

Evaluation of cephalomedullary implant fixation in unstable trochanteric fractures

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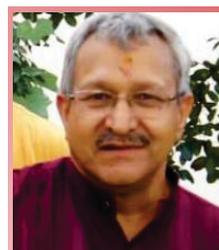
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Abstract: Introduction: Hip fractures continue to be a major cause of mortality and disability among the elderly.

Methods: The study includes 32 patients with closed unstable intertrochanteric fracture classified as AO 31A2 & 31A3, over a period of 30 months between may 2008 to November 2011. Inclusion Criteria-All mature skeleton above 50 years of age .Closed Unstable Trochanteric Fracture Classified as AO 31 A2 & A3. Exclusion Criteria-Immature skeleton, Pathological fracture of any cause other than osteoporosis, ,Inability to walk independently prior to injury.

Results: The average duration between injury and surgery was 5.06 days(range 1-9days). The average duration of surgery was 51.33 minutes(range 31-90 minutes). The average blood loss during surgery was 124.33 ml(range 50-199ml), 2 patient had shortening >1cm but less than 2cm, 1 patients had superficial wound infection, 2 patients had varus ranging from 1-4 degree, 2 patients had varus ≥ 5 degree maximum of 15 degree, 8 patients had valgus ranging from 1-4 degree.

Conclusion: It is a implant of choice for osteoporotic and unstable trochanteric fractures, and imparts greater biomechanical stability with lesser post-operative complications.

Keywords: Hip, unstable, intertrochanteric fracture, cephalomedullary implant.

THESIS SUMMARY

Introduction

Population of senior citizens is increasing as longevity increases day by day (1). Hip fracture is the second most common cause of hospitalization for elderly patients (2). Ninety percent of intertrochanteric fracture in elderly patients result from a simple (3). By 2040 the incidence is estimated to be doubled, and the figure may be much more in India (3). Operative management has become the treatment of choice for the trochanteric fractures as it permits early mobilization and minimizes the complication of prolonged bed rest. Over the past fifty years, a wide variety of implants and fixation strategies have been utilized for the surgical stabilization of trochanteric fractures (4). In surgical practice, it is important to know whether a fracture is stable or unstable. The introduction of sliding compression hip screw and side plate device till 1990 were considered the standard treatment for trochanteric fractures of femur for nearly 40 years and produced excellent results in stable

fractures (4). The absence of medial support of lesser trochanter in the fracture area and dorsal-medial comminution in unstable fractures lead to implant failure, particularly cut out and subsequent loss of reduction (5). The cephalomedullary nails have some advantages over the dynamic side hip plate and the sliding screw. It combines intramedullary shaft stabilization with sliding features of a hip screw. Such a device may offer a decreased bending strain because the shaft fixation is moved medially in the intramedullary canal, and thus decreases the lever arm of fixation. Moreover, its mass act as internal block against neck translation and prevent medial displacement of the shaft. Such a nail may offer biological advantage of combining a closed technique with limited periosteal disruption (6).

Aims and Objectives

To evaluate the effectiveness of cephalomedullary implant

fixation in management of unstable trochanteric fractures of femur.

Methods

The prospective study was conducted in our institute over a period of 30 months in patients having unstable trochanteric fractures of femur with minimum follow-up of 1 year and maximum follow-up of 2 1/2 year.

Patients were included in the study after obtaining informed written consent.

INCLUSION CRITERIA: All mature skeleton. Closed Unstable Trochanteric Fracture Classified as AO 31 A2 & A3 (22).

EXCLUSION CRITERIA: Immature skeleton, Pathological fracture of any cause other than osteoporosis, Open fractures, Inability to walk independently prior to injury event, Neurological and psychiatric disorders that would preclude assessment (eg, Parkinson disease, Multiple sclerosis, severe depression).

METHODS

TECHNIQUE: After general anesthesia, patient Supine on fracture table. Closed reduction of fracture on fracture table and confirmed the reduction by image intensifier. Lateral skin incision and entry point on tip of greater trochanter identified and made with awl. Introduction of guide wire into proximal fragment & distal fragment. Reaming of canal in ante-grade direction. Introduction of nail of appropriate diameter and Length. Proximal screws placement and distal locking with help of jig. Closer done in layers. Blood loss was calculated.

Postoperatively patient was assessed for any postoperative complications. Partial weight bearing crutch walking after 48 hours / drain removal. Physiotherapy was started from next day. Suture removal on 12th day.

FOLLOW-UP

Patient was followed up at 6th weeks, 12th weeks, 18th weeks and 24th week, 1 year, 2 year and 2 1/2 year. They were assessed clinically and radiologically. After union of fracture the functional outcome was assessed after 1 year as per 'Harris Hip Score' (23).

The data thus collected was subjected to standard statistical analysis.

Result

In our study, we included 32 patients with unstable intertrochanteric fractures out of which 2 patients died due to some other ailment within 2 months of surgery, so we included only 30 patients with minimum follow up of 1 year and maximum follow up of 2 1/2 years.

In our study minimum age of the patient was 28 years, and maximum age was 85 years. Maximum numbers of patient were between 60 years to 89 years. The average age was 66.7 years (ranging from 20 years to 99 years). There were 20 males and 10 females.

Total number of patients were 30, out of which 27 patients were 31-A2 and 3 patients were under 31-A3 as per AO classification. In our study, the average duration between injury and surgery was 5.06 days, ranging from 1 day to 9 days.

In our study minimum duration of surgery was 35 minutes and

maximum of 90 minutes. The average duration of surgery was 51.33 minutes (ranging from 31 minutes to 90 minutes). Minimum blood loss during surgery was between 80 ml and maximum blood loss of 190 ml. Average blood loss during surgery was 124.33 ml (ranging from 50 ml to 199 ml). Out of thirty patients 2 patients had varus ranging from 1-4 degree, 2 patients had varus ≥ 5 degree maximum of 15 degree, 8 patients had valgus ranging from 1-4 degree, 18 patients had no change in their neck shaft angle, this is in comparison to normal side.

Functional assessment was done after complete radiological union, out of 30 patients 18 patients had good grade, 10 patients had fair grade and 2 patients had excellent outcome. In post-operative period 1 patient had superficial infection and 2 patient had limb shortening of > 1 cm maximum of 1.8 cm. when compared with normal limb.

Discussion

Intertrochanteric fractures is one of the most common fractures of the hip especially in the elderly with porotic bone, usually due to low energy trauma like simple falls. The incidence of intertrochanteric fracture is rising because of increasing number of senior citizen with osteoporosis (3). The primary goal in the treatment in elderly patients with an intertrochanteric hip fracture is to return the patients to his prefracture activity level as soon as possible (24). Surgery is the treatment of choice for early mobilization and prompt return to pre-fracture functional level, as well as for reducing mortality and morbidity (6). Treatment of unstable trochanteric fracture with cephalomedullary implant or with extramedullary implant has been the topic of discussion for years together. The present study was conducted to evaluate the role of cephalomedullary implant in unstable trochanteric fractures. A total number of 32 patients who presented with unstable intertrochanteric fractures were included in this study, out of which 2 patients died due to age related problems after 2 months of surgery who were excluded from the study, and only 30 patients were included in the study.

In the present study, the age of the patient ranged from 28 years to 89 years with mean age of 66.6 years. Majority of the patients, 80% were in the age group of 60 years to 89 years. Kuderna et al (25) in their study had 72% of the patients over 60 years of age with average age of 68 years ranging from 21 years to 94 years. This is comparable to our study. Bonnaire et al (10) implicated in their study that in this age group proximal femoral fractures are on increase with morbid outcome, and intertrochanteric fractures account for approximately half of the hip fractures. In our study of 30 patients, 20(66.6%) were male and the rest of 10(33.33%) were female. Gadegone and Salphale et al (26) in their study of 100 patients, 62(62%) were male and 38(38%) were female, which is comparable to our study. This may be on account of the fact that males are more involved in out door activity and more liable to sustain fractures. In our study, the fracture type according to AO classification 27(90%) patients had 31-A2 type of fracture and rest 3(10%) patients had 31-A3 type of fracture. Morihara (15) in their study of all unstable intertrochanteric fracture they had 88.2% of patients who had 31-A2 type of fracture and rest 11.7% patients were having 31-A3 type of fracture. Cleveland et al (27) concluded in their study that unstable trochanteric fractures are

common in patients over 60 years age and more common in severely osteoporotic bone as compared to femoral neck fractures. In the present study, the average duration between injury and surgery was 5.06 days, ranging from 1 day to 9 days. Tyllianakis et al (28) who in their study had average duration of 3 days between injury and surgery, ranging from 1 day to 7 days. This delay between injury and surgery is because of, as our hospital which is tertiary center of hill region, most of the patients were coming from far distance in hills, due to which patient came to hospital after 2-3 days of injury. In the present study, the average duration of surgery was 51.33 minutes, ranging from 30 minutes to 90 minutes. Gadegone and Salphale (26) had similar finding in their study with 50 minutes the average duration of surgery (ranging from 45 - 65 minutes), which is comparable to our study. In first 4 cases the duration for surgery was more than 60 minutes because of being new technique, it needs expertise, after being familiar with the instrumentation and technique rest 26 cases were operated between 31 minutes to 60 minutes. Agarwal et al (29) in their study had 75 minutes the average duration of surgery when treating unstable trochanteric fractures with extramedullary implant, which was much higher when compared with intramedullary implant. Thus it shows that cephalomedullary implant have advantage over extramedullary implant as it reduces morbidity related to prolonged anaesthesia. In the present study, the average blood loss during surgery was 124.33 ml (ranging from 50 ml to 199 ml). Hardy et al (30) in their study showed, that when operating with cephalomedullary implant in unstable trochanteric fracture the average blood loss was 144 ml (ranging from 24 - 144 ml) which is comparable to our study. However, where extramedullary implant was used, average blood loss of 198 ml (ranging from 115 - 280 ml). Thus with use of extramedullary implant blood loss is more when compared with cephalomedullary implant. In the present study, the association of varus ranging from 1-4 degree was found in 2 (6.66%) patients, varus ranging from 5 degree or > 5 degree was found in 2 (6.6%) patients, maximum of 15 degree. Russel et al (64) in their study concluded that acceptable reduction is less than 5 degree of angulation in any plane, they had similar finding with malreduction more than 5 degree in 10% cases and acceptable reduction in 90% cases which is comparable to our study. The varus malreduction may be due to severe comminution, wrong trajectory of the entry portal and adducted position of the limb during final insertion of proximal part of nail, particularly in obese patients. Kim et al (31) in their study had 27.7% angular malreduction when extramedullary implant was used in unstable trochanteric fracture, thus we can conclude that cephalomedullary implant have less angular malreduction when used in unstable trochanteric fractures. In the present study, post operatively patients were followed up for minimum of 24 weeks and were assessed radiologically for the union, out of 30 patients 22 (73.33%) patients showed union at the end of 18 weeks and 8 (26.66%) patients showed union by end of 22 weeks. Gadegone and Salphale (26) in their study had similar findings, who had union in all cases between 15 weeks to 21 weeks, which is comparable to our study. Khan et al (1) in their study with minimum follow up of 24 weeks had 99.9% union rate with extramedullary implant, which is also comparable to our study,

where cephalomedullary implant was used. Thus both implants have no difference in union rate when treating the unstable trochanteric fractures. In the present study functional assessment was done by Harris Hip Score in which 2 patients had excellent score, 18 patients had good score, 10 patients had fair score, which was 66.6% good or excellent outcome when treated with proximal femoral nail which allows early weight bearing and mobility. Porecha et al (21) in their study had similar findings who had 64.6% good or excellent outcomes when they used proximal femoral nail. However they showed 63.6% good or excellent outcomes when extramedullary implant was used according to Harris hip score which is comparable to cephalomedullary implant fixation. It concludes that there is no difference in functional outcome with both the implants. In the present study, post operatively 1 (3.33%) patient had superficial infection. Which was treated by dressing. Tyllianakis et al (28) had similar finding, in their study they had 4.44% infection which is comparable to our study. In this study 2 (6.66%) patient had limb shortening more than 1cm and maximum of 1.8 cm. Gadegone and Salphale (26) in their study had shortening in 10% of their patients which is comparable to our study. Harington and Johnston (32) had showed in their study, shortening more than 1cm was found in 84% of their patients when they used extramedullary implant in trochanteric fractures. In cephalomedullary implant there was no telescoping reduction and less sliding because the proximal end of intramedullary nail was at the level of the of the greater trochanter. When telescoping of the lag-screw occurs the neck fragment abuts the intramedullary nail, thus preventing further collapse of the fracture, thus resulting in less subsequent shortening (30). In our study, complication like avascular necrosis, shaft fracture at tip of nail as mentioned by other authors were not found, as our follow up was of short duration and it needs to be evaluated for longer duration.

Conclusion

Though rate of union and functional outcome is the almost same in unstable trochanteric fractures when treated with intramedullary or extramedullary implant. However, as the cephalomedullary implant imparts greater biomechanical stability with lower levels of anaesthetic, surgical and post surgical complications. Proximal femoral nail (PFN) appears to be very effective implant in unstable trochanteric fractures even in Indian patients where the bones are narrow and neck diameter is small.

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