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A CLINICAL STUDY OF MANAGEMENT OF SUBTROCHANTERIC FEMORAL FRACTURES USING PROXIMAL FEMORAL LOCKING PLATE

Orthopaedics

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ABSTRACT

Background: Subtrochanteric fractures have evolved as one of the most important causes of morbidity and mortality in elderly patients. They account for approximately 10-30% of peritrochanteric fractures. However, comminuted and unstable inter or subtrochanteric fractures in the presence or absence of osteoporosis are difficult to treat and are prone to complications. The PF-LCP is a novel implant that provides angular stability by forming a fixed angle block. It is indicated for the treatment of complicated, comminuted proximal femoral fractures. **Objectives:** To evaluate effectiveness of proximal femoral locking plate in subtrochanteric fractures. **Materials And Methods:** This is a prospective cross sectional study. 20 patients with subtrochantric fractures were operated in our institute during December 2020 to May 2022 using ORIF with PF-LCP. Patients were followed up post operatively and functional outcome was evaluated using harris hip score. **Results:** Union time was 12 weeks in 10% patients, 16 weeks in 55% patients, 20 weeks in 15% patients and 24 weeks in 5% patients. Malunion was present in 5% patients and Non-union was present in 10% patients. 5 patients developed shortening, 3 patients developed screw breakage,3 patients had varus collapse. **Conclusion:** The procedure may be used in patients with communited fractures in whom conventional dynamic hip screw fixation is difficult or contraindicated, and in whom adequate postoperative immobilisation is required to avoid implant failure complications.

KEYWORDS

open reduction internal fixation, proximal femoral locking compression plate, subtrochantric.

INTRODUCTION

Subtrochanteric fractures have evolved as one of the most important causes of morbidity and mortality in elderly patients. They account for approximately 10-30% of peritrochanteric fractures. Subtrochanteric region is area below the inferior border of lesser trochanter extending up to 5cms distally. These fractures have bimodal distribution and are seen in two main populations, older osteopenic patients following low energy falls and younger patients with high energy trauma.[1,2]

Early surgical intervention is needed in majority of patients to avoid the major complications that can occur due to long term immobilization which include deep vein thrombosis, thrombophlebitis, urinary and lung infections and ulcers. This pattern of fracture is associated with higher rates of malunion and non-union than any other femoral fractures because of the anatomical peculiarity of this area. Locking plates for stabilizing subtrochanteric fractures were developed in 21st century as it can act as a buttress for the lateral trochanteric wall and helps in the stabilization of the lateral trochanteric wall.[1,2]

PATIENTS AND METHODS

This is a prospective cross-sectional study. 20 patients with subtrochantric fractures were operated in our institute during December 2020 to May 2022 using Open reduction internal fixation with proximal femoral locking compression plate. Patients were followed up post operatively and functional outcome was evaluated using Harris hip score.

Inclusion Criteria

1. Patients admitted with subtrochanteric fractures.
2. Male and female patients who are skeletally matured.
3. Injury within 2 weeks.
4. All fresh subtrochanteric fractures.
5. Patients who give consent for the study

Exclusion Criteria

1. Patients with pathological subtrochanteric fractures.
2. Patients in whom surgery was contraindicated due to systemic diseases
3. Immature skeleton
4. Open sub-trochanteric fractures
5. Injury more than 3 weeks.

Surgical Technique: Plating[8-20]

A direct lateral approach is made over the flare of the trochanter deepened through the skin, subcutaneous tissue, and fascia lata. The vastus lateralis is elevated in a submuscular fashion from its origin on the vastus ridge and the lateral femur. The surgeon should be careful to avoid any broad-tipped (Bennett type) retractors medially, and if possible, no medial dissection should occur at all. It is important that any plating technique involve as much "indirect" reduction as possible. Typically, manipulation of the proximal fragment can be performed with simple clamps or joysticks, avoiding large broad-based circumferential clamping techniques, which may further strip soft tissues. All modern plating techniques share several common principles. The proximal fixation must be placed accurately into the femoral head, for example, when using a blade plate, a dynamic hip screw, a dynamic condylar screw, or a locking proximal femoral plate. The plate on the proximal fragment is then reduced to the shaft and this should afford an excellent reduction of the proximal fragment. This "self-aligning" indirect reduction technique is predicated on absolutely accurate positioning of the fixation in the proximal fragment. The neck shaft angle will be accurately restored only if the proximal fixation is accurately placed. Preoperative templating can facilitate accurate placement. Compression is then typically achieved with an articulating tension device or other clamp-based techniques to avoid distraction, and side plate screws are placed in the usual fashion in compression mode. Due to the inherently unfavorable biomechanics when using plates in this anatomic region, it is important that compression be obtained so that the bone can bear some load as well. Essentially, acute compression makes the construct more "load sharing." The specific surgical techniques for implanting any plate such as a sliding hip screw, dynamic condylar screw, blade plate, or locking proximal femoral plate involve accurate biplanar fluoroscopic vigilance. The relationship of the tip of the trochanter and the center of the femoral head should be very carefully scrutinized to avoid any varus. After the plating is completed, the wound is irrigated and closed in layers in the usual fashion over a suction drain. The patient is placed in a lightly compressive dressing.

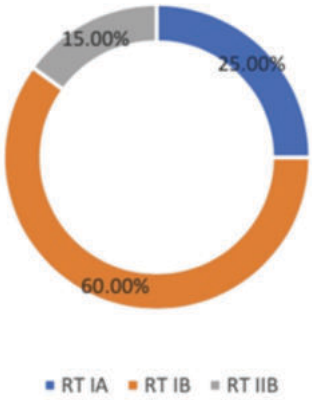
RESULTS AND OBSERVATION

Majority of the patients belonged to the age group of 56-65 years (30%) followed by 26-35 years (20%), 26-45 years (20%), >66 years (20%) and 46-55 years (10%). Mean age was 52.35 + 15.97 years.

Males were 90% and females were 10%.

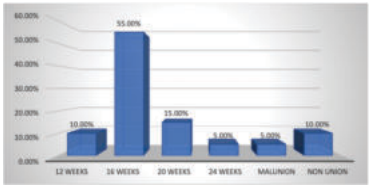
Mode of injury was accidental fall in 40% patients and RTA in 60% patients.

25% patients belonged to Russell taylor type IA, 60% belonged to Russell taylor type IB and 15% belonged to Russell taylor type IIB.



Graph 1 : Distribution of patients based on the on the classification Left side was involved in 60% patients and right side was involved in 40% patients.

Union time was 12 weeks in 10% patients, 16 weeks in 55% patients, 20 weeks in 15% patients and 24 weeks in 5% patients. Malunion was present in 5% patients and Non-union was present in 10% patients.



Graph 2 : Distribution of patients based on the union time

According to harris hip score, results were excellent in 25% patients, good in 45% patients, fair in 15% patients and poor in 15% patients. c

Graph 3 : Distribution of patients based on harris hip score.

Mean operating time is 92 minutes with minimum of 60mins and maximum of 120mins with standard deviation 18.166.

Mean blood loss is 115.25ml with minimum of 50ml and maximum of 200ml with standard deviation 45.116.

Mean follow up is 10.70 months with minimum of 7months and maximum of 22months with standard deviation 4.256.

There was no prescence of infection in any of the cases.

Shortening of 1cm was present in 10% patients, 2cm was present in 10% patients and 3cm was present in 5% patients.

Screw breakage was present in 15% patients.

Varus collapse was present in 15% patients.

Implant failure was due to plate breakage (5%), plate pull out(5%), screw loosening + plate pullout(5%) and screw breakage (5%).

Lurching was present in 15% patients.

Bone grafting was primary in 15% patients.

Bone grafting was primary in 15% patients.

Among patients with excellent harris hip score; 20% belonged to 26-35 years, 40% belonged to 36-45 years, 20% belonged to 46-55 years and 20% belonged to 56-65 years. Among patients with good harris hip score; 33.3% belonged to 26-35 years and 66.7% belonged to >66 years.

Among patients with fair harris hip score; 33.3% belonged to 36-45 years, 11.1% belonged to 46-55 years, 33.3% belonged to 56-65 years and 11.1% belonged to >66 years. Among patients with poor harris hip score; 66.7% belonged to 56-65 years and 33.3% belonged to >66 years. The association was found to be statistically not significant.

Among patients with excellent harris hip score; males were 100%.

Among patients with good harris hip score; males were 88.9% and females were 11.1%. Among patients with fair harris hip score; males were 100%. Among patients with poor harris hip score; males were 66.7% and females were 33.3%. The association was found to be statistically not significant.

Among patients with good harris hip score; screw breakage was present in 11.1% patients.

Among patients with poor harris hip score; screw breakage was present in 66.7% patients. The association was found to be statistically significant.

Among patients with poor harris hip score; varus collapse was present in 100% patients. The association was found to be statistically significant.

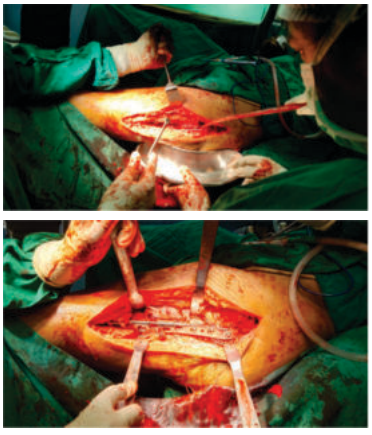
Among patients with good harris hip score; Implant failure was due to screw breakage (11.1%).

Among patients with poor harris hip score; Implant failure was due to plate breakage (33.3%), plate pull out (33.3%) and screw loosening + plate pullout (33.3%).The association was found to be statistically significant.

Among patients with poor harris hip score; lurching was present in 100% patients. The association was found to be statistically significant.

Clinical And Radiological Photographs

Operative Pictures



DISCUSSION

The present study was conducted to evaluate effectiveness of proximal femoral locking plate in subtrochanteric fractures.In the present study, according to harris hip score, results were excellent in 25% patients, good in 45% patients, fair in 15% patients and poor in 15% patients. In PFLCP group 60 % of cases had good to excellent Harris Hip Score ,study by P.K.Chalise28 it was observed that 88% of cases had a good to excellent Harris Hip Score whereas in a study by Nishanth kumar et al29 a good to excellent Harris Hip Score was seen in 77.5% of patients.

According to Mirbolook A et al.26, while the Harris Hip Score improved for patients treated with both methods, there was no statistically significant difference between the two groups (proximal femur locking compression plate and intramedullary locking nail)

Ravi GO et al.44 reported that ten patients (48 percent) had excellent outcomes, eight patients (38 percent) had good outcomes, two patients (10 percent) had poor outcomes, and one case was considered a failure (5 percent).

Shao-hong48, Wei-lin WANG et al49 2011 demonstrated that the Harris hip function score was excellent in 24 cases, good in 20 cases, and poor in 4 cases. In 2011, Minghua XI E Wenweiet observed that the Harris score results were excellent (90 score) in 22 cases (80-89 score). 50

In Hu S et al.,27 range of score of the Harris social index was 73-95 (86.5±9.8), including 16 excellent cases, 22 good cases, and 5 median cases. Good- -excellent rate was 84.4% (38/45).

Table 1: Union rates among different studies

STUDIES	UNION RATES
Mark.W.Floyd et al33	78%
Saini et al 34	90.6%
Owais Ahmed et al35	80%
Nishanth Kumar et al29	80%
Our Study	85%

Table 2: Union time among different studies

STUDIES	UNION TIME
Oh C-W et al36	5.4 months
Wei Ting Lee et al37	11.0 weeks
Hossain M et al38	16 weeks
Our Study	16 weeks

Operating Time

In the present study, mean operating time was 92 + 18.16 min. In Zha G et al.,42 mean operating time was 35.5 min.

Blood Loss

In the present study, mean blood loss was 115.25 + 45.11 ml. In Zha G et al.,42 mean blood loss was 150 ml.

CONCLUSION

ST femur fractures are a less common type of hip fracture, but they can occur in both young and elderly patients following both high- and low-energy modes of injury. While initial evaluation and treatment may include resuscitation and modalities such as skeletal traction, very rarely should surgical fixation be avoided. The procedure may be used in patients with communited fractures in whom conventional dynamic hip screw fixation is difficult or contraindicated, and in whom adequate postoperative immobilisation is required to avoid implant failure complications.

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