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Original article

Treatment options for unstable trochanteric fractures: Screw or helical proximal femoral nail

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ABSTRACT

Purpose: To compare treatment outcome of screw proximal femoral nail (PFN) system with that of a helical PFN.

Methods: The study included 77 patients with closed unstable intertrochanteric fracture classified as AO 31A2 & 31A3, between June 2008 to August 2011. Inclusion criteria were: all mature skeletons above 50 years of age; closed unstable trochanteric fracture classified as AO 31A2 & A3. Exclusion criteria were: immature skeleton, pathological fracture of any cause other than osteoporosis, inability to walk independently prior to injury. Patients were randomized to 2 treatment groups based on admission sequence. Forty patients were treated with screw PFN and thirty seven were treated with helical PFN.

Results: Both groups were similar in respect of time of surgery, blood loss and functional assessment and duration of hospitalization. In screw PFN group 2 patients had superficial wound infection, 1 patient had persistent hip pain and 1 patient had shortening >1 cm but <2 cm, while in helical PFN group 1 patient had superficial wound infection.

Conclusion: Both screw and helical PFN are very effective implants in osteoporotic and unstable trochanteric fractures even in Indian patients where the bones are narrow and neck diameter is small. It is an implant of choice for osteoporotic and unstable trochanteric fractures.

1. 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 fall and are a considerable burden to the health care system through their association with increased mortality and morbidity.[3] The high prevalence of these fractures in the elderly is related to numerous factors, including osteoporosis, malnutrition, decreased physical activity, impaired vision, neurological impairment, poor balance, altered reflexes and muscular weakness.[4] Hip fractures continue to be a major cause of mortality and disability among the elderly. It also causes loss of mobility and can significantly reduce patients' quality of life. Factors that adversely affect mortality included advanced age, male sex, an intertrochanteric location of the fracture and the poor mobility before the fracture occurred.[5] The goal of treating hip fracture is to return patient to their prefracture functional level, without long-term disability and avoiding medical complication.[1] The introduction of sliding compression hip screw and side plate device till 1990 was considered the standard treatment for trochanteric fractures of femur for nearly 40 years and produced excellent results in stable fractures.[6] 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.[7]

Biomechanical studies have shown that intramedullary nail devices are more stable underload applied using a shorter lever arm and that excessive sliding is controllable.[8]

Thus, the goal of this study was to compare treatment outcomes achieved by a proximal femoral nail (PFN) screw system with those obtained using a PFN with a helical blade, and to determine the effectiveness of helical PFN in the treatment of intertrochanteric fractures.

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2. Materials and methods

2.1. Patients

The prospective study include 77 patients with closed unstable intertrochanteric fracture classified as AO 31A2 & 31A3 was conducted in our institute, over a period of 24 months between June 2008 to August 2011 in patients having unstable trochanteric fractures of femur with minimum follow-up of 24 weeks and maximum follow-up of 2 year.

Inclusion criteria were: all mature skeleton above 50 years of age; new mobility score of 9 (palmer and parker 1993); closed unstable trochanteric fracture classified as AO 31A2 & A3.[9] Exclusion criteria were: 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).

Patients were included in the study after obtaining informed written consent. This study was approved by ethics committee at our hospital. Patients were randomized to 2 treatment groups based on admission sequence. Forty patients were treated with screw PFN (mean patients age, 69.1 years; men to female ratio, 1:2), and thirty seven were treated with helical PFN (mean patients age, 71.2 years; men to female ratio 9:28). There were 28 patients with 31A2 and 12 patients with 31A3 type in group treated with screw PFN and 27 patients with 31A2 and 10 patients with 31A3 type in group treated with helical PFN.

2.2. Operation and postoperative management

Operation was performed on fracture table in supine position under general anesthesia. Closed reduction of fracture was confirmed by image intensifier. For both implants, the desired position of the lag screw was in the central femoral neck on the lateral view and in the central inferior femoral neck on the anteroposterior view, with the tip between 5 and 10 mm from the subchondral bone.[10] Distal locking was performed with help of jig. Closure was done in layers. Blood loss was calculated with suction in drain substracting fluid used for irrigation and weight of sponge used.

Postoperatively patient was assessed for any postoperative complications. Crutch walking with partial weight bearing was allowed after 48 h/drain removal. Suture was removed on 12th day.

2.3. Follow-up

Patient was followed up at month 6, 12, 18 and 24. They were assessed clinically and radiologically. Functional assessment was done after 18 months as per Harris Hip Score.[11]

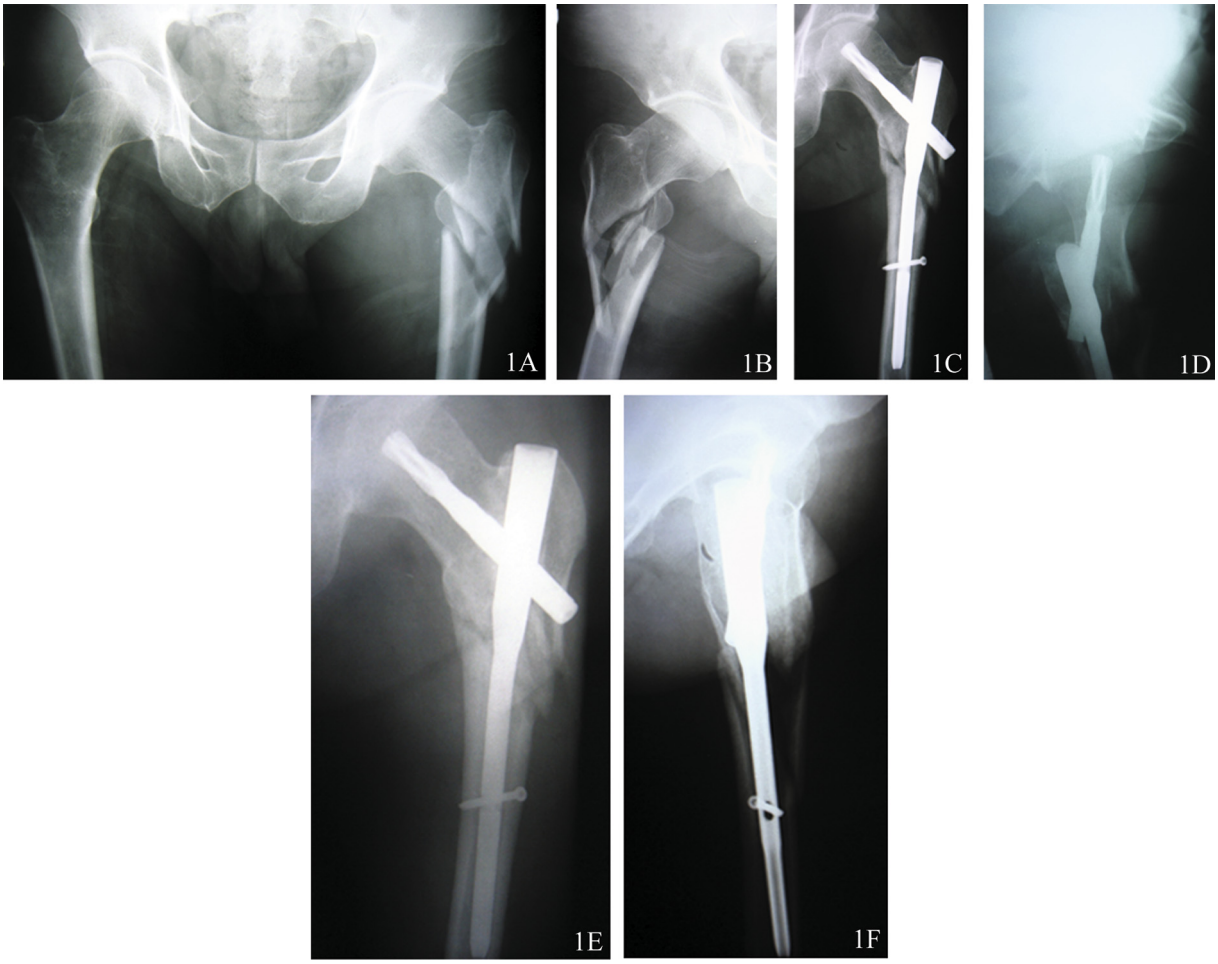

Fig. 1. An unstable trochanteric case treated by helical PFN. A, B: Anteroposterior and lateral preoperative view; C, D: Anteroposterior and lateral films 6 weeks after operation; E, F: Anteroposterior and lateral films 24 weeks after operation showing union.