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Dynamic Compression Plate: A useful procedure for sub-trochanteric femur fracture with osteopetrosis.

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Abstract:

Introduction: Osteopetrosis is an uncommon disease. It is of infantile and adult type. With adult type osteopetrosis, bones are vulnerable to fracture even with minimal injury. As there is increased bone density and small medullary canal, therefore, these fractures are challenging for orthopedic surgeons.

Objective: To evaluate the results of Dynamic Compression Plate (DCP) for the fixation of sub-trochanteric fractures of femur with osteopetrosis in terms of union malunion, non-union and post-operative infection.

Methodology: This prospective study was conducted in the department of Orthopedic surgery at Muhammad Medical College Mirpur Khas from March 2015 to February 2017. Patients, with sub-trochanteric fractures of femur having osteopetrosis, between the age of 20-60 years of either gender were included in this study. All fractures were fixed with DCP. Post-operatively patients were mobilized with crutches in 1st week, followed by partial weight bearing in 3rd week and full weight bearing in 6 weeks.

Results: Union of fractures occurred in 98% patients. Mal union in one patient and nonunion in one patient. Post-operative infection was observed in one patient.

Conclusion: This study shows management of sub trochanteric fractures of femur in patients with osteopetrosis are best treated with DCP with little or no complications.

Key words: Osteopetrosis, sub trochanteric fractures, DCP.

Introduction:

Osteopetrosis (Albers-Schwann Bergs disease¹) is a rare hereditary disease, characterized by increased bone density due to decreased osteoclastic activity, which leads to decreased bone resorption and causes thickening and widening of cortices and narrow medullary canal. It is of two types².

Infantile or malignant type.

Adult or benign type.

Adult osteopetrosis is usually presented with hip and proximal femoral fractures. These fractures can be treated by conservative methods but complications like nonunion, mal union are

common³. Internal fixation⁴ can be done but it is challenging⁵ as medullary canal is narrow⁴, bone is hard due to increased density⁶ and can lead to breakage of drill bit⁵ due to high friction and poor drilling.

Methodology:

This prospective study was conducted from March 2015 to February 2017 at Orthopedic department of Muhammad Medical College Hospital, Mirpurkhas. Patients, with sub trochanteric fractures of femur having osteopetrosis, during study period were registered as per following inclusion and exclusion criteria.

Inclusion criteria:

- 1-All the patients with sub trochanteric femoral fractures with osteopetrosis.
- 2-Closed fractures.
- 3-Adult patients of either gender between the age of 20 to 60 years.

Exclusion criteria:

- 1-Patients other than osteopetrosis.
- 2-Open fractures.

Results:

During period of study, 60 patients meet inclusion criteria. All patients were investigated and managed, as per routine protocol of the hospital, within one week of the admission. There were 42 (70%) males and 18 (30%) females. Mean age of the patients was 42 years, the commonest age (41.70%) group was aged between 31-45 years. All the patients had minimal injury due to fall on ground. The injury sustained over right side in 70% of the cases. Post operatively all patients were mobilized with crutches within 1st week, partial weight bearing in 3rd week and full weight bearing in 6 weeks. The check x rays done repeatedly to confirm union. Among all patients only 1 female patient developed superficial surgical site infection which responded with the change of the antimicrobial agent. The overall satisfactory union was achieved in 58 (96.67%) patients, one patient developed malunion and only patients had nonunion.

Table 1: Age distribution:

Age in years	Number of patients	Percent
20-30	15	25
31-45	25	41.66
40-60	20	33.34
Total	60	100

Table 2: Anatomical site of fracture

Side	Number of patients	Percentage
Right	42	70
Left	18	30

Table 3: Gender distribution

Gender	Number of patients	Percentage
Male	42	70
Female	18	30

Table 4: Criteria for union

Criteria	Number of patients	Percentage	Overall Status
Excellent	80	100	Satisfactory
Good	70	79	Satisfactory
Fair	60	69	Satisfactory





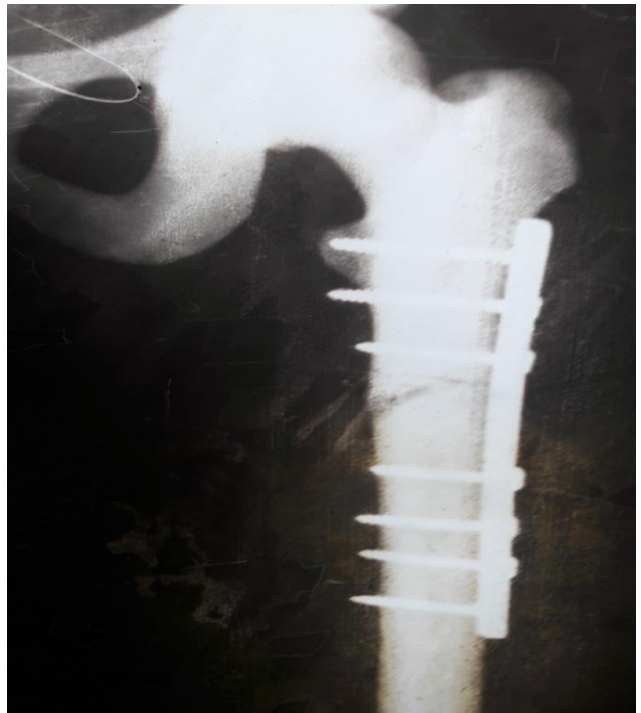
Post-operative results after 8 weeks, AP-View.



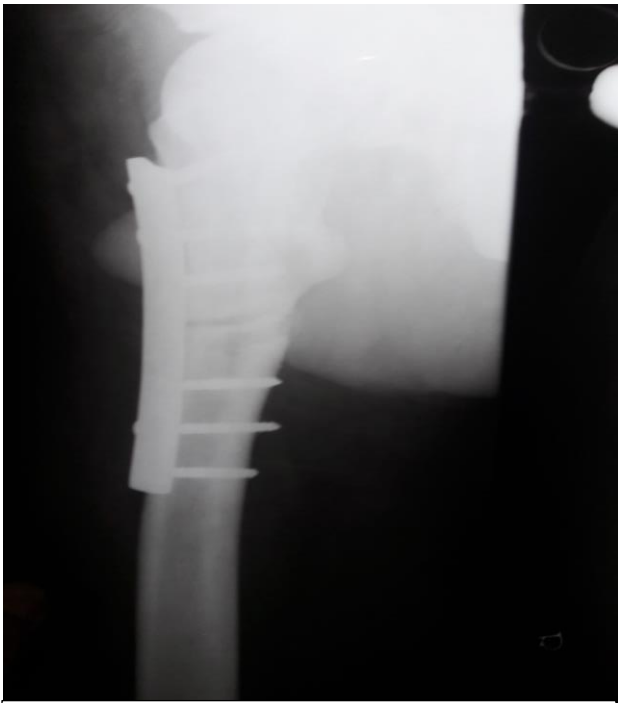
Pre-operative view of Sub-trochanteric fracture of femur.



Post-operative result after 8 weeks, Lateral view.



Post-operative AP view: Fracture fixed with DCP.



6 weeks post-operatively, AP view.



6 weeks post-operatively, Lateral view.

Discussion:

Osteopetrosis is a rare disorder. It is benign in adult form and usually presents with fracture of proximal femur⁷ after minimal injury⁸. The osteopetrosis is characterized by increased density of bone⁹ and narrow medullary canal due to osteoclasts dysfunction. The fracture in osteopetrosis can be treated conservatively¹⁰ but nonunion and mal union are common complications. Internal fixation of these fracture is challenging and difficult job for orthopedic surgeons. As medullary canal is narrow, so insertion of intramedullary nail is not possible. Some people used Steinmann pin¹¹, but results are not satisfactory. Insertion of DCS and DHS is very difficult because bone is too hard¹². We used DCP for the treatment of these fractures. Although drilling is difficult and there are chances of breakage of drill bit¹³, but we have achieved good to excellent results with this implant with minimal complication. The overall results were 96%.

Conclusion:

The management of sub trochanteric fracture femur with osteopetrosis can best be treated with DCP if due care is observed.

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