



A Comparative Study of Trochanteric Stabilizing Plate With Dynamic Hip Screw in Fracture Intertrochanteric Femur With Lateral Wall Comminution

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ABSTRACT

Introduction: Our study aimed to compare effectiveness of Trochanteric stabilizing plate and Dynamic hip screw in intertrochanteric fracture femur with lateral wall fracture.

Method: This prospective comparative study included 81 patients who had intertrochanteric fracture femur with lateral trochanteric wall fracture (Evan's type III & V) which were treated either with Dynamic hip screw or Trochanter stabilizing plate. Patient was evaluated for screw impaction, limb shortening & functional outcome using modified Harris hip score.

Result: In the group treated with DHS patients have more impaction and shortening & only 40% patients have Harris hip score above 60 whereas in TSP group patients have less impaction and shortening and 70% patients have HHS above 60.

Conclusion: Addition of TSP with DHS in fracture intertrochanteric femur with lateral trochanteric wall comminution can prevent excessive collapse & limb shortening therefore improving overall functional outcome.

KEYWORDS : unstable intertrochanteric femur fracture, dynamic hip screw, trochanter stabilizing plate.

INTRODUCTION

The Lateral Trochanteric Wall is a key element in the reconstruction of unstable peritrochanteric hip fractures. Excessive collapse & femoral medialisation is common in specific fracture type particularly if there is comminution of lateral femoral cortex at the site of insertion of the lag screw. Femoral medialisation & excessive collapse is strongly associated with non-union & fixation failure and functional deficit (due to reduced hip mobility, limb shortening & pain). Patients with preoperative or intraoperative fracture of the lateral femoral wall are not treated adequately with a sliding compression hip-screw device, and integrity of the lateral femoral wall should be a major factor in determining the internal fixation device used for fracture stabilisation. The addition of a TSP to the DHS reconstruct lateral trochanteric wall & effectively supports the unstable greater trochanter fragment and can prevent rotation of the head-neck fragment. Excessive fracture impaction and consecutive limb shortening is prevented by this additional implant. Value of this implant in preventing femoral medialisation in this specific type of intertrochanteric fracture merit further evaluation. Our study was aimed to compare effectiveness of implant TSP & DHS in intertrochanteric fracture femur with lateral wall fracture in terms of fracture collapse, limb shortening & overall functional outcome.

MATERIAL AND METHOD

All patients who were referred to our institute from Aug 2008 to Aug 2010 & between the age 18 to 65yrs and who fit into with type III & V of Evan's type intertrochanteric fracture (i.e. with lateral trochanter wall fracture) classification. Open, pathological & fracture associated with other lower limb or vertebral injuries were excluded from study. Every patient on admission was evaluated. Treatment options including DHS, TSP & conservative treatment with risk and benefits of each method being explained in detail. Once a clinical pathway was chosen the patient managed with DHS & TSP were included in study. Postoperative patient having neck shaft angle between 130 to 140 degree & TAD index less than 25mm were selected for followup. Those patient which were having postoperative complication of infection excluded from study.

A total of 116 pts has been registered for study. Out of these 116 pts treated by TSP and DHS only those who were having postoperative neck shaft angle between 130 to 140 degree & TAD index less than 25mm were selected for followup. 4 pt have been lost in followup, 2 of them died. So effectively 81 pts who were fulfilling above criteria were followed for a minimum period of 1 year, out of which 41 were treated by DHS and 40 were treated by TSP forming 2 groups for comparative study. Clinical data were collected prospectively at each follow-up with use of template data sheet.

Preoperative assessment of fracture geometry was done using Evan's classification. Intra operatively pattern of reduction achieved was seen on Anteroposterior and Lateral projections by image intensifier. Using TAD index assessment of Screw placement was done in postoperative period. Neck shaft angle measured on immediate post operative x ray with the help of Goniometer. During 1st follow up (2 weeks post op), 2nd follow up (6 weeks post op), 3rd follow up (3 months post op) and 4th follow up (6 months) and 5th follow up (1 year) plain radiographs (true AP and true lateral hip with thigh) were obtained to look for signs of union and impaction. All radiographs were taken keeping a fixed distance of tube and plate to minimize the error due to magnification also the magnification was cross checked by measuring the length of Richards screw in x ray and comparing it with the actual length as has been used in individual case. Functional results were evaluated after a period of 6 months postoperatively using a new criteria devised from Harris hip score taking into consideration the needs of Indian patients (Modified Harris Hip Score).

DHS fixation was done using standard AO technique. Patient positioned supine on fracture table and closed reduction done. Lateral approach used for exposure. In case of TSP same technique as for DHS was used except addition of trochanteric stabilising plate which buttress the greater trochanter fragment from lateral side. Through this plate a derotation screw can be inserted cranially and two screw were used to fix greater trochanter. Lateral wall impaction measured after 1 year and correlated with functional outcome. This can be measured by subtracting distance of screw thread from barrel tip in 1 year x ray from similar distance in immediate post op x-ray.

STATISTICAL ANALYSIS:

Statistical analysis was performed to compare the demographic characteristic between two groups. Clinical data, including the type of fracture, reduction achieved, impaction achieved at fracture site after 1 year, union time in weeks, limb shortening after 1 year, & over all functional outcome after 1 year of surgery. A Fisher's exact test was used for continuous variables. Ninety five percent confidence interval were used. A p-value of > 0.05 was defined as significant.

RESULTS

Average screw impaction (Fracture collapse) was 18.8mm in DHS group & 6.5mm in TSP group. Jacobs et al reported that sliding of more than 15mm leads to a higher prevalence of fixation failure. In our study 21 patients (51.21%) out of 41 patients of DHS group had screw impaction more than 15mm at 6 month of follow up, whereas only 1 patient (2.5%) out of 40 in TSP group. Fisher's exact test was applied to prove this difference statistically. With a p-value of 0.0001, this difference is statistically highly significant. (Table-3)

Table 1: Impaction achieved at fracture site after 1 year.

Group A	Impaction measured in mm									
		0-3	>3-6	>6-9	>9-12	>12-15	>15-18	>18-21	>21-24	>24
	III	06	04	02	01	00	00	00	00	00
V	03	09	08	04	02	00	01	00	00	
Total	09	13	10	05	02	00	01	00	00	
Group B	III	00	01	02	04	04	03	01	01	0
	V	00	00	00	06	05	06	05	04	01
	Total	00	01	02	08	09	09	06	05	01

Average shortening in DHS group was 2.9 cms & 1.42cms in TSP group at 1 year followup. Generally, a leg length discrepancy of 1-2 cm is well tolerated. In our study 25 (61%) out of 41 patients of DHS group had shortening more than 2cm whereas only 3 (7.5%) out of 40 patients in TSP group. Fisher's exact test proved this difference statistically significant with a significant p-value. (Table-3).

Table 2: Limb length shortening at 1 yr

Groups	Grades	Limb shortening in cm after 1 year					Total
		0	0-1	>1-2	>2-3	>3-4	
Group A	III	0 3	06	04	0 0	0 0	1 3
	V	0 2	11	11	0 3	0 0	2 7
	Total	0 5	17	15	0 3	0 0	4 0
Group B	III	0 1	02	05	0 6	0 0	1 4
	V	0 0	00	08	1 5	0 4	2 7
	Total	0 1	02	13	2 1	0 4	4 1

Average functional score was 76 in TSP group & 61.68 in DHS group. 28 patients (70%) in TSP group had HHS >60 after 1 year of surgery, whereas only 17 patients (41.5%) out of 41 in DHS group.

Table 3: Functional outcome (Harris Hip Score)

Group	Grades	Functional Results				Total
		Excellent HHS >90	Good HHS 60-89	Fair HHS 30-59	Poor HHS <30	
Group A	III	0 5	0 5	0 3	0 0	1 3
	V	0 6	1 2	0 8	0 1	2 7
	Total	1 1	1 7	1 1	0 1	4 0
Group B	III	0 2	0 6	0 5	0 1	1 4
	V	0 0	0 9	1 5	0 3	2 7
	Total	0 2	1 5	2 0	0 4	4 1

DISCUSSION:

Pertrochanteric hip fractures still are a major orthopaedic challenge, and those that are unstable have the poorest prognosis. Despite the fact that union rates are high in intertrochanteric hip fractures functional outcomes tend to be disappointing.

Peritrochanteric fractures with lateral wall fracture are very unstable & have poorest prognosis. These unstable fracture results in a severe and prolonged period of postoperative disability. Fracture collapse is one of the postoperative complications reported in association with these fractures.

The lateral trochanteric wall is a key element in the reconstruction of unstable pertrochanteric hip Fractures. Presence of the lateral wall fracture on the preoperative radiograph should be a major factor in determining the internal fixation device used for fracture stabilization.

The sliding compression device DHS, 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.

Hip screw migration is considered to be an evolutionary complication and the ability of the implant to resist migration under dynamic loading is of critical importance. Walking subjects the Implant-bone interface to combined axial and torsional loading and may play a role in lag screw migration.

Lateral wall reconstruction is an important component in stabilization of unstable trochanteric fractures and a TSP appears to be a useful device to achieve this. Addition of anterolateral screws is likely to enhance the stability further by providing two point fixation.

CONCLUSIONS

In unstable intertrochanteric fracture with lateral trochanteric wall fracture, reconstruction of lateral trochanteric wall & abductor mechanism using trochanteric stabilizing plate helps in achieving anatomical reduction imparts stability and prevents excessive sliding of screw & collapse, limb shortening and overall good functional outcome.

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