

Short Term Outcome of Patients With Four Part Unstable Fracture Intertrochanteric Femur Operated with Dynamic Hip Screw Supported with 'T' Buttressing Plate



MEDICAL SCIENCE

KEYWORDS : Lateral wall reconstruction, medialization, collapse, T buttressing plate,

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ABSTRACT

➤ *To study the results of Dynamic hip screw supported with " T " buttressing plate in the management of " Four part Unstable Fracture Intertrochanteric Femur " by analyzing the factors which influence post operative mobilization and assessment of hip function and functional abilities of patient in follow up studies*

➤ *To evaluate whether the implantation of T buttressing plate in addition to the dynamic hip screw (DHS) prevents excessive collapse, screw cut out, medialization of shaft and limb shortening in four-part and selected three-part trochanteric fractures.*

INTRODUCTION

Intertrochanteric fractures of femur are common in old age group, but it is not uncommon in younger age group. These fractures unite readily with conservative line of treatment. Unlike fractures of neck of femur, there is no fear of complication like, avascular necrosis of head and its sequelae of osteoarthritis. Though trochanteric fractures unite without surgical intervention, malunion with coxa vara deformity resulting in shortening of limb and limp are commonly seen. Earlier active treatment was usually delayed for as long as there to four weeks because it was believed that attempts to immobilize the limb by splints traction or open reduction with internal fixation would prove fatal but this usually leads to secondary complication. Intertrochanteric fractures are seen with increasing frequency and severity as the life expectancy of our population increases. The primary goal in the treatment of an elderly patient with Intertrochanteric fracture is to return the patient to his / her pre-fracture activity as early as possible. Rapid mobilization of these elderly patients reduces the morbidity and mortality rate in geriatric patients.

The Sliding Nail – plate devices give rise to Sliding Hip Screw devices. The nail portion was replaced by a blunt ended screw with a large outside thread diameter. The first author to describe a sliding hip screw device was Suhumpulick W 48.

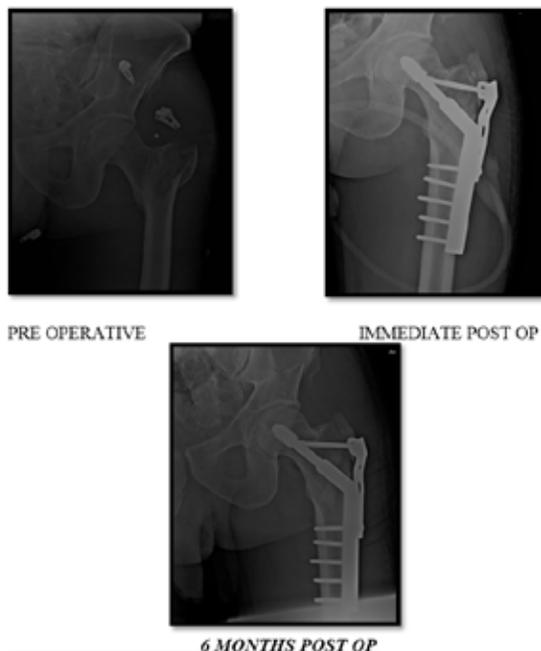
One early modification to the sliding Hip Screw maximized fracture impaction by allowing the proximal lag screw to telescope within the plate barrel and the plate to slide axially along the femoral shaft. To accomplish this bi-directional sliding, the plate was modified by replacing the round screw holes with slotted screw holes (Egger's plate). More recently, a two-component plate device was introduced (Medoff plate, Medpace, Culver City, CA) in which a central vertical channel contains an internal sliding component. Both device have been used successfully for the treatment of stable and unstable intertrochanteric fractures.

Hence, for these various complication associated with other fixation devices the treatment of intertrochanteric fractures, Dynamic Hip Screw Fixation has become the Gold standard treatment.

The sliding compression device, a widely used implant in unstable proximal femoral fractures, suffers from two major limitations; excessive collapse and screw cut-out. Commonly attributed reasons for these are lateral wall comminution and single-point fixation, respectively. The diversity of fixation devices available for treatment of trochanteric fractures illustrates the

difficulties encountered in the actual treatment, and the discussion about ideal implant for such cases still continues. From a mechanical point of view, the dynamic hip screw (DHS), a sliding screw device, has many advantages such as controlled impaction and short operation time.

The intact lateral wall plays a key role in stabilization of unstable trochanteric fractures by providing a lateral buttress for the proximal fragment, and its deficiency leads to excessive collapse and virus malpositioning. As it was noted that besides undisplaced or well reduced I/T femur on fracture table, all other type of fractures treated with DHS plating got collapsed many a times and went into varus and shortening. It is because lateral wall is not intact every fracture, even in simple fractures microfractures lines are always there, which leads to instability and intraoperative fractures or in post op periods which lead to over collapse and medialization.



CASE STUDY

28 patients were available for the outcome analysis. There were 10 males and 18 females; the average age was 67 years. Fall on a level surface was the most common mode of trauma, accounting for 85% of the cases, with the remainder sustained in high energy road traffic accidents. Prior to injury, 22 of the patients were ambulatory without any walking aid. Average delay to operation from the time of injury was 8 days (range 7–10 days), which was mostly due to delay in reporting to the hospital. Postoperative X-ray examination showed anatomical reduction in 25 cases, and nonanatomical reduction in 3 cases. There were two local complications, as well as some systemic complications

COMPLICATION	No. of patients
SYSTEMIC	
Chest infection	1
Urinary tract infection	1
Urinary retention	3
LOCAL	
Superficial wound infection	1
Wound Hematoma	1

Clinico-radiological consolidation of the fracture was observed in all cases at an average of 14.5 weeks. One patient complained of persistent pain in the hip region because of impingement of the proximal part of the T Plate and later on the screw went cut out and plate was loosened and back out. Two patients had moderate persistent pain due to varus malunion. No limb length discrepancy was observed in any of our cases with anatomical reduction. 3 cases had less than anatomical reduction observed in the immediate postoperative period resulting in 7–9 mm of shortening rotation on X-rays of the proximal fragment was not observed in any of our cases.

Near normal walking was resumed in 18 patients, 8 patients needed a walking aid for long distances and the remaining two patients required a walking aid even for short distances. Postoperative mobility score in our patients was almost comparable to the status before trauma apart from six cases where the score was reduced. Normal range of hip movements and full muscle power was achieved in 15 patients while 8 patients had slight decrease in range of hip movement and the rest of the 5 patients had limited flexion and abduction with fair muscle power. Hip abductor function was observed to be adequate in most of the cases at final follow-up. Normal function was regained in 13 patients, while very little restriction was observed in 13 patients and the remaining 2 patients had restricted normal activities but were able to do most of the housework and shop freely.

DISCUSSION

The treatment of local problem has evolved over the years, from diagnostic conservatism to an absolute faith in metal implants. These fractures mostly occur in elderly and the risk of prolonged immobility and recumbency in bed arises in senile patients, so early mobilization after rigid internal fixation is achieved.

. Some forty years later, it appears timely to evaluate the extent to which these four principles have stood the test of time.

These are:-

1. Anatomic or good reduction.
2. Stable internal fixation: designed to fulfill the local biomechanical demands.
3. Preservation of blood supply: to the bone fragments and the soft tissue by means of atraumatic surgical technique.
4. Early active pain free mobilization of muscle and joint: adjacent to the fractures, preventing the developments of fracture disease.

All the cases in this series were operated using fracture table we have found following advantages in using fracture table.

- Reduction done with traction is easier
- Less assistance is required
- Manipulation is reduced to minimum
- Trauma and shock are reduced

Most patients with intertrochanteric fracture have considerable osteopenia with quality of the bone for purchase of fixation within the head is less than desirable. It is therefore important that the lag screw and cancellous screws are placed in that part of the head and neck where the quality of the bone is best. The calcar is a dense vertical plate of bone extending from posteromedial portion of the femoral shaft under the lesser trochanter and radiating laterally into the greater trochanter, serving to reinforce the femoral neck posteroinferiorly. The calcar is thickest medially and gradually thins as it passes laterally.

Reduction of the intertrochanteric fracture may be carried out either by open or closed means. In either circumstance the objective is to achieve a stable reduction be it anatomical or non-anatomical in configuration.

Our study is to evaluate the results of lateral cortex reinforcement in unstable intertrochanteric fractures with T buttressing plate, which resist the collapse and medialisation, support the Greater trochanter and enhance the rate of union.

In the present study, the average age 67 yrs was comparable to those of other Indian authors, and most of the western authors. We did not encounter pathological fractures in our study. Most authors have reported some incidence of failure of union in their series of trochanteric fractures following the use of DHS. The primary complications of trochanteric fractures fixed with DHS are post operative late collapse leading to shortening of the limb and screw cut-out resulting in coxa vara as a result of lateral cortex weakness.

The mean sliding in our study was significantly lower than previous studies using DHS alone. Jacobs et al. have reported an average sliding of 5.3 mm in stable fractures and 15.7 mm in unstable fractures. Similarly, Larson et al. have reported average sliding of 6.3 mm in stable fractures and 12.4 mm in unstable fractures. Hardy et al. and Steinberg et al have reported an average sliding of 10.2 mm and 9.3 mm, respectively.

These figures do highlight the importance of anatomical reduction at the time of surgery but this is possible only if stability of these fractures is achieved by buttressing the lateral wall. These findings reinforce the results of Babst et al., who also reported significant reduction in excessive collapse and subsequently reduced limb length discrepancy by using a TSP in combination with the DHS.

The mechanism of action of the 'T buttressing plate' has not been properly evaluated in biomechanical studies. However, T

plate seems to act as a buttress plate against the medialisation of the distal fracture fragment often seen in unstable fractures stabilized with the sliding screw plate systems alone. In unstable trochanteric fractures owing to posterior, medial and lateral comminution, the collapse at the fracture site that occurs with sliding hip screw fixation may be more than usual. In such a situation abductor muscle weakness and its consequent fatigability is likely to be greater.

This study therefore does indicate that addition of a 'T buttressing plate' over DHS is likely to improve the stability of fracture fixation, while at the same time permitting a controlled sliding collapse.

CONCLUSION

The combination of 'T buttressing plate' and DHS is a useful technique in the treatment of unstable trochanteric femoral fractures. It creates a biomechanically stable construction allowing reconstruction of the lateral wall to maintain adequate lever arm and abductor strength. In addition the screws passed from it, thereby providing two-point fixation with additional rotational stability.

Superior overall functional and radiological outcome in patients with unstable trochanteric fractures does indicate that the combination of DHS and 'T buttressing plate' is likely to be a better option in the management of these fractures as compared to DHS alone.

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