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Management of Fracture of Distal Femur

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KEYWORDS :

INTRODUCTION

Fractures of distal femur are very difficult to treat successfully. Whether surgical or non surgical methods are selected the end results of the treatment are stiffness of knee joint, malunion,shortening and infection. The reasons are incongruence of the articular surface of the lower end of femur, prolonged immobilization and poor surgical techniques.

REVIEW OF LITERATURE

MANAGEMENT : ERA OF CLOSED REDUCTION

Sir Watson Jones (1975) and Charnley (1963) advocated closed reduction and plaster cast. Stewart (1966) treated 213 cases with tibial pin traction followed by Plaster of Paris cast. Quadriceps setting exercises and early knee movement were started.

Neer et al (1967) reviewed 110 cases. He compared the results of closed and open methods of treatment. He concluded that 90% excellent results were found by closed methods as compared to 52% in open method. Failures of open method were due to infection and poor fixation.

Mooney (1970) treated 150 patients by cast brace. A total contact lower extremity plaster device incorporating brace joint had been described.

ERA OF OPEN REDUCTION

Sven Olerud (1972) : Improvement in design and surgical techniques had improved the rigidity of fixation of distal femoral fractures. He reported 16 fractures treated surgically, and results were quite encouraging.

Schatzkar and Lambert (1979) : His experience is known as Toronto Experience of 47 fractures . He found 75% excellent results when fractures were treated by open reduction and internal rigid fixation, 32% good results were treated non operatively.

Frank Seinsheimer (1980) : A new classification system for fractures of distal femur was presented and results analyzed according to type of fractures. Type 1,,2,3,4. Patients with supra condylar extension obtained better knee motion when treated and followed by a cast brace. Patients with inter condylar fractures obtained better knee motion when treated with internal fixator.

Mize (1982) and Healy & Brooker (1983) reported the same results.

Miller M.E. et al (1990). The classification of distal femoral fractures described by Miller is useful in determining treatment and prognosis.

Shewring & Meggitt (1992): Fractures of distal femur treated with the AO dynamic condylar screw.

Koval K.J. (1955): Distal Femoral non union treatment with a retrograde inserted locked intra-medullary nail

Ostermann (1996): Retrograde interlocking nailing of distal femoral fractures with the intra-medullary supra-condylar nail.

AIMS & OBJECTIVES

The problems of limitation of knee movement, deformity and infection can be prevented by achieving the congruity of the articular surface of the lower end of the femur, early mobilization of joint, anatomical reduction, and rigid internal fixation by perfect surgical techniques.

MATERIAL AND METHODS

During last 7 years, 16 patients of distal femoral fractures were treated by closed and open methods . Age range was 18-65 years. There were 11 male and 05 female patients in this series. The majority of the patients were younger than elderly patients. Low energy trauma was the cause of the fractures in 6 cases. Associated injuries included ipsilateral fracture of shaft of tibia 2,head injury 1, olecranon fracture 1, fracture mandible 1, fracture dislocation talus 1, common peroneal nerve injury 1, and fracture patella 1. According to Muller's classification, the numbers of patients are as follows:

Type 1 : A1-2, A2-1, A3-3 =6

Type 2 : B1-0, B2-1, B3-2 =3

Type 3 : C1-1, C2-2, C3-4 =7

In all A type fractures, tibial pin traction for 2-3 weeks was given once callus is formed. Cast brace was applied and knee movements were started. Type B & C were treated surgically.

In the patients with an open fractures initial irrigation debridement, tibial pin traction, intravenous antibiotics, delayed wound closure were done routinely. Internal fixation was done after the healing of bone wound 10-14 days after the date of fracture. In cases we used a dynamic condylar screw and angle blade plate; 3 case cobra plate(biological fixation), one case supracondylar nail, . One B2 case compression screws were used.

Broad spectrum antibiotics were given before application of a tourniquet and 72 hours post operatively. In the operative approach, the interval between vastus lateralis and the anterior border of lateral inter muscular septum was developed to allow full visualization of the distal part of the femoral shaft. This exposure was extended by a lateral parapatellar arthrotomy after which the patella could be dislocated medially.

The articular end were anatomically reduced, in type c, both medial and lateral condyles are fixed together to make them single. We used cobra plate ,DCS that would anatomically restore the alignment of the femur. The fragments of the shaft were anatomically manipulated, reduced and approximated to the plate with bone holding clamps. In distal hole compression screws were used for fixation of the plate to the shaft. The reduced fracture was then examined and a decision was made concerning the need for bone grafting if there is a gap. After copious irrigation of the wound , the incision was closed over suction drains.

Post operatively , the limb was kept in 90 degrees flexion splint to prevent contraction of the quadriceps.The suction drain was removed on first or second post operative day and intensive physical therapy was begun immediately. After quadriceps and hamstrings setting exercise, active and active assisted range of motion exercise of the lower limb were initiated. Long Knee brace was applied at discharge from the hospital if there was any diffault concerning the rigidity of internal fixation.

All patients were properly examined. Both clinical and Roentgenographic examination criteria were utilized to evaluate bone union. No pain, no increase in warmth at fracture site, no discomfort on weight bearing.

The average length of follow up was 16 months, with shortest being 4 months.

RESULTS

The average duration of hospitalization was 09 days to 24 days. The time of full weight bearing without protection averaged 3-7 months. Union was evident at an average of 4 months (2-5)months after the fracture. Autogenous bone grafts were used in 9 months.The average range of movement was 120 degrees (50-170 degrees). No patient had traumatic arthritis evident clinically or radiologically. However, much longer follow up is necessary to determine the the true incidence of the complication.

Infection was present in 1 patients who were treated by culture and sensitivity of the organism and debridement of the infected tissue and irrigation of the wound was performed.

Breakage of the place was observed in 1 patient in which the patient was overweight. Loosening of screw and plate was found in 1 patient in whom patient had started unprotected early walking. Shortening of 1-2 cm was present in 2 cases where the fragments of fracture were collapsed. Valgus of 5-10 degrees was found in Type A fracture in whom conservative treatment was done. Non union was present in 1 cases and healing occurred by bone grafting. Death of 1 patient had occurred in one case who was of 65 years of age, who had compound fracture and associated diabetes.

DISCUSSION

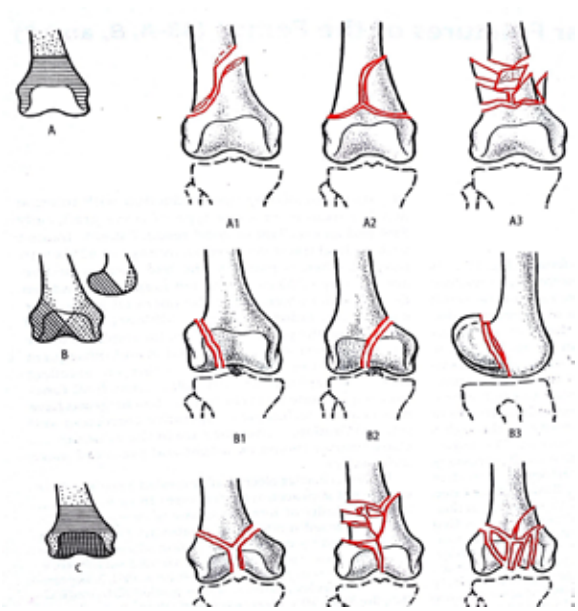
When a femoral fracture involves the knee or quadriceps mechanism or both, some loss of motion of knee seems to be inevitable in most patients whether they are treated non operatively or by internal fixation. The final average post operative range of motion reported by Olerud, Shelton & Seinsheimer was from 100-125 degrees. The average post operative range of motion in our series was 120 degrees. Institution of early intensive physical therapy was important in restoring bone and maintainance of functional range of motion.

In prior reports on the surgical management of supra condylar fractures of the femur, the real and potential danger of infection has been the prime deterrent to wider acceptance of internal fixation. Open fractures, extensive surgical exposure required and prolonged operative time are all factors that increases the threat of infection. Neer et al and Olerud reported 20% infection rate which was the highest of any of the series that we reviewed. In more recent reports, infection rates have ranged from 0-5 %. There was less in Zimmerman. Superficial infection in 2 cases in our cases in our series 5.2%. Meticulous surgical technique, prophylactic broad spectrum antibiotics seemed to be the important factors in avoiding infection.

There were 2 implant failures and 1 loosening in our study in contrast to Schatzker et al who reported on a series of 35 patients with seven instances of loosening and 3 broke.

CONCLUSION

We conclude that meticulous open reduction anf stable internal fixation of supra condylar fracture with cobra plate,DCS,angle blade plate lag compression screw combined with autogenous bone grafting in patients with severe communication provide an excellent opportunity to secure bone union and restore limb alignment, joint congruity and range of motion, extensive surgical exposure and potential risk of exposure and potential risk of infection. The selection of patientsand treatment based on proper analysis with Muller's classification is essential.



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