

Retrospective Radiological Analysis of Postoperative Complications in Unstable Peritrochanteric Fractures in a Tertiary Hospital

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Abstract: ***Introduction:** Peritrochanteric fractures are one of the most common fractures occurring in the elderly which are frequently associated with low energy trauma. With improved surgical techniques, better design of implants, open reduction and internal fixation of these fractures has become treatment of choice in the recent area. Unstable intertrochanteric fractures are ones where there is posteromedial comminution thereby increasing the chance of various complications postoperatively. **Aims and Objectives:** To document the incidence of post operative complications radiologically and determine the differential incidence between intramedullary and extramedullary fixation devices. **Materials and Methods:** This was a retrospective radiological audit of 101 unstable peritrochanteric fractures which were assessed radiologically at 3 months and 6 months to look for various complications like varus collapse, non union, screw cut out and implant failure. **Conclusions:** The incidence of varus collapse, screw cut out, implant failure and excessive medialization is significantly more with dynamic hip screw as compared to a proximal femoral nail. However the incidence of non union was equal with both modes of fixation.*

Keywords: Peritrochanteric fractures; Dynamic hip screw; Proximal femoral nail; Varus collapse; Non Union

1. Introduction

Extracapsularperitrochanteric fractures are one of the most common fractures occurring in the elderly. They are frequently associated with low energy trauma but can be seen with high energy injury in the young. Intertrochanteric fractures unite readily due to broad fractures surfaces being in contact leading to good cancellousinterdigitation. If proper precautions are not taken the fracture may malunite in varus or valgus resulting in limb length discrepancy and limitation hip movement. Restoration of neck shaft angle is equally important. Treatment must also consider effective internal fixation to help early mobilization. The treatment modalities have come a long way from early days of conservative treatment by hip spica and traction. With improved surgical techniques , better design of implants, open reduction and internal fixation of these fractures has become treatment of choice in the recent years. Intertrochanteric fractures are common in elderly patients. The average age reported in these patients in 66-76 years. Most of the published reports from the western countries and Europe suggested greater incidence of trochanteric fractures among women. The male to female ratio is about 1:2 to 1:8.

2. Aims and Objectives

The primary aim of this radiological audit was to document the incidence of various complications seen after fixation of peritrochanteric fractures. Also the aim was to study the incidence of complications with intramedullary fixation and dynamic hip screw thereby determine the superiority of a particular implant.

3. Materials and Methods

We included unstable intertrochanteric fractures in this study. Stable intertrochanteric fractures were excluded from this study. A truly stable intertrochanteric fracture was one, when reduced had a cortical contact without a gap medially and posteriorly. Medial cortices of proximal fragment and distal fragment were not comminuted and there is no fracture of lesser trochanter. This contact prevents displacement into varus or retroversion, when forces are applied. Unstable intertrochanteric fractures are those in which comminution of posteromedial buttress exceeds a simple lesser trochanteric fragment or those with subtrochanteric extension. There is comminution of greater trochanter and there is no contact between proximal and distal fragment because of displaced posteromedial fragment. Similarly intertrochanteric fracture with reversed obliquity in which there is inherent tendency of medial displacement of distal fragment are considered unstable.

We have included cases in which a dynamic hip screw with a fixed angle barrel plate or proximal femoral nail was used as the method of fixation. The post operative radiographs 3 months and 6 months after surgery from our archives and were evaluated for various complications.

Fractures occurring outside the geriatric age group, stable peritrochanteric fractures, open fractures, fractures requiring fixation with other than the above mentioned devices, presence of associated fracture in the same limb were excluded from the study. Also fractures that were operated after more than 1 week after trauma were not included in our study. A total of 101 fractures were analysed in the time frame of our study.

4. Results

The age-wise distribution of the subjects was as follows; 75 patients were in the age group between 60 to 70 years of age while 26 patients were more than 70 years of age. 63 fractures were fixed with a dynamic hip screw with a barrel plate while 38 were operated with a proximal femoral nail. The reduction was good or acceptable in all the cases.

The incidence of collapse of the fracture in varus was noted with respect to the reconstruction post operatively which heralded a definite failure of the fixation. Varus collapse was considered as loss of the anatomical neck shaft angle that was reconstructed during the surgery.

Table 1: Incidence of varus collapse

Varus Collapse	Sliding hip screw	Sliding hip screw	
N	5 (7.9%)	0 (0%)	5 (4.9%)
Total	63	38	101

Out of the 63 cases fixed with dynamic hip screw 7.9% collapsed in varus at the end of six months while none of the cases fixed with proximal femoral nail collapsed in varus. This difference was considered to be statistically significant.

The radiological sign of union was considered by appearance of cortical continuity in both anteroposterior and lateral projections.

Table 2: Incidence of radiological union

Radiological union	Sliding hip screw	Proximal femoral nail	
3 months	58 (92%)	36 (94.7%)	94 (93%)
6 months	61 (97.8%)	37 (97.3%)	98 (97%)
Total	63	38	101

Thus at an interval of 6 months incidence of non union was 3% in the cases included. The difference in the incidence of non union in fractures fixed with sliding hip screw and proximal femoral nail was not significant ($p < 0.05$)

Three (4.7%) cases of screw cut out were seen, all which occurred in the sliding hip screw group. The screw cut out was superior and anterior. This difference was considered to be significant between the two modes of fixation. Also excessive medialization was seen in 7 cases out of 63 (11.1%) while no case fixed with proximal femoral nail showed excessive medialization. 1 case out of 38 in the proximal femoral nail group showed Z deformity.

Table 3: Incidence of various complications

Complications	Sliding hip screw	Proximal femoral
Screw cut out	3 (4.7%)	0 (0%)
Excessive Medialization	7 (11.11%)	0 (0%)
Z deformity	0 (0%)	1 (2.6%)

5. Discussion

Stable intertrochanteric fractures are those, in which posteromedial cortex remains intact and calcar femorale is not affected. Unstable intertrochanteric fractures are those, in which comminution of posteromedial buttress exceeds a simple lesser trochanteric fragment, those with

subtrochanteric extension or those with reverse oblique fracture patterns.

Dynamic hip screw and proximal femoral nail have shown to be equally successful in stable intertrochanteric fractures. But unstable intertrochanteric fractures present a surgical dilemma as both modes of fixation have got an inherent risk of certain complications. In such a scenario it is important to have a surgical implant that has minimal surgical risk and incidence of various complications.

The incidence of screw cut out, medialization, and varus collapse was significantly more in the dynamic hip screw group than the one with proximal femoral nail group. However there was no statistically significant difference in the incidence of non union with respect to both types of implants. This is because an intramedullary device had many mechanical advantages over standard compression devices. The load transfer is more efficient in an intramedullary device due to its positional advantage. A shorter lever arm of the intramedullary device decreases tensile strain on the implant thereby reducing the risk of implant failure. The advantage of controlled fracture impaction is maintained as a sliding hip screw is incorporated. It also acts as a buttress to prevent medialization of the shaft.

An Asian study reviewed outcomes of 100 patients who underwent short proximal femoral nailing for stable and unstable intertrochanteric fractures. They concluded, that short proximal femoral nail is a superior implant for stable and unstable intertrochanteric fractures in terms of operating time, surgical exposure, blood loss, and complications, especially for patients with relatively small femora. (Gadegone WM, SalphaleYS ;April 2010)

6. Conclusions

Our study confirms that an intramedullary fixation device is much more efficient in fixation of unstable intertrochanteric fractures compared to a dynamic hip screw. The difference in the incidence of nonunion is not statistically significant. The incidence of varus collapse, screw cut out, implant failure and excessive medialization is significantly more in a dynamic hip screw with a fixed angle barrel plate compared to a proximal femoral nail. Thus a proximal femoral nail is a better implant biomechanically for fixation of unstable peritrochanteric fractures.

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