoral nail has an additional de-rotation screw placed in the femoral neck to avoid rotation during the weight bearing.

In the present prospective study we assessed lower extremity functional scale (LEFS) score, results and complications faced while surgically treating 30 such patients.

Material And Methods

A prospective cohort study of 30 patients with Intertrochanteric femur fracture managed with proximal femoral nail (PFN) was done from March 2013 to April 2014. Evans classification system was applied for evaluation. As emphasized by JENSEN, a classification system must serve two functions. First, it must relate the possibility of obtaining a primary stable and anatomical fracture reduction. Second, it must allow the surgeon to predict the risk of secondary loss of reduction following internal fixation. Evans classification system based on the stability of the fracture pattern and the potential to covert an unstable fracture pattern to a stable one (post reduction stability). He has divided the fractures into two main types; stable and unstable pattern. On admission detail history of the patient was taken into consideration including mechanism of injury, associated injuries, medical co-morbidities, pre injury LEFS. Detailed examination of the fractured limb, status of skin and soft tissue was carried out. The general condition was built up if necessary and complications of recumence prevented as far as possible with good nursing care. Anesthetic and physician fitness was taken. Standard antero-posterior view of pelvis with both hip joints and lateral view of affected side were taken in all cases to assess fracture geometry and type accurately. Serial radiographs were taken at follow up visits to assess union. Early ambulation was encouraged depending upon type of fracture and as soon as the patient became pain free. Results obtained were critically assessed.

Results

A total of 30 Patients of unstable intertrochanteric fracture treated with proximal femoral nail (PFN) were included in this study. The mean age (in years) of patients in our study was 66.36 ± 8.92 (range 52-86 years). Majority of patients were female (21). Mostly affected left side (21) and self fall was the major cause of injury (22). 4 patients had associated injury (distal radius fracture). 5 patients had diabetes mellitus and 2 patients had hypertension as co-morbid conditions. Mean duration of surgery (in minutes) was 58.20 ± 11.86. Mean time of fracture union (in weeks) was 12.70±1.67. 80% of patients (24) started weight bearing within 12 weeks. Mean time of hospital stay (in days) was 12.44±2.30. Mean amount of blood loss (in ml) was 71.33±16.54. 2 patients had screw cut out, 2 patients had limb shortening, 1 patient had Z effect and 1 patient had superficial infection as complications.
DISTRIBUTION OF CASES ACCORDING TO LOWER EXTREMITY FUNCTIONAL SCALE (LEFS): At the time of admission, we evaluated the history of pre injury lower extremity functional scale (LEFS) score of every patient. The distribution of cases as per LEFS score is as under. [Table 01]

It is clearly shown that at the time of enrollment we found 8(27%) patients with LEFS score up to 60; 7(23%) up to 61-70 and majority of patients i.e.15(50%) had a range of 71-80 LEFS. Mean LEFS was 68.37 ± 8.32 with a range of 45-80.

COMPARISON OF MEAN LEFS SCORE BEFORE TRAUMA AND AFTER 3/6/12 MONTHS REVIEW: In the present study at the time of admission and after postoperative period; we found no change in LEFS score. We reviewed our cases at 3 months, 6 months and 12 months interval and the following results were obtained.

When we evaluated our cases after 3 months period, we found that before trauma mean LEFS was 68.37 ± 8.32 and after 3 months it was 36.03 ± 8.33. When we compared mean LEFS before and after 3 months statistically by using Spearman Correlation of Coefficient (r value) it was found to be not significant. [Table 02]

When we evaluated our cases after 6 months period, we found that before trauma mean LEFS was 68.37 ± 8.32 and after 6 months it was 51.6 ± 9.54. When we compared mean LEFS 3 months and 6months statistically by using Spearman Correlation of Coefficient (r value ) we was found that there is significant difference between the means of two groups and it was found to be significant(p value < 0.01). [Table 05]

When we evaluated our cases between 3 months and 6 months period, we found that at 3 months period LEFS Score was 36.03±8.33 and after 6 months it was 51.6 ± 9.54. When we compared mean LEFS 3 months and 6months statistically by using Spearman Correlation of Coefficient (r value ) we was found that there is significant difference between the means of two groups and it was found to be significant(p value < 0.01). [Table 05]

When we evaluated our cases during their follow up period i.e. 3months; 6 months and 12 months and the following results were found.

When we evaluated our cases after 3 months period, we found that before trauma mean LEFS was 68.37 ± 8.32 and after 3 months it was 36.03 ± 8.33. When we compared mean LEFS before and after12 months statistically by using Spearman Correlation of Coefficient (r value) it was found to be not significant. [Table 04]

When we evaluated our cases between 3 months and 6 months period, we found that at 3 months period LEFS Score was 36.03±8.33 and after 6 months it was 51.6 ± 9.54. When we compared mean LEFS 3 months and 6months statistically by using Spearman Correlation of Coefficient (r value ) we was found that there is significant difference between the means of two groups and it was found to be significant(p value < 0.01). [Table 05]

When we evaluated our cases between 3 months and 6 months period, we found that at 6 months period LEFS Score was 51.6± 9.54 and after 12 months it was 67.63 ± 7.42. When we compared mean LEFS 6 months and 12 months statistically by using Spearman Correlation of Coefficient (r value) we found that there is significant difference between the means of two groups and it was found to be significant(p value < 0.01). [Table 06]

When we evaluated our cases between 3 months and 12 months period, we found that before trauma mean LEFS was 68.37 ± 8.32 and after 12 months it was 67.63±7.42. When we compared mean LEFS 6 months and 12 months statistically by using Spearman Correlation of Coefficient (r value) we found that there is significant difference between the means of two groups and it was found to be significant(p value < 0.01). [Table 07]
Table 02 At 3 months review

<table>
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<tr>
<th>Pre injury</th>
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<tr>
<td>LEFS</td>
<td>68.37 ± 8.32</td>
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<tr>
<td>Spearman correlation</td>
<td>r=0.295; p=0.113 (p&gt;0.05) Not significant</td>
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Table 03 At 6 months review

<table>
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<th>Pre injury</th>
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<tr>
<td>LEFS</td>
<td>68.37 ± 8.32</td>
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<tr>
<td>Spearman correlation</td>
<td>r=0.183; p=0.334 (p&gt;0.05) Not significant</td>
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Table 04 At 12 months review

<table>
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<th>Pre injury</th>
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<tr>
<td>LEFS</td>
<td>68.37 ± 8.32</td>
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<tr>
<td>Spearman correlation</td>
<td>r=0.139; p=0.464 (p&gt;0.05) Not significant</td>
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Table 05 3 months versus 6 months

<table>
<thead>
<tr>
<th>Pre injury</th>
<th>After 3 months</th>
<th>After 6 months</th>
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<tbody>
<tr>
<td>LEFS</td>
<td>36.03 ± 8.33</td>
<td>51.6 ± 9.54</td>
</tr>
<tr>
<td>Spearman correlation</td>
<td>r=0.918; p&lt;0.01 significant</td>
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Table 06 : 6 months versus 12 months

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<th>Pre injury</th>
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<th>After 12 months</th>
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<tbody>
<tr>
<td>LEFS</td>
<td>51.6 ± 9.54</td>
<td>67.63 ± 7.42</td>
</tr>
<tr>
<td>Spearman correlation</td>
<td>r=0.931; p&lt;0.01 significant</td>
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Table 07 : 3 months versus 12 months

<table>
<thead>
<tr>
<th>Pre injury</th>
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<th>After 12 months</th>
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<tbody>
<tr>
<td>LEFS</td>
<td>36.03 ± 8.33</td>
<td>67.63 ± 7.42</td>
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<tr>
<td>Spearman correlation</td>
<td>r=0.860; p&lt;0.01 significant</td>
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Discussion

Intertrochanteric femur fractures are common injuries among the elderly individuals. In order to reduce the morbidity and mortality associated with the conservative management of Intertrochanteric fracture; surgical management of the Intertrochanteric fracture is preferred. In cases of unstable Intertrochanteric fracture the incidence of limb shortening, malalignment of distal fragment, nonunion and implant cutouts are high. This led to development of intramedullary devices. These devices have the advantage of being an intramedullary fixation device shorter lever arm of device causing less tensile strain on the implant, controlled fracture impaction due to incorporation of sliding screw, shorter operative duration and less soft tissue dissection. During this study 30 patients were diagnosed as unstable Intertrochanteric fracture (type 2 Evan’s) and were surgically managed by proximal femoral nail.

Simmermacher et al reported an overall technical failure rate of only 4.9% in a series of 191 fractures and no cases of mechanical complications. In our study we had 2 cases of screw cutout and 1 case of Z effect.

In this study the average age was 66.36 years ranging from 52-86 years. The average age reported in other studies are as follows. [Table 08]

The female preponderance in our study is comparable as observed by various other authors. [Table 09]

Out of 30 patients 22 patient sustained injury by trivial fall (73.33%) such as fall at home, slipping in bathroom or missing a step. In 8
patients (26.6%) mode of injury was road traffic accident. [Table 10]

The average amount of blood loss was 71.33 ml. The average time of surgery was 58.20 minutes. Bed side passive mobilization was started from the next day of surgery and toe touch weight bearing started as patient became pain free. Fully weight bearing was started at 8 weeks except for 6 patients who were non-compliant in following the physiotherapy due to increased comminution and other co-morbid conditions. The mean period for Radiological union was 12.70 weeks, in two patients radiological union was seen at 16 weeks and in 1 patient at 6 months. All the patients in our study were subjected to lower limb functional scale (LEFS) scores at 3 months, 6 months and 1 year. At the end of 1 yr. according to the patients results were good or excellent; as all patients were able to reach their pre injury level which was comparable with other studies. There were post-operative complications in 6 patients. Post-operative complications were in from of superficial infection, screw cut out, Z effect and shortening.

J. Pajarinen et al did a randomized study comparing the post-operative rehabilitation and concluded that PFN when used for trochanteric fracture have positive effect on speed of restoration of walking when compared with DHS. While a meta-analysis done by Xiao Huang et al found that both are equally effective in treatment of trochanteric fractures.

Conclusion

Intertrochanteric fractures are the most disabling injuries in the elderly population. This study was done to assess the functional outcomes (LEFS score) of unstable intertrochanteric fractures managed by proximal femoral nail. Excellent clinical and radiological outcome has been reported with use of PFN for treatment of unstable intertrochanteric fractures. Findings in our study are comparable with the literature in terms of operating time, blood loss, radiological union and functional outcome. From our study we conclude that proximal femoral nail (PFN) in an excellent modality for treating unstable intertrochanteric fractures with lesser operating time, lesser blood loss, allows early weight bearing and less chance of complications. We would like to recommend PFN as preferred modality of treatment for such fractures.

References


