

Research article
Orthopaedics

RETROGRADE ENDERS NAIL –AN EXCELLENT OPTION FOR TIBIAL SHAFT FRACTURES WITH COMPOUND WOUND OVER AND AROUND THE KNEE

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Abstract:

Aims & Objectives: A mode of treatment using retrograde enders nailing for compound (Gustillo- Anderson type 2 and type 3A) tibial shaft fractures with wound over and around the knee where intermedullary nailing is not possible at early phase.

Materials And Methods: 30 patients of either sex above 20 years with compound tibial shaft fractures (Gustillo- Anderson type 2 and type 3A) with wound over and around the knee were included in this study. All patients were briefed about the surgery, informed consent for surgery and use of data for study were obtained. Patients with G.A. type 1 and 3B and above open fractures, fractures primarily treated with external fixator and intra-articular fractures were excluded from this study.

Results And Observations: Out of the 30 patients, there was an increased incidence of fracture in the 20-40 years age group. 27 patients showed union within 15 weeks of surgery, 3 patients showed union within 15-20 weeks. Average union time was 13.1 weeks with no significant difference. The patients were evaluated with respect to range of motion, time to union, and complications.

Conclusion: Retrograde Enders nailing shows satisfactory functional and radiological outcomes in the treatment of tibial shaft fracture. The compound nature of wound over and around the knee impeded the insertion of intramedullary device (intermedullary V nail / Interlock nail). Short

operative time, minimal invasive techniques, dynamic controlled motion at fracture site leading to early callus formation which is favorable biomechanically and biologically and sufficient stability in all planes that allows early motion without additional fracture support with usage in segmental fractures, poor skin condition, osteoporotic bones lends credence to Enders nailing being a viable treatment option for tibial shaft fractures. Also in such type of injuries all the complications encountered with external fixators are negated with the use of this device.

Keywords: Retrograde Enders nailing, tibial shaft fractures, compound wound.

Introduction

Tibial shaft fractures are common injuries for orthopaedic surgeons to encounter in their daily work. The fractures occur usually by the direct impact of external forces in traffic accidents.¹ The remarkable development of the motor car in recent years has led to the complicating of the fractures, with severe comminutions and/or large displacements. Less soft tissue coverage on the tibia more often causes open fractures and brings about many severe injuries²⁻³. Intramedullary nailing is a leading treatment which is able to accomplish excellent fixation, allowing early weight-bearing walking for the fast social recovery of the patients for closed mid shaft or distal third tibia fractures. However, for open injuries with wound over and around the knee we prefer Ender nailing, which is a semiconservative treatment for tibial shaft fractures based on the belief of “gentle treatment for bone”. Enders nails with their minimally invasive approach do not insult the already wounded soft tissues, help in preserving the periosteal blood supply that can be lost due to reaming and achieve better three point fixation due to ability to stack multiple nails in the medullary canal make them a viable fixation method for compound tibial shaft fractures. The Ender nailing usually does not require a plaster cast and has a wide range of applications as a relatively easy procedure involving less impairment and fewer complications than other nailing methods⁴⁻⁶.

Materials And Methods

A total of 30 patients with tibial shaft fractures with compound wound over and around the knee were selected and were treated with multiple retrograde Enders nailing

were selected for the study.

Inclusion criteria

- Patients of age > 20 years of either sex.
- Open fracture (Gustilo Anderson type 2 and type 3A open fractures) with wound over and around the knee.
- Tibial shaft fractures.

Exclusion criteria

- Patients with Gustilo Anderson type 1 and type 3B and above open fractures.
- Closed fractures.
- Intra-articular fractures.

Patients who fulfilled the inclusion criteria were studied and evaluated.

Observations And Result

A total of 30 patients operated for tibial shaft fractures with retrograde enders nailing were selected for the study.

The following observations were noted: -

Age distribution.

1 - Age group

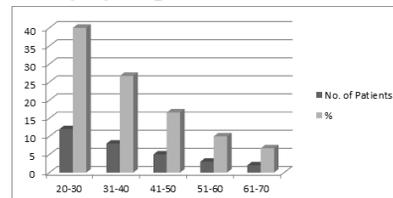


Figure 1. Graph depicting the number of Patients in Different Age Groups

2 - Sex distribution

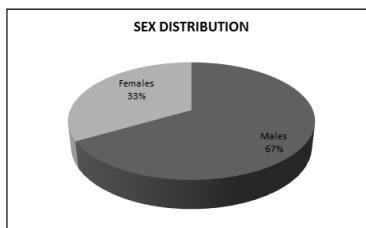


Figure 2. Pie chart depicting the Sex Distribution of patients.

The ratio between male is to female was found to be 2:1

Table 1 - Type of Fracture According to Gustilo-Anderson Classification

Type	No. of Patients	Percentage (%)
TYPE II	27	90
TPYE IIIA	3	10
TOTAL	30	100

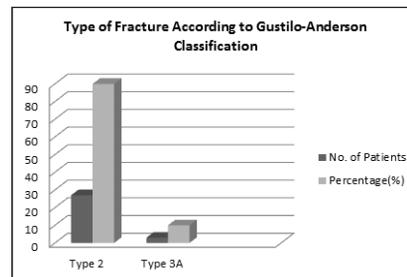


Figure 3. Showing type of fracture according to Gustilo-Anderson Classification

Table 2 -Treatment done

	No. of Patients	Procedure done
Type 2	27	-Wound wash -Retrograde Enders nailing -Wound closure
Type 3A	3	-Wound wash and debridement -Retrograde Enders nailing -Skin flap

Table 3 - Fracture Union

Time	Type2	Percentage (%)	Type 3A	Percentage (%)	Total	Percentage (%)
<15 weeks	25	83.3	2	6.7	27	90
15-20 weeks	2	6.7	1	3.3	3	10

Discussion

Tibial shaft fractures are important for the reason that they are common and the exposed anatomical location of the tibia leaves it vulnerable to high energy trauma resulting in fractures that are often comminuted associated with significant loss of skin and soft tissues. Furthermore, the inadequacy of musculature around the tibia leaves it with precariously low blood supply thereby increasing the chances of complications and consequences such as infection, compartment syndrome, vascular and/or neural injury. Treatment of tibial fractures, despite recent advancements in techniques, equipments and materials, remains controversial. Antegrade intermedullary nailing and minimally invasive percutaneous plate osteosynthesis represent the mainstay of fracture treatment but cannot be used for all bony and soft tissue injuries over the incisional site like over and around the knee⁷.

In the retrograde Ender nailing which we have performed, there are some advantages, as follows: this operation is a good indication for a fracture associated with multiple trauma and/or multiple fractures, as the procedure is very small and the operation time is short; when insertion areas selected for the original method have severe soft-tissue injury, other areas can be selected, as Ender nails are bent, not straight, sufficient stability to resist a rotational force can

be achieved.

Ender nailing is essentially a flexible fixation, not a solid fixation⁸⁻¹⁰. As the number of nails inserted increases, however, the fixation gradually changes to solid. We can therefore consider two concepts here as to the meaning of fixation in Ender nailing. The first concept refers to solid fixation that is achieved with early weight-bearing by a sufficient depth of nail insertion and the use of multiple nails so as to fill the medullary canal. The second concept refers to fixation, based on a semi conservative treatment, that is not necessarily solid. Here, however, the fixation achieved may not have sufficient stability to resist a rotational force or a bending force, in which case the postoperative treatment must be carefully considered. Retrograde Ender's nailing provides an alternative treatment modality being a closed insertion technique, without compromising endosteal blood supply and dynamic controlled motion, which stimulates periosteal callus formation. The nails also allow stacking of the canal leading to axial stability and rotational control leading to early mobilization and weight bearing leading to union and good outcomes for tibial shaft fractures.

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