Management of High Energy Proximal Tibial Fractures by Ilizarov External Fixator

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بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

”إِنْ أُرِيدُ إِلاَّ الإِصْلاَحَ مَا اسْتَطَعْتُ وَمَا تَوْفِيقِي إِلاَّ بِاللَّهِ عَلَيْهِ تَوَكَّلْتُ وَإِلَيْهِ أُنِيبُ.“

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List of Abbreviations

Fig.	Figure
ORIF	Open Reduction and Internal Fixation
SC	Subcutaneous
LPFA	Lateral Proximal Femoral Angle
mLDFA	Mechanical Lateral Distal Femoral angle
JLCA	Joint Line Congruity Angle
MPTA	Medial Proximal Tibia Angle
LDTA	Lateral Distal Tibia Angle
MNSA	Medial Neck Shaft Angle
MPFA	Medial Proximal Femoral Angle
aLDFA	Anatomical Lateral Distal Femoral Angle
PPFA	Posterior Proximal Femoral Angle
ANSA	Anterior Neck Shaft Angle
PDFA	Posterior Distal Femoral Angle
PPTA	Posterior Proximal Tibia Angle
ADTA	Anterior Distal Tibia Angle
A/P	Anterior/Posterior
ACL	Anterior Cruciate Ligament
MCL	Medial Collateral Ligament
LCL	Lateral Collateral Ligament
PCL	Posterior Cruciate Ligament
RTA	Road Traffic Accident
ATLS	Advanced Trauma Life Support
AP	anteroposterior
AO	Association of Osteosynthesis
ASIF	Association and Society of Internal Fixation
OTA	Orthopedic Trauma Association
ROM	Range of Motion
MIO	Minimal Invasive Osteosynthesis
LISS	Less Invasive Stabilization System

DVT	Deep Venous Thrombosis
IM	Intramedullary
IV	Intravenous
OA	Osteoarthritis
TKR	Total Knee Replacement
MCA	Motor Car Accident
ER	Emergency Room
OPD	Out Patient Department
PT	Prothrombin Time
PTT	Partial Prothrombin Time
INR	International Normalized Ratio
OR	Operative Room
IU	International Unit
ASAMI	Association for the Study and Application of the Method of Ilizarov
SPSS	Statistical Program for Social Science
SD	standard deviation

Abstract

Background: Despite the evolution of surgical techniques and implants, high energy proximal tibia fractures remain a challenging problem. The goals of treatment are to obtain a well-aligned stable joint with a painless functional range of motion and prevention of posttraumatic arthritis. Indirect reduction techniques and other soft tissue preservation methods safeguard the vascularity and emphasize restoring both joint congruity and the mechanical axis of the limb. ***Aim of the work***: is to evaluate the use of circular hybrid Ilizarov external fixator with or without minimal internal fixation in the management of high energy proximal tibial fractures. ***Methods***: between March 2011 and March 2013 we treated 30 patients with high energy proximal tibia fractures including extra- and intra- articular fractures using the Ilizarov fixator, all patients were a result of high energy trauma. There were 23 male patients and 7 female patients, 14 were Right side while 16 were Left side, mean age was 36.2 years, there were 17 cases with open fractures and 13 patients had closed fractures, 21 patients had intraarticular fractures and 9 patients had extraarticular fractures. ***Results***: all patients united in a mean time of 19 weeks, we had 9 patients with few complications that have been well treated. According to ASAMI scoring system we had excellent results in 66.7%, good results in 26.7%, fair results in 6.6% and no poor results. ***Conclusion***: Ilizarov external fixation is a safe and effective treatment option for high energy proximal tibia fractures with good functional results.

Keywords: Ilizarov, circular external fixator, high energy proximal tibia fractures, Schatzker types V and VI.

Introduction

Introduction

The knee joint is one of three major weight-bearing joints in the lower extremity. Fractures that involve the proximal tibia affect knee function and stability. These fractures can either be intra-articular (tibial plateau) or extra-articular (proximal fourth). Generally, these injuries fall into two broad categories: low-energy and high-energy fractures. The spectrum of associated injuries, potential complications and outcomes varies with fracture pattern.[(1)]

There are many classification schemes to describe these injuries, with no clear consensus on indications for surgical treatment of certain fracture patterns. More attention has been paid to the condition of the soft tissue envelope before surgical intervention.[(1)]

Complex fractures of the proximal tibia are difficult to treat and represent one of the most challenging problems in orthopedic surgery as they entail articular depression, condylar displacement, dissociation of comminuted metaphysis, and usually associated with soft tissue injuries.[(2)]

The treatment goals are to anatomically reconstruct the proximal tibial articular surface, fix metadiaphyseal comminution, and restore limb axial alignment to allow early knee mobilization and weight bearing and minimize further morbidity to an already traumatized soft tissue envelope. [(3)]

Over the years, many treatment modalities have been proposed for these complex fractures. Indirect reduction and external fixation have been advocated by many authors to improve the results and to minimize the risk of serious complications associated with the extensile approaches of ORIF. [(3)]

The Ilizarov method combined with minimal internal fixation enables excellent to good results in most cases of complex proximal tibia fractures when applied with good indications, planning, and surgical experience. [2]