CLOSED REDUCTION AND CASTING IN CLOSED TIBIAL DIAPHYSEAL FRACTURE IN OUR SET UP

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ABSTRACT

To evaluate the result of closed reduction and casting in closed diaphyseal fracture and compare our results with the published literature.

Study design: This is a descriptive observational study.

Place and duration: This study was conducted at Orthopedic B unit Lady Reading Hospital Peshawar, from April 2011 to March 2012 on 50 patients with closed tibial fractures.

Patients and method: Fifty patients with closed diaphyseal tibial fractures admitted through emergency were included in this study. All patients were resuscitated according to ATLS protocol. All fractures were treated with close reduction and casting under anesthesia. Follow up was done for 6 months with assessment of radiological healing and clinical outcome that is union, joint movement, limb length discrepancy.

Inclusion and exclusion criteria: Patients below the age of 16 years, open fracture and poly trauma patients were excluded from the study. Patients with close diaphyseal fracture were included in the study.

Results: Among 50 patients 36(72%) were male and 28(28%) female. Left involved in 28 (56.8%) patients and right in 22 (44%) patients. we achieved union in 44 (88%) patients within 12 to 20 weeks. In our study 6 (12%) patients got nonunion. two patients (4%) developed compartment syndrome. Knee stiffness, which did not resolved after physiotherapy, was found in 6(12%) patients and non-union in 6(12%) patients. We achieved excellent and good results in 35 (70%) patients and poor results in 6 (12%) patients.

Conclusion: Closed reduction and POP cast application is still a safe and effective method and is a good option in our circumstances for treating closed diaphyseal fracture of the tibia and gives excellent results regarding healing and function.

Key words: fracture tibia, pop cast, closed reduction.

INTRODUCTION

Tibia is the most common fractured long bone because of its exposed position and less coverage by soft tissue [1]. Due to its decreased soft tissue coverage in distal third non union is a common problem and is one of the common sites for nonunion in long bone fractures[1,2] and delayed union (1-7 %)[4,5,6]. Various factors can affect the healing and lead to delayed or nonunion. The local factors are, damage to soft tissue, fracture morphology[8,9] and intact fibula[11]. Historically tibial fracture are notorious among diaphyseal fractures in adults due to various modality problems[6,11,12].

There are various treatment options available now a day for tibia fracture including casting, functional bracing, open reduction and internal fixation with plate or Intramedulary nails, external fixation and skeletal traction. One should select the best treatment modality after proper analysis of fracture morphology, mechanical characteristics of bone, the trauma severity to the extremity, age of patient, general condition of patient, fracture site and most important is the soft tissue i.e. skin, muscle and neurovascular status and the facilities and experties available[6,13]. Tibial shaft fractures are important due to two reasons i.e. they are very common and they are controversial regarding treatment, therefore anything which is common and controversial must be important[14]. Currently surgical treatment is commonly practiced but that needs availability of expertise and modern equipments. Conservative management with close reduction and casting still has a role. Soft tissue status must be evaluated in tibial fracture[15,16]. In open tibial fracture, external fixator is the safest method for initial skeletal stabilization[17] and as a damage control orthopedics. Close Intramedulary nails, locked or unlocked are the best because they give greater stability to the fracture site, increases healing rate, less chances of infection and early weight bearing. Unreamed interlocking nails in open fracture tibia give better results because of less microcirculation damage near the fracture site which increases the fracture healing and decreases the infection rate [18].

MATERIALS AND METHODS

This is a descriptive study, conducted at Orthopedic B unit Lady Reading Hospital, Peshawar, from April 2011 to March 2012 on 50 patients with closed tibial fractures. Patients were admitted through emergency. Informed consent were taken from all patients. Patients included were adults of both genders with

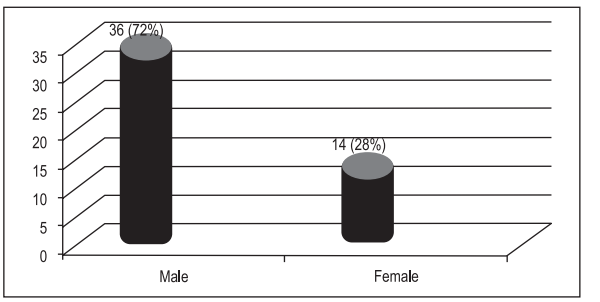
closed tibial diaphyseal fractures who presented within twenty four hours of injury. Patients below 16 years and above 60 years of age, open fractures; pathological fractures were excluded from the study. All fractures were treated with close reduction and casting under anesthesia on the same day of admission. Follow up was done for minimum of 6 months with assessment of radiological healing and clinical outcome i.e. joint movement, leg alignment and length. After receiving the patients in emergency room proper resuscitation was done according to ATLS protocol and fractured limb was immobilized, analgesia was given and X-rays were done in both AP and LAT view. In fractures without swelling close reduction was done and long leg POP cast was applied under anesthesia. During casting involved limb was hanging over the edge of the table. Traction and counter traction was applied by assistants and reduction was checked clinically. The pop was applied in two stages; firstly the fracture site of tibial shaft was immobilized with POP cast while maintaining the traction for reduction, followed by extending the POP above the knee up to the groin with 5 to 15 degree flexion at the knee joint. Check X-rays were done in two planes, to check the reduction. Afterwards the leg was kept elevated for few days to reduce the swelling. In case of swelling of the leg, back Slab was applied after close reduction which was converted to long leg POP cast after 3 days. Most of the patients were discharged on the same day. Hospital stay was from 6 to 24 hours. Follow up was done for 6 months. Patients were evaluated clinically and radiologicaly in POP cast, patients were checked for any swelling of the limb or cast loosening. On each visit X-rays AP and Lateral view of the involved limb were advised to see the healing, displacement and angulations. Shortening up to 1.5 cm, rotation up to 10 degree and angulations up to 5 degree in anterioposterior plane were accepted as reduced. No weight bearing was allowed for 6 weeks. X ray was repeated after one week, third week and at 8th week of reduction. At 6th week partial weight bearing was allowed. At 8th week POP was converted into patellar tendon bearing cast and full weight bearing with crutches was allowed. Then monthly follow up was advised till union was achieved.

Tibial fracture is one of the most common long bone fractures especially in young people and has many treatment modalities i.e., close reduction and casting, open reduction and internal fixation with plates and screws and interlocking nails. Tibial fracture in adults may cause various complications like non union, mal union, joint stiffness, compartment syndrome, skin necrosis and limb length discrepancy.

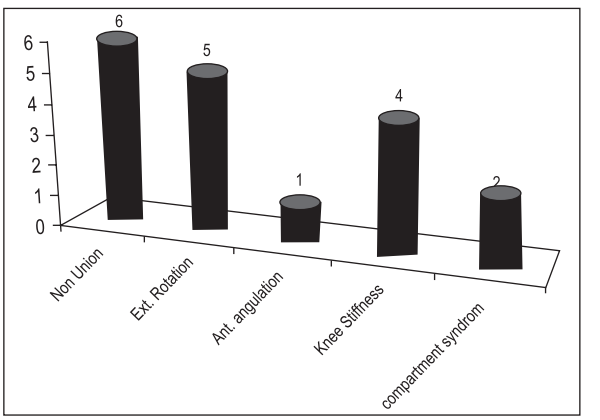
RESULTS

This study was conducted on 50 patients with close diaphyseal fracture admitted through emergency. Among 50 patients 36(72%) were male and 28(28%) female. Left tiba was involved in 28 (56.8%) patients and right in 22 (44%) patients. we achieved union in 44 (88%) patients within 12 to 20 weeks.

In our study 6 (12%) patients got nonunion. two patients (4%) developed compartment syndrome. Knee stiffness of 15 to 30 degree, that did not resolved after physiotherapy, was found in 6(12%) patients and non-union in 6(12%) patients. Among the non unions, 2 were (4%) hypertrophic and 3 (6%) cases were 0ligotrophic non union. External rotation in all cases was less than 5 degree. No skin necrosis was found in this study. We achieved excellent and good results in 35 (70%) patients and poor results in 6 (12%) patients.



Distribution of gender



Complications

DISCUSSION

Closed reduction and pop is one of the old method of treating fracture tibia[4], Now a day's most fractures are treated with open reduction and internal fixation by modern methods like DCP, locking plates and nails [5,] but some time these methods may not be suitable in our circumstances due their cost, prolong hospital stay and other complications. All forms of treatment for tibial shaft fractures are associated with complications. Knowledge of the incidence of each complication facilitates the consent process[25].

Among 50 patients in our study, 36(72%) were male and 28(28%) female. Left tibia was involved in 28 (56.8%) patients and right in 22 (44%) patients.

In our study we achieved union in 44 (88%) out of 50 patients within 12 to 20 weeks comparable with study by Bostman and Hanninen 20 which shows 15.3

weeks union time with POP cast. Sarmiento4 has union time of 14.1 weeks treated with POP cast. Digby et al shows 16.7 weeks union time with pop cast.

In our study 6 (12%) patients out of 50 got non-union comparable to study by Haines et al 21 having 18.6% nonunion rate. Two patients (4%) developed compartment syndrome. It was diagnosed by clinical examination. Both cases of compartment syndrome were treated by splitting of pop and limb elevation. No fasciatomy was done. Anterior compartment of the leg was most commonly involved in compartment syndrome. Micheal et al [23] showed twenty per cent compartment syndrome in 25 patients with closed tibial fracture. Knee stiffness was the common problem and was found in 6(12%) patients. These include those cases which did not resolved after physiotherapy and exercises. Non-union was noted in 6(12%) patients, 3 were hypertrophic and 3 oligotrophic.

We achieved excellent and good results in most of the cases i.e. in 35 (70%) patients and poor results in 6 (12%) patients. Excellent are those cases where union was achieved in 6 months without complications. Good are those cases where union was achieved but with complication like knee stiffness. Poor cases are those with non union. Shoaib et al[24] has excellent result in 50%, good in 33.33% and poor in 16.66%.

CONCLUSION

Closed reduction and POP cast application is still a safe and effective method for treating closed diaphyseal fracture of the tibia and gives excellent results regarding healing and function.

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