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A study of outcome of surgical management of diaphyseal fractures of tibia treated with intramedullary interlock nailing

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Abstract

Management of the fractures of the shaft of the tibia remained a controversial subject despite advances in both non-operative and operative care. Sir John Charnley stated that, “we have still a long way to go before the best method of treating a fracture of the shaft of tibia can be stated with finality” in 1961. Several published series regarding the treatment of fractures of the shaft of tibia have shown that closed treatment of fractures can have excellent results. But the drawbacks of prolonged healing time, malalignment and non-compliance of the patient has led to the thought of other modalities of treatment, finally resulting in the use of closed interlocking intramedullary nailing which has given excellent results. The method of closed nailing with or without reaming followed by early ambulation and weight-bearing has positive advantages over all existing methods, significantly lower complication rates and has comparable results. The intramedullary interlock nailing under image intensifier fulfills the objective of stable fixation with minimal tissue damage resulting in better and quicker fracture unions. The important aspects for its use are its ability to prevent axial collapse, rotational and angulation deformities and most important of all, being earliest possible ambulation.

The present study has been taken to review the results of diaphyseal fractures of tibia treated with intramedullary interlock nailing.

Keywords: Surgical management, diaphyseal fracture, tibia

Introduction

Since tibia is the large bone of body and one of the principal load-bearing bones in lower extremity, fractures of tibia can cause prolonged morbidity, extensive disability unless treatment is appropriate. The overall incidence of diaphyseal fractures of tibia is 26/1,00,000 population. With the increasing number of vehicles on roads in India, complex trauma cases caused by road traffic accidents have increased progressively. The use of non-operative treatment for tibial diaphyseal fractures that are widely displaced or that are result of high energy forces is associated with a high prevalence of malunion, stiffness of the joint and poor functional outcome.

Being sub-cutaneous in location, the tibia is the commonest bone to be fractured and seen commonly in orthopaedic practice. Open fractures are more common, because one third of its surface is subcutaneous throughout most of its length. Furthermore, the blood supply to the tibia is more precarious than that of bones enclosed by heavy muscles. The presence of hinge joints at the knee and ankle allows no adjustment for rotatory deformity after a fracture. Delayed union, non-union and infection are relatively frequent complications, especially after open fractures of the shaft of tibia.

Due to its frequency, topography and mode of injury it has become a major source of temporary disability and morbidity. Hence special care and expertise is necessary when treating such fractures. It requires the widest experience, the greatest wisdom and the nicest of the clinical judgement in order to choose the most appropriate treatment for a particular pattern of injury. Management of the fractures of the shaft of the tibia remained a controversial subject despite advances in both non-operative and operative care. Sir John Charnley stated that, “we have still a long-way to go before the best method of treating a fracture of the shaft of tibia can be stated with finality” in 1961.

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The present study has reviewed the results of diaphyseal fractures of tibia treated with intramedullary interlock nailing.

Aims and Objectives

To study and evaluate the results of intramedullary interlock nailing in diaphyseal fractures of tibia.

Materials and Methods

Patients of both sexes belonging to the adult age group presenting with fracture tibia to Orthopaedic Department are admitted from August 2018 to December 2020 and evaluated. Those satisfying our inclusion criteria and are surgically fit are included in the study. This includes a prospective study of 45cases.

Inclusion and Exclusion Criteria

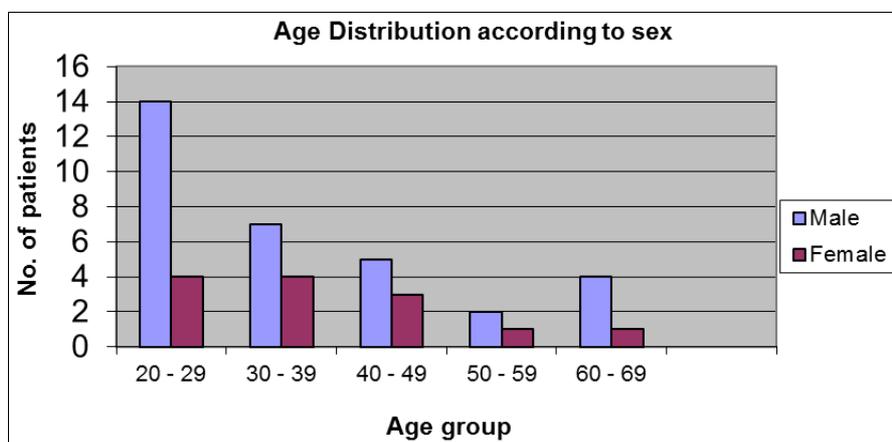
Inclusion criteria

1. Age >20 years of age
2. All Closed diaphyseal fractures of tibia.
3. Open type 1 and Type 2 (according to Gustilo Anderson Classification) diaphyseal fractures of tibia presenting within 24 hours of injury

Exclusion criteria

1. Age < 20 years
2. Patients with open physis
3. Open fractures of tibia Type 3A, Type 3B and Type 3C (according to Gustilo and Anderson Classification)
4. Immunocompromised patients

Results



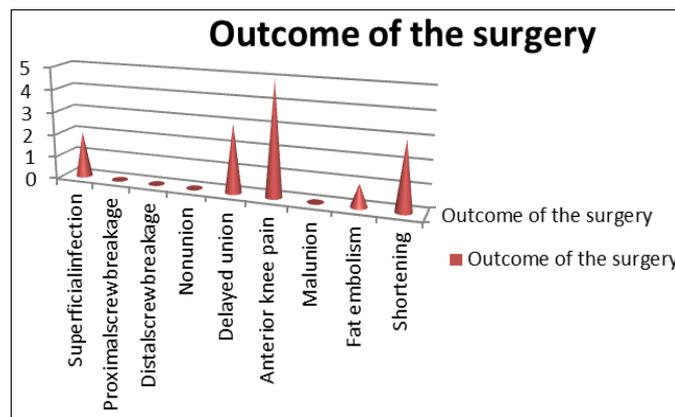
Graph 1: Age Group

Table 1: Type of fracture

Type of fracture	Number of patients	Percentage
Transverse	10	22.22
Oblique	4	8.89
Wedge(butterfly)	9	20
Spiral	4	8.89
Communited	18	40
Segmental	0	0
Total	45	100.00

Table 2: Outcome of the surgery

Complications	Number of patients	Percentage
Superficial infection	2	4.44%
Proximal screw breakage	---	---
Distal screw breakage	---	---
Nonunion	---	---
Delayed union	3	6.67%
Anterior knee pain	5	11.11%
Malunion	---	---
Fat embolism	1	2.22%
Shortening	3	6.67%



Graph 2: Outcome

Discussion

In 1942, Fischer had reported, in the German literature, the use of intramedullary reamers to increase the contact area between the nail and host bone with the hope of improving stability of the fracture [1]. However, it took another decade

with Küntscher's introduction of flexible reamers for the concept to take hold. Fischer also believed that reaming in combination with a larger diameter nail would enhance the stability of fractures by increasing the contact area. He felt that, although the intramedullary vascular supply was obliterated through this technique, the periosteum and surrounding tissues would promote adequate bone formation for healing. Another currently used technique introduced in the 1950s was the application of interlocking screws to enhance stability of the construct. Modny and Bambara introduced the transfixion intramedullary nail in 1953 [2]. This nail was cruciate-shaped, with multiple holes the length of the nail to allow for placement of screws at 90° angles from each other. Modny and Lewert later reported excellent results in a series of 261 femur fractures treated with this nail [3]. Enthusiasm for compression plating of long bone fractures exploded during the 1960s, and general advancement in the use of intramedullary nails "went on hiatus." Despite the emergence of compression plating, there were several advancements that changed the future practice of intramedullary nailing. Cephalomedullary nails were first introduced in the 1960s, highlighted by the development of the Zickel nail in 1967 [4]. The Zickel nail contained a hole in the proximal portion in order that a separate nail could be placed through the lateral cortex of the proximal femur into the neck and head. A set screw, which continues to be found on some current cephalomedullary designs, could be inserted through the proximal portion of the shaft nail to prevent backout of the head and neck nail. During the 1940s and 1950s, many surgeons abandoned early radiological techniques, such as head-worn fluoroscopy, because of the potential side effects to both surgeon and patient. This forced these surgeons to adopt an open nailing technique. The development of radiological image intensification in the 1960s allowed surgeons to readopt closed nailing techniques with a much lower risk to patient and surgeon alike. As surgical techniques continued to expand during this time, there was a surge in clinical data regarding the use of reamed interlocking nails of both the femur and tibia. This was culminated by a three-part study of reamed interlocked femoral nails by Brumback and colleagues [5, 6, 7]. This work reported a 98% (85/87) initial healing rate with statically locked, reamed intramedullary nails in 87 femur fractures. Union was reported in the remaining two fractures after dynamization.

While there was certain progress as far as nail design and materials are concerned during the 1990s, the major advancements came with the expansion of indications for unreamed and reamed intramedullary nailing. Open tibial shaft fractures were now being treated with intramedullary fixation with good results. Design achievements of the 1990s included the introduction of new titanium nails, Cephalomedullary devices such as the Gamma nail, and retrograde supracondylar intramedullary nails such as the GSH (Green-Seligson-Henry) nail [8, 9]. In addition, slotted cloverleaf cross-sectional designs were being replaced by non slotted designs that provided greater torsional rigidity. In 1999, Brumback and associates reported a two-part study looking at immediate weight bearing in patients with comminuted femoral shaft fractures that were treated with intramedullary nailing [10]. These investigators concluded that immediate weight bearing is advisable in patients who had their femur fractures fixed with larger diameter nails with high fatigue strength, as this allows for more rapid

mobilization for the trauma patient with multiple injuries of the extremities.

Conclusion

Patients operated with this technique can be ambulated early without external immobilization in majority of cases, patients are allowed to resume work as early as tolerated and this procedure also reduces the hospital stay and boosts up the morale of the patient.

References

1. Fischer AW, Maatz R. Weitere Erfahrungen mit der Marknagelung nach Küntscher. Arch Klin Chir. 1942;203:531.
2. Modny MT, Bambara J. The perforated cruciate intramedullary nail: Preliminary report of its use in geriatric patients. J Am Geriatr Soc. 1953;1:579-88.
3. Modny MT, Lewert AH. Transfixion intramedullary nail. Orthop Rev. 1986;15:83-8.
4. Zickel RE. A new fixation device for subtrochanteric fractures of the femur: A preliminary report. Clin Orthop Relat Res. 1967;(54):115-23.
5. Brumback RJ, Reilly JP, Poka A, et al. Intramedullary nailing of femoral shaft fractures. Part I: Decision-making errors with interlocking fixation. J Bone Joint Surg Am. 1988;70:1441-52.
6. Brumback RJ, Uwagie-Ero S, Lakatos RP, et al. Intramedullary nailing of femoral shaft fractures. Part II: Fracture-healing with static interlocking fixation. J Bone Joint Surg Am. 1988;70:1453-62.
7. Brumback RJ, Ellison TS, Poka A, et al. Intramedullary nailing of femoral shaft fractures. Part III: Long-term effects of static interlocking fixation. J Bone Joint Surg Am. 1992;74:106-12.
8. Stapert JW, Geesing CL, Jacobs PB, et al. First experience and complications with the long Gamma nail. J Trauma. 1993;34:394-400.
9. Lucas SE, Seligson D, Henry SL. Intramedullary supracondylar nailing of femoral fractures. A preliminary report of the GSH supracondylar nail. Clin Orthop Relat Res. 1993;(296):200-6.
10. Brumback RJ, Toal TR, Murphy-Zane MS, et al. Immediate weight-bearing after treatment of a comminuted fracture of the femoral shaft with a statically locked intramedullary nail. J Bone Joint Surg Am. 1999;81:1538-44.