The Functional Outcome of the Treatment of Subtrochanteric Fracture of Femur Fixed by Proximal Femoral Nail (PFN)

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Abstract

Objective: In this study our main goal is to evaluate the functional outcome of the treatment of subtrochanteric fracture of femur fixed by proximal femoral nail (PFN). Method: This clinical trial study was conducted at National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), Sher-e-Bangla Nagar, Dhaka January 2017 to June 2018. Results: During the study, 40% of the cases femoral nail was fixed within 10 days of occurrence of fracture, while in rest 60% of cases, fixation was done after 10 days of fracture. The mean interval between injury and nail fixation was 10.9 days and the minimum and maximum intervals were 8 and 13 days respectively. Evaluation of outcome 12 months after nail fixation showed that 80% of the patients had good outcome (Haris Hip Score between 80 - 89) and the rest 20% had fair outcome (Haris Hip Score between 70 - 79). Conclusion: From our study we can conclude that, the proximal femoral nail is a safe and reliable implant for the treatment of subtrochanteric fractures of femur. Majority of the patients return to preinjury activities with mild limitations in hip movement.

Keyword: subtrochanteric fracture, femur fixed, proximal femoral nail (PFN).

INTRODUCTION

Proximal femoral nail (PFN) is a new device in our country for the fixation of various types of trochanteric fractures like unstable trochanteric fractures and subtrochanteric fractures [1]. It is an intramedullary nail device which has emerged as the treatment of choice for subtrochanteric femur fractures [2]. Osteosynthesis with the PFN offers the advantages of high rotational stability of the head and neck fragments an unreamed implantation technique and the possibility of static or dynamic distal locking [3]. The PFN has been shown to prevent the fractures of the femoral shaft by having a smaller distal shaft diameter which reduces the stress concentrations at the tip. Due to its position close to weight bearing axis, the stress generated on the intramedullary implants is negligible. The PFN implant also acts as a buttress in preventing medialization of the shaft [4]. Bearing all these advantages of PFN in mind, the present study was undertaken to evaluate the outcome the results of fixation of subtrochanteric type of fracture with PFN.

In this study our main goal is to evaluate the functional outcome of the treatment of subtrochanteric fracture of femur fixed by proximal femoral nail (PFN).

OBJECTIVE

General objective

- To assess the functional outcome of the treatment of subtrochanteric fracture of femur fixed by proximal femoral nail (PFN).

Specific objective

- To identify time interval between injury and nail fixation.
- To detect return to activity.
METHODOLOGY

Type of Study
- This was a clinical trial study.

Place and period of study
- The study was conducted at the National Institute of Traumatology and Orthopedic Rehabilitation (NITOR), Sher-e-Bangla Nagar, Dhaka January 2017 to June 2018

Study population
- Patients of diagnosed subtrochanteric fracture of both sexes admitted in NITOR during the abovementioned period were the study population.

ENROLLMENT CRITERIA

Inclusion criteria
- Patients with following characteristics were included in the study
  - Age above 18 years irrespective of sex
  - Closed subtrochanteric fracture

Exclusion criteria
- Patients with following characteristics were excluded in the study
  - Pathological fracture
  - Multiple injuries
  - Inability to walk before the fracture

Sample size and sampling procedure
- A total of 15 patients who underwent fixation of subtrochanteric fracture by femoral nail were consecutively included in the study.

Detailed procedure
- In all cases, a detail history, clinical examination and relevant investigations were done. X-ray of the affected thigh including hip and knee (anterior-posterior and lateral view), complete blood count, random blood sugar and serum creatine were done routinely. Any associated illness such as hypertension, diabetes mellitus, pulmonary problem and concomitant injuries were treated adequately. As soon as the general condition of the patient got settled the patient underwent operation. In all cases, antibiotic (3rd generation cephalosporin 1 gm were given intravenously prior to operation. Surgery was performed on an average of 1-2 weeks after injury. The patients were followed up as outdoor patients at the outpatient department. They were requested to attend outpatient department with check X-ray pelvis anterior-posterior view including both hip joints and X-ray of thigh including hip and knee joint (lateral views) of the affected side. All patients were followed up a minimum of 12 months with 6 weekly schedules. Patients were evaluated with history, clinical examination and radiograph of the affected hip. Postoperative complications, if any, were noted and adequately managed.

DATA ANALYSIS

- Collected data were analyzed using software SPSS (Statistical Package for Social Sciences) version 11.5 for windows. Descriptive statistics were used to analyze the data. Analyzed data were presented in the form of tables and charts with due interpretation.

RESULTS

In figure-1 shows age distribution of the patients, out of 15 patients 6(40%) were 30 or below 30 years old, 4(26.6%) 31-40 years and 3(20%) 41-50 years. The following figure is given below in detail:

In figure-2 shows gender distribution of the patients. Majority (87%) of the patients was male and the rest female giving a male to female ratio of roughly 9.1. The following figure is given below in detail:

In table-1 shows time interval between injury and nail fixation. In 40% percent of the cases femoral
nail was fixed within 10 days of occurrence of fracture, while in rest 60% of cases, fixation was done after 10 days of fracture. The mean interval between injury and nail fixation was 10.9 days and the minimum and maximum intervals were 8 and 13 days respectively. The following table is given below in detail:

<table>
<thead>
<tr>
<th>Time interval</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10 days</td>
<td>06</td>
<td>40.0</td>
</tr>
<tr>
<td>&gt; 10 days</td>
<td>09</td>
<td>60.0</td>
</tr>
</tbody>
</table>

Mean interval = (10.9 ± 1.5) days; range = (8 - 13) days.

In table-2 shows evaluation of outcome 12 months after nail fixation. Evaluation of outcome 12 months after nail fixation showed that 80% of the patients had good outcome (Haris Hip Score between 80 - 89) and the rest 20% had fair outcome (Haris Hip Score between 70 - 79). The following table is given below in detail:

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair</td>
<td>09</td>
<td>60.0</td>
</tr>
<tr>
<td>Good</td>
<td>06</td>
<td>40.0</td>
</tr>
</tbody>
</table>

In table-3 shows distribution of patients by return to activity. Majority (86.6%) of the patients returned to preinjury activities with mild limitations and the rest 2(13.4%) with moderate limitations. The following table is given below in detail:

<table>
<thead>
<tr>
<th>Return To activity</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preinjury activities with Mild limitation</td>
<td>13</td>
<td>86.6</td>
</tr>
<tr>
<td>Preinjury activities with Moderate limitation</td>
<td>2</td>
<td>13.4</td>
</tr>
</tbody>
</table>

**DISCUSSION**

In our study, 60% patients presented with right sub-trochanteric fracture and 40% with left sub-trochanteric fracture. In 40% percent of the cases femoral nail was fixed within 10 days of the incidence of fracture, while in rest 60% of cases, fixation was performed 10 days after the occurrence of fracture. The mean interval between injury and nail fixation was about 11 days and the shortest and longest intervals were 8 and 13 days respectively. Majority (86.6%) of injuries was caused by motor-vehicle accident. Evaluation of outcome (by Haris Hip Score) one year after fixation of nail showed that most (80%) of the patients with good outcome and the rest 20% with fair outcome. Majority (86.6%) of the patients returned to preinjury activities with mild limitations of the hip movement.

One study showed that the right limb was involved in 19(64%) patients and the left limb in 11(36%) of cases which is similar to our study. Over 80% of patients reported to the hospital within 24 hours and the rest within 1 week between injury and admission. In our series as well, most of the patients admitted within 24 hours of the incidence of injury. In another study 18 patients were injured in a road traffic accident and 12 patients due to fall from a height, but the frequency of road traffic accident was much higher in the present study [5].

Another study reported good results using standard IM nails to treat subtrochanteric femoral fractures [6]. They used antegrade proximal femoral locking nails in either standard or reversed mode. In reverse mode, the screw was placed up the neck into the femoral head, as with a reconstruction nail. The authors reported a 99% union rate at an average of 25 weeks.

**CONCLUSION**

The proximal femoral nail is a safe and reliable implant for the treatment of subtrochanteric fractures of femur. Majority of the patients return to preinjury activities with mild limitations in hip movement.

**REFERENCE**