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Original Research Article

Clinico-RadiologicalStudy of Proximal Femur Fracture Treated with Proximal Femoral Nail

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Abstract:

Background and Objectives: Proximal femoral nails have been introduced relatively recent but have begun to complete the traditional dynamic hip screw. Fractures of the proximal femur including the intertrochanteric and subtrochanteric region which are commonly encountered in Orthopaedics especially in elderly population having porotic and weak bones. In elderly these occur even withminimal or trivial trauma ,whereas in the younger population these result from high velocity trauma. These injuries are in association with a high incidence of mortality and morbidity. These injuries were treated conservatively prior to the early 1970's and arenow treated totally surgically now. The goal of any treatment in fracture is stable fixation,ultimately leading to early mobilization and decreased incidence of morbidity and mortality. Many surgical interventions like Gamma Nail, Jewet Nail, Condylar plates had been tried but the outcomes were not very satisfactory. Clinical And Radiological Analysis of Proximal Fractures of femur when Treated with Proximal Femoral Nail.

Materials and Methods: A prospective study done in the Department of Orthopaedics at NMCH Patna Bihar. Patients with Proximal femoral fractures managed with PFN and subsequent follow up at regular intervals for a duration of 1 year.

Conclusion: Proximal femoral nail is a suitable implant for unstable intertrochanteric femoral fracture needing open reduction internal fixation.

Keywords: Proximal Femoral Fractures, Subtrochanteric fractures, Intertrochanteric fractures, Proximal Femoral Nail.

Introduction

Proximal femoral fractures account for a large proportion of hospitalization among trauma cases,an increased occurrence of proximal femur fractures ,as population general life expectancy has dramatically increased in recent decade. Proximal femoral fractures are one of the most common causes of morbidity and mortality. The purpose of treating these fractures is early stabilization which allows the patient to be mobilized early. [1] The end goal of any fracture treatment is early recovery and a quick return to daily routine functional life. A literature review to try and understand the various issues involved in management of proximal femoral fractures and search for answers to the existing contentions in the numerous treatment. Proximal femoral fractures that occur in the hip region, fractures usually the result of low impact trauma although in the, in younger patients they are usually victims of high impact trauma, usually during a car accident. The incidence of these fractures is 2-3 times more in females as compared to male population.

The weight bearing axis of proximal femur is mainly through the postero-medial cortex ,the load sharing properties of these implants like DHS having hip screw fixation in the inferior cortex shows a relatively lesser stability as compared to the hip screw fixation of the intra-meduallry devices, therefore such load sharing implants is not commonly used in management of unstable fractures and they show good results in stable fractures due to their good biomechanical superiority. The failure rate for a DHS is as high as 21 per cent for defective fractures. [2]

Early operative procedures have become a preferred modality to return to preinjury activity and functions. In order to improve the efficiency of rotational instability was developed, asit bears the load bearing strength. The introduction of PFN in 1997 had shown positive results with relatively lesser intraoperative complications and considerably low post- operative complication rates. We suspect the clinical superiority of PFN has immense potential advantages and suspected lower complication rates, hence PFN in our system needed to be augmented and further studied. We therefore proposed a

prospective study to analyses the Clinicoradiological study of proximal femur fractures surgically managed with Proximal Femoral Nail.

Material & Methods

The Observational study, It will be a prospective study design. After obtaining ethical clearance from the ethical committee and consent of the patients, The study shall be conducted between 2015 to May-2019 in the Department of Orthopaedics at Nalanda Medical college and hospital Patna, Bihar.

Patients who fulfill the criteria will be included in the study.

Participants

Inclusion Criteria

- Age of the patient >19years
- Patients with Proximal Femoral fracture femur

Exclusion Criteria

- Age of the patient <19years
- Open and Compound Fractures
- Patients who are unable to walk prior to the fracture
- Patients with Pathological Fracture

Sampling Procedure

All the diagnosed patients with intertrochanteric and subtrochanteric femur fractures, are admitted in the Department of Orthopaedics through the casualty of NMCH and patients who fulfill the inclusive criteria will be subjected in my study.

After initial assessment and Hemodynamically stabilizing all the patients, these patients were subjected for radiological confirmation with X-rays of the involved Bone with AP andLateral views and also investigated for routine blood levels in planning for managementsuch fractures. Age of the patient, gender of the patient, Classification and ASA grading, mechanism of injury will be recorded preoperatively. Post operatively patient will be followed up at intervals on 6 weeks, 12 weeks, 24 weeks, and 48 weeks. At every Follow up patient will be radiologically assessed with X-rays of the operated limb by AP and lateral views and clinical assessment will be done on the basis of pain, Range of Motion, when the patient started weight bearing, return to work. The patient will be clinically and radiologically evaluated at each follow up. Depending on the clinical and radiological evaluation the functional outcome will be studied.

Sample Size

Sample size of 30(thirty) adult patients with Proximal femoral fractures only skeletally mature patients.

Data Collection

The patients data shall include

- Details of the patient
- Any associated medical history of the patient
- Cause and Classification of each fracture
- Uniting fractures
- Time interval for fracture union
- The intra and early as well as late post-operative complications of the procedure.
- Serial Clinical evaluation of patient.

Investigations

Plain X-Ray of the affected Hip in standard projections (Antero-Posterior and Lateral)

Analysis Plan

Qualitative Variables will be tested using Chi-square test / Fisher's exact test andquantitative variables will be compared by using the unpaired t-test. A P value of lesser than 0.05 will be considered significant. Mater chart will be prepared in Microsoft Excelspreadsheet and will be analysed statistically.

Expected Results

In stable as well as unstable proximal femoral fractures including intertrochanteric andsubtrochanteric region It is expected that the clincoradiological study in these patients treated with PFN is expected to be superior in terms of mean intraoperative blood loss, mean duration ofoperation, early weight bearing and mobilization.

Discussion

Surgical fixation in managing the Proximal femur fractures poses a challenging job to the operating surgeon, as such fractures are technically difficult and prone to failure of fixation due to improper surgical technique.[1,2] A few of the common outcome of failed fixation include porotic bone, improper anatomical reduction, mismatched implant size or screw positioning, and fracture instability. Extramedullary implants are inferior to Cephalomedullary femoral reconstruction nails which are biomechanically stronger. Regulation of axial telescoping and rotational stability are important in unstable fractures. Intramedullary implants that are inserted in a less - invasive surgical manner are better tolerated by the elderly. [3] Velasco et al found 63 percent of subtrochanteric fractures were observed in patients aged 51 to over 70 and 24 percent in patients aged 17 to 50. In a 1998 intertrochanteric fractures study by Babst et al, mean age was 79.7 years (39 - 98 years). [4] Klinger et al(2005) study has patients mean age of 74 years with the age group ranging from 27 to 98years being treated with either DHS or PFN. [5] In their research, Simmermacher had a mean length of surgery (skin to skin) of 68.7 minutes (range 25 - 240mins). [6] In

their analysis, Wang had averaged 90 min (range 60-155 min) of operating time. [7] Mechanical complications mainly associated with distal nail locking and intraoperative technical complications of lateral wall fracture of greater trochanter, being the most common were reported with an average rate of 23.4 percent in 46 patients of the study conducted by Fogagnolo et al. [8] Kamboj et al reported one case treated with encirclage wiring for trochanteric fractures extending distally .Another patient had suffered with intaoperative shaft fracture and three patients having misplacement of the screw. 30 cases, In one of their case with trochanteric fracture that extended to the diaphysis encirclage wiring was done. One of their patients had suffered from intra operative fracture shaft femur, other three patients had misplacement of the screw. In his study, he included 30 patients out of which,17 patients achieved successful closed reduction, and remaining patients open reduction attempted to achieve the anatomical reduction. [9] Pajarinan et al reported in their study, one case with of heterotropic ossification out ofeighty-three patients, for which PFN was used. [10] Fogagnolo et al reported in his study of two cases of implant failure and one periprostheticfracture distal to tip. He also reported two cases of heterotopic ossification that had been managed with PFN fixation. [11]

Z-effect was first introduced by Werner et al, which was detected in five (7.1 percent) of their 70 cases. In this study. The neck screw cut out rate was 8.6 percent [12] Boldin et al elaborated the Reverse Z-effect. In their study he reports two cases of reverse Z effect and three cases of Z effect phenomenon, when such patients were surgicallymanaged with PFN for unstable IT and subtrochanteric femur fracture. [13] In 1997, AO/ASIF developed the proximal femoral nail (PFN) an intramedullary device for the treatment of proximal femoral fractures. Faisal and Nistane et al(2016) and Singla et al found that PFN had less amount of intra operative blood loss. [14-17] Presence of systemic disorders like hypertension, diabetes [18,19,20] also play a key role in fracture healing and treatment of these underlying entities needs to be addressed properly. Few of the other related studies on bone and joint disorders are available [21,22]. Few evidences from Global burden of disease study also reflected on related issues.

Conclusion

The main advantage of the use of PFN is that only requires shorter exposure and has a lesserpossibility of morbidity and operating time. Optimal management of proximal femoral fractures remains a challenge for the orthopedic surgeon. Babar et al 2011 concluded that PFN has immediate stability and is good with unstable type of intertrochanteric fractures.

It has low per operative and post operative morbidity.

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