

To study association between type of intertrochanteric fracture and difficulties encountered during fixation of trochanteric fractures with Proximal femoral Nailing operated in the department of orthopaedics at Dr RPGMC Kangra, Tanda

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Abstract

Background: Trochanteric fractures are one of the commonest fractures seen in elderly people. We conducted a study association between type of trochanteric fractures and difficulties encountered during fixation of trochanteric fractures with Proximal femoral Nailing operated in the department of orthopaedics at Dr RPGMC Kangra at Tanda.

Methods: This study was conducted on patients presenting to the Department of Orthopaedics at Dr

RPGMC Tanda with trochanteric fractures and fulfilling the criteria and studied for a period of one year starting from the date of study. The patients were clinically evaluated at the time of admission. Demographic data of the patients such as age, sex, pre-operative mobility status, pre-existing co-morbidities, type of fracture/fracture classification, degree of osteoporosis (measured by Singh’s Index) were noted.

Results: Type of fracture was not significantly associated with the difficulties encountered

Conclusion: In this study, we observed that technical difficulty in PFN can arise in any patient irrespective of type of fracture.

Keywords: Type of fracture, PFN, Difficulty

Introduction

Trochanteric fractures are one of the commonest fractures seen in elderly people.^{1,2} With the increase in life expectancy, these fractures are more common in our practice today.³ These elderly people have many associated co-morbid conditions like hypertension, poor cardio-pulmonary reserve and the quality of life of these patients will be poor until they are mobilized early.

Various studies on intramedullary devices have shown that there are complications with nail to make screw cut out, proximal femoral fracture, higher reoperation rates, wound infection.³ Also, none of these studies have studied or described how neck shaft angle is maintained in patients treated with PFN (proximal femoral nailing), thus highlighting the superiority of PFN over DHS (dynamic hip screw) in preventing varus collapse.

PFN with slightly reduced proximal diameter and two screw systems became popular although considering complications like Z effect and technical difficulties.

This study was thus aimed at understanding the difficulties encountered during fixation of trochanteric fractures with proximal femoral nailing in the patients presenting to the department of Orthopaedics at Dr RPGMC Kangra at Tanda.

Material and methods

This study was conducted on patients presenting to the Department of Orthopaedics at Dr RPGMC Tanda with trochanteric fractures and fulfilling the criteria and studied for a period of one year starting from the date of study.

The patients were clinically evaluated at the time of admission. Demographic data of the patients such as age, sex, pre-operative mobility status, pre-existing co-morbidities, type of fracture/fracture classification, degree of osteoporosis (measured by Singh's Index) were noted.

To establish the diagnosis, all these relevant investigations like X-ray, CT scan (if required) were performed.

Inclusion Criteria

1. Patients of trochanteric fractures planned for operative procedure with PFN.

Exclusion Criteria

1. Patients with associated fracture of neck of femur, shaft of femur of same side.
2. Patients with polytrauma.
3. Patients with multiple fractures.
4. Pathological fractures
5. Patients who are unwilling to participate in study.

Statistical Analysis

Data were presented as frequency, percentages, mean, and standard deviation. Student t-test was used to compare quantitative variables between 2 groups. Categorical variables were compared using Chi square test. P value <0.05 was considered significant. Statistical analysis was performed using SPSS v21.

Results

The present study was aimed to evaluate intraoperative difficulties encountered during fixation of trochanteric fractures with PFN. A total of 200 patients were included in the study over the period of one year at Department of Orthopaedics at Dr RPGMC Tanda. Results of the study have been described below:

Type of fracture

Type of fracture was evaluated using AO classification. The AO Classification of fractures is a system for classifying bone fractures initially published in 1987 by the AO Foundation as a method of categorizing injuries according to the prognosis of the patient's anatomical and functional outcome. "AO" is initialism for the German "Arbeitsgemeinschaft für Osteosynthesefragen", the predecessor of the AO Foundation. It is one of the few complete fracture classification systems to remain in use today after validation.

Table 3 given below shows distribution of patients on the basis of AO classification. Majority of the 42% patients (n=84) had type 31A2.2 fracture followed by 16% (n=32) with type 31A3.1 fracture and 11% (n=22) with type 31A3.3 fracture.

Table 1: AO Classification-based distribution of patients (n=200)

AO Classification	n	%
31A1.1	1	0.5
31A1.2	19	9.5
31A1.3	15	7.5
31A2.2	84	42.0
31A2.3	14	7.0
31A3.1	32	16.0
31A3.2	13	6.5
31A3.3	22	11.0

AO Classification

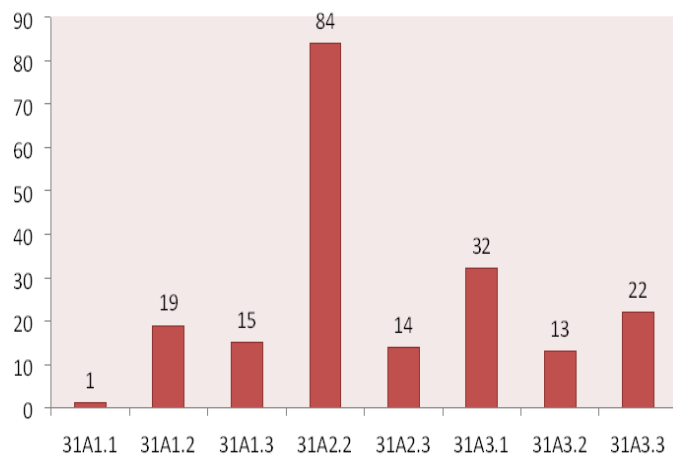


Figure 1: AO Classification-based distribution of patients (n=200)

Hypertension was the most common co-morbidity in 21% (n=42) patients followed by anemia in 14.5% (n=29) patients and diabetes mellitus in 9% patients. 34.5% (n=69) patients had no co-morbidity.

Table 2: Co-morbidities (n=200)

	n	%
Anemia	29	14.5
COPD	7	3.5
CAD	6	3
CKD	8	4
DM	18	9
Hypertension	42	21
TB	5	2.5
Poor CPR	6	3
Others	10	5
No comorbidity	69	34.5

COPD, Chronic Obstructive Pulmonary Disease; CAD, Coronary Artery Disease; CKD, Chronic Kidney Disease; DM, Diabetes mellitus; TB, Tuberculosis; CPR, Cardiopulmonary Reserve.

Table 3: Co-morbidities (n=200).

	No Difficulty Encountered (n=58)	Difficulty Encountered (n=142)
Anemia	2	27
COPD	3	4
CAD	1	5
CKD	2	6
DM	8	10
Hypertension	22	20
TB	3	2
Poor CPR	6	0
Others	1	4
No comorbidity	10	59

COPD, Chronic Obstructive Pulmonary Disease; CAD, Coronary Artery Disease; CKD, Chronic Kidney Disease; DM, Diabetes mellitus; TB, Tuberculosis; CPR, Cardiopulmonary Reserve

Discussion

This study was conducted on patients presenting to the Department of Orthopaedics at Dr RPGMC Tanda with trochanteric fractures and fulfilling the criteria and studied for assessment of difficulties during fixation of trochanteric fractures with PFN.

PFN is an intramedullary device and has all advantages of intramedullary biomechanics, such as decreasing the moment arm, can be performed by closed technique, which preserve the fracture hematoma and it's an important consideration in fracture healing, it also decrease blood loss, infection risk, minimizes soft tissue dissection and wound related complications.⁴ The PFN system offers some major biomechanical innovations.⁵ Axial loading in A1 and A2 fractures leads to fracture

impaction, whereas in A3 fractures such impaction doesn't occur, and medial displacement of the distal fragment of the fracture is common due to the instability. PFN for A3 type unstable fracture has superior results; PFN has been shown to prevent the fractures of the femoral shaft by having a smaller distal shaft diameter which reduces stress concentration at the tip.⁶

Due to its position close to the weight-bearing axis the stress generated on the intramedullary implants is negligible. The PFN implant also acts as a buttress in preventing the medialization of the shaft. The entry portal of the PFN through the trochanter limits the surgical insult to the tendinous hip abductor musculature, only unlike those nails which require entry through the piriformis fossa.⁷ The stabilizing and the compression screws of the PFN adequately compress the fracture, leaving between them a bone block for further revision should the need arise.⁶

In other case, broken piece of guide wire was in the neck, which we removed successfully by reverse reaming.

In osteoporotic patients, we under-ream (6.4 mm) the proximal fragment to achieve better purchase of lag screw (8 mm).

Problems during distal locking screw through zig in short nail, in one patient after putting distal screw, it was checked in C- arm in AP/Lat view, screw seemed to be in the hole, but it was found outside hole in post-op digital X-rays. Then, we tried to remove the screw, but we couldn't remove the screw (that was outside hole) and then we put another screw in distal locking hole

Conclusion

As our study observed that reduction, entry point, and guide wire passage were the most common difficulties faced intraoperatively and we solved them at the fracture table immediately. In this study, we observed that

technical difficulty in PFN can arise in any patient irrespective of type of fracture .

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