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Functional Outcome of Various Modalities of Management of Distal Tibial Fractures

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Abstract: This paper aim to assessment the Functional Outcome of various modalities of management of Distal Tibial Fractures were. A cross-sectional study was conducted on 50 patients of the distal tibia from different hospitals in Iraq from 2-February-2020 to 12-1-2021 Through the statistical evaluation of the different treatment, it was noted that there was a relative increase in the degree of evaluation of the method of treatment MIPO (79 ± 12.2). This is due to the few complications that occurred after treatment, which included Ankle stiffness for one patient. Statistically significant differences were found by relying on the evaluation ratio between the three methods used in the treatment, where the p-value was 0.0044.

Keywords: MIPO, treatment, Tibial, AO, IM Nail, Ext. Fix.

INTRODUCTION

This type of fracture occurs when exposed to compressive forces and is associated with high-energy trauma [Wang, B. *et al*., 2019; Singer, B.R. *et al*., 1998].

The combination of forces such as compression, rotation, and elements of excessive dorsiflexion results in a severe type of injury associated with extensive soft tissue trauma [Finkemeier, C.G. *et al*., 2019; Tarr, R.R. *et al*., 1986].

Classification of fractures according to AO /ASIF type fractures: A - extra-articular fractures of the distal tibial metaepiphysis, division A1, A2, A3 is based on the number of fragments of the metaphyseal region and the degree of their fragmentation [Ekeland, A. *et al*., 1988; Wiss, D.A. *et al*., 1986; Müller, M.E. *et al*., 1965]. Type B fractures are incomplete intra-articular fractures in which the articular surface of the tibia is split, but part of it remains associated with the diaphysis of the tibia. The division into - B1, B2, and B3 is based on the assessment of the impaction of the articular surface and the nature of the fragments [Danis, R. *et al*., 1979; Allgöwer, M. *et al*., 1969; Azboy, İ. *et al*., 2013; Marsh, J.L. *et al*., 2006].

Fractures of type- C - complete intra-articular fractures with a complete interruption of the connection between the articular surface and the diaphysis of the bone by the fracture lines [Teeny, S.M. *et al*., 1993; Uchiyama, E. *et al*., 2005; Joveniaux, P. *et al*., 2010; Budiman-Mak, E. *et al*., 1991].

The division into -C1, C2, and C3 is based on an assessment of the comminuted nature of damage to the articular surface and diaphysis [Budiman-Mak, E. *et al*., 1991].

The quality of management depends on different methods, including non-surgical management, which can be defined as including closed fractures to patients with comorbidities and in which the patient is not fit to undergo anesthesia, and intramedullary nailing, which includes simple fractures, which can be managed through intramedullary nailing, in addition To other methods, including management by relying on AO External fixators: and Plating devices that include the treatment of fractures free from the presence of significant and serious damage to the soft tissues[Leonard, M. *et al*., 2009; Collinge, C.A. *et al*., 2000; Collinge, C. *et al*., 2000; Helfet, D.L. *et al*., 1997].

MATERIAL AND METHOD

Patient Sample

A cross-sectional study was conducted on 50 patients of the distal tibia from different hospitals in Iraq from 2-February-2020 to 12-1-2021.

Study Design

Cooperating with the hospital for the purpose of obtaining information and demographic data for patients, where the date of stay was recorded, in addition to the included follow-up.

IM nail as a fixation method was chosen in cases where there was minimal soft tissue injury.

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MIPO technique was preferred in cases with minimal soft tissue injury, severe comminution, and fracture location above the articular suface. External Fixation was chosen in cases with extensive soft tissue damage and extended articular comminution.

Classifications are used in research and clinical practice; they are the basis for harm assessment and the basis of Appropriate communication, i.e., a classification tool for the systematic accumulation, storage, transmission, and processing of data. Following standardized principles of damage, the regulation allows for determining the optimal treatment strategy and has been relied upon the AO classification of distal tibia fractures, as shown in figure 1.

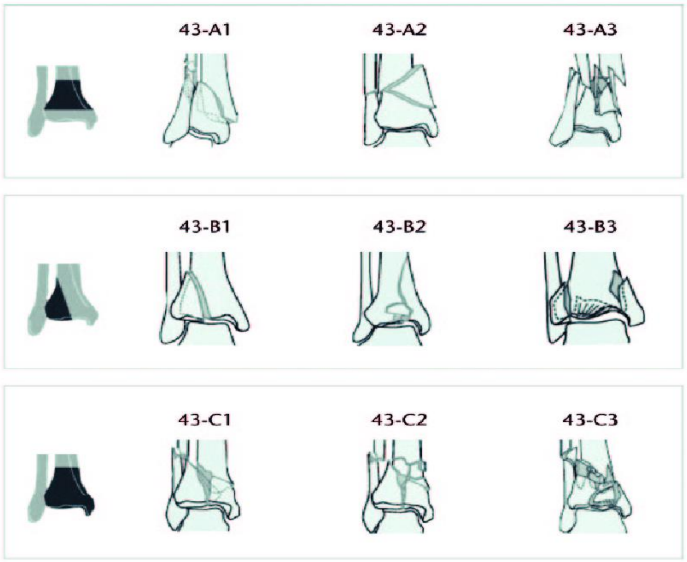

Figure 1: AO classification of distal tibial fractures

In this study, a comparative analysis of the three methods used in treatment was used.

IM Nail, Ext. Fix* and MIPO. The treatment method was evaluated based on statistical analysis, in addition to the value of the logistic regression to patients, in addition to knowing the complications that occurred after treatment.

Study Period

Was conducted at different hospitals in Iraq, from 2-February-2020 to 12-1-2021. Required consents from all the patients and ethical committee clearance were taken before conducting the study.

Aim of Study

This paper aim to assessment the Functional Outcome of various modalities of management of Distal Tibial Fractures.

RESULTS

Table 1: Distribution of patients according to age

Age group	f	p%
25-30	16	32
31-35	10	20
36-40	5	10
41-45	10	20
46-50	4	8
>50	5	10

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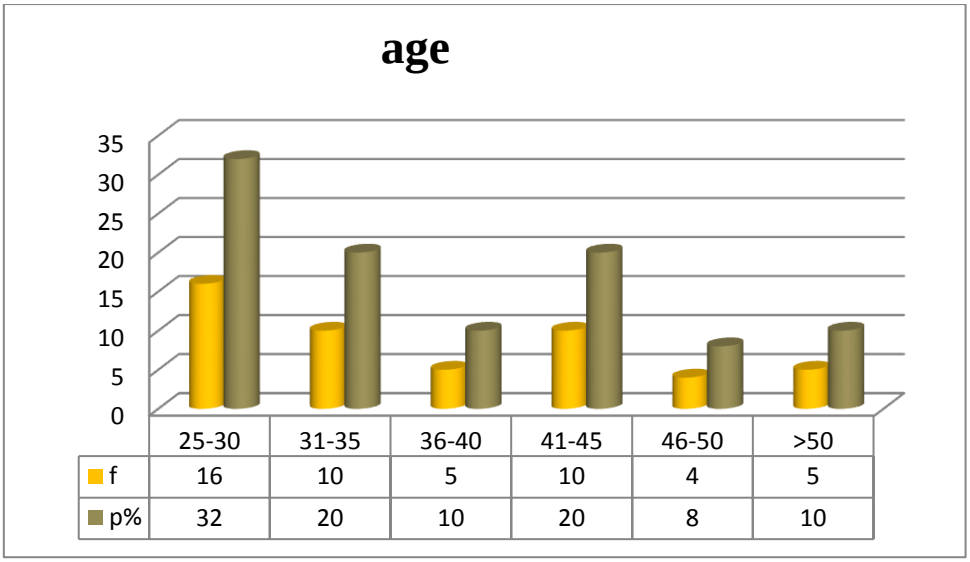

Figure 1: chart for Distribution of patients according to age

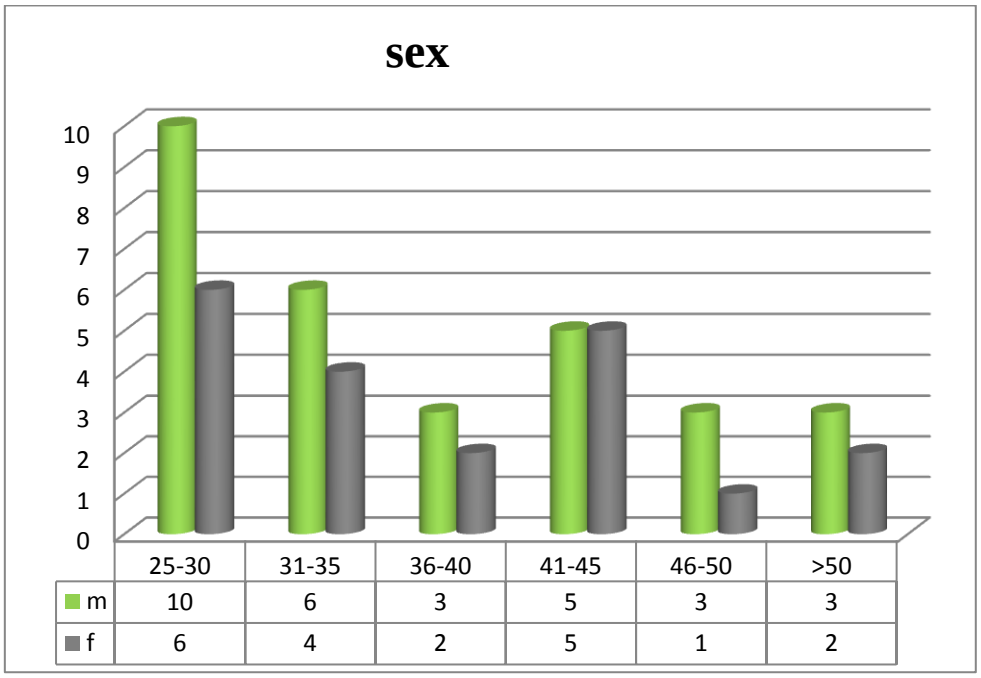

Figure 2: Distribution of patients according to sex

Table 2: Mode of Injury

	n	**p%**
RTA	30	60
Fall	10	20
Fall of Heavy Object	5	10
Wall Collapse	3	6
Assault	2	4

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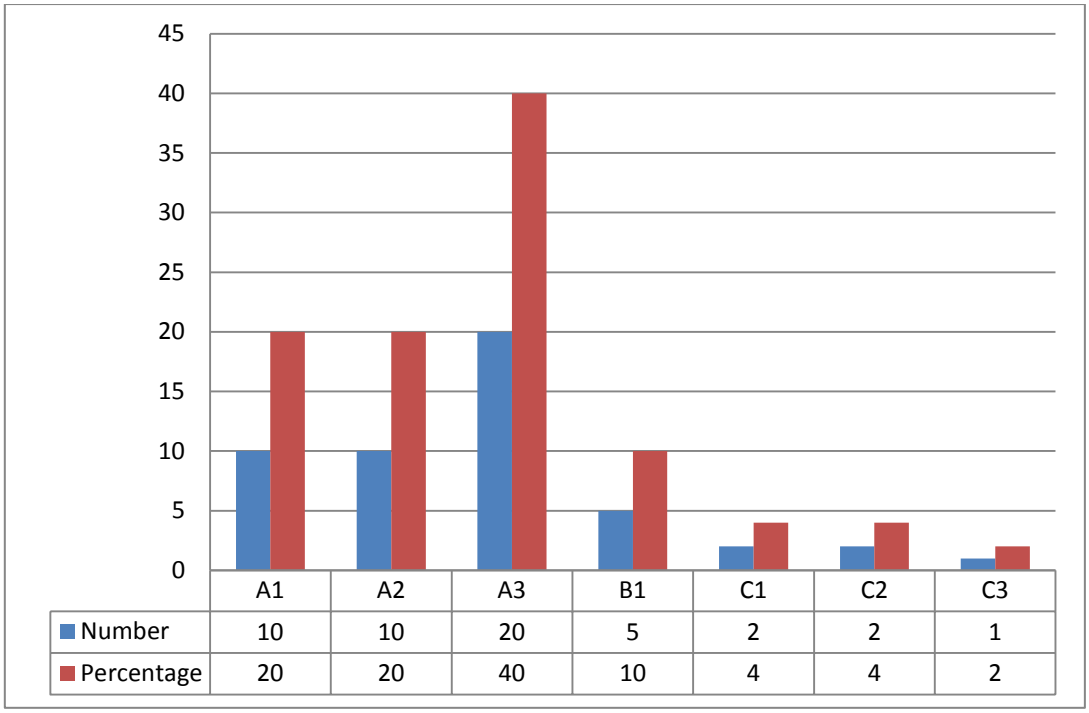

Figure 3: Distribution of the patients according to AO classification

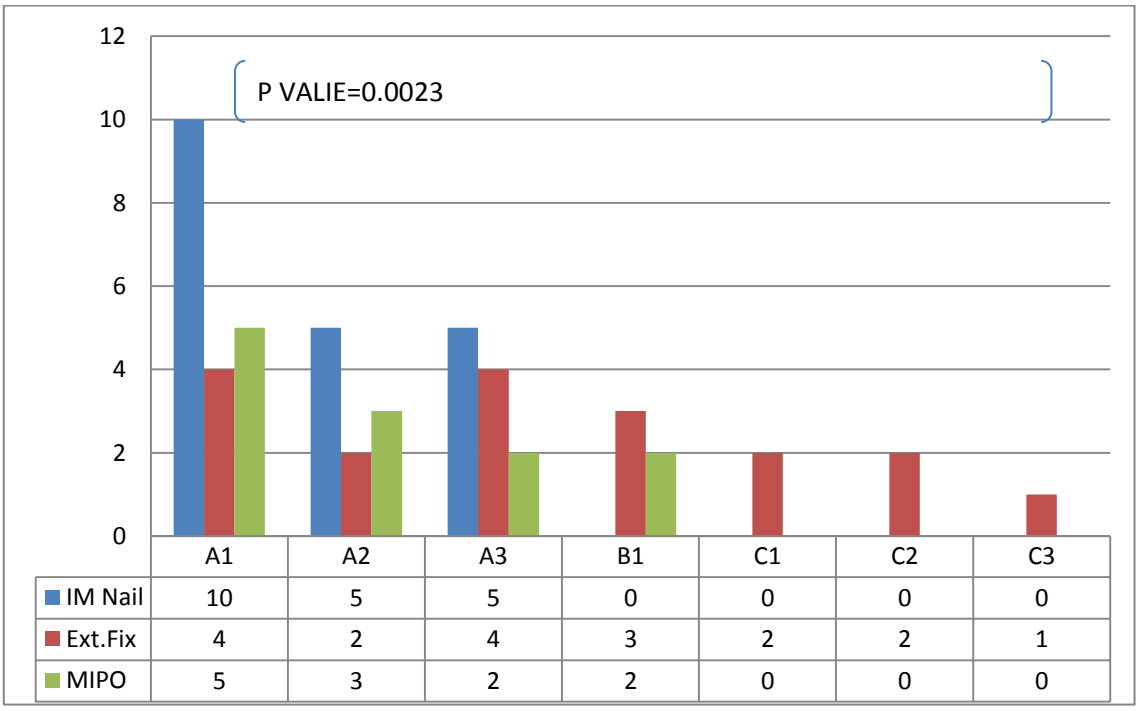

Figure 4: different modalities in different AO types of fracture among the patients

Table 3: assessment of different modalities in a different types of fracture

Score	Value	P value
IM Nail	69±8.9	
Ext. Fix	66±5.5	0.0044
MIPO	79±12.2	

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Table 4: complications according to the modality of treatment

	IM Nail	Ext. Fix*	MIPO
Ankle stiffness	1	1	1
knee mobility	0	1	0
Non-Union	0	2	0
Wound discharge	2	0	0
Subtalar Joint (<50% of normal)	1	0	1

DISCUSSION

Fifty patients were collected and analyzed statistically using IBM SPSS SOFT and Microsoft Excel 2016.

The average age of patients ranged from 25 to 55 years, and the most frequent category in the statistical distribution was between 25-30 years old for 16 patients with 32%, 31-35 years old for ten patients with 20%, and 36-40 years old for five patients with 10 %.

In Figure 2, the patients were distributed according to gender, and the percentage of male patients was more than females (30 male patients and 20 female patients).

In Figure 3 Distribution of the patients according to AO classification.

The distribution of patients was present in A1, a2, a3 for 40 patients, B1 for five patients at a rate of 10%, and c1, c2, and c3 also for five patients.

Statistically significant differences were found between the three treatment methods used, and the p-value between them was 0.0023.

Through the statistical evaluation of the different treatment, it was noted that there was a relative increase in the degree of evaluation of the method of treatment MIPO (79 ± 12.2). This is due to the few complications that occurred after treatment, which included Ankle stiffness for one patient.

As for the method of IM Nail treatment, the evaluation ratio was (69 ± 8.9) and complications were seen in 3 patients in Ankle stiffness for one patient and Wound discharge for two patients.

The ext. fix treatment method got the lowest rating (66±5.5) and four complications occurred in 4 patients.

CONCLUSION

In this paper, the type of treatment depended on the type of wound in addition to its nature and injury

Where the condition in which the soft tissues determine the method of treatment, if it is small, the IM nail provides an excellent result. As for cases where the fragmentation is severe, it is preferable to use the MIPO treatment method for the purpose of preserving the biology of the fracture.

Treatment methods were evaluated based on the type and incidence of complications in patients for the treatment of distal tibial fractures

RECOMMENDATION

The best way to manage a distal tibial fracture is one that achieves good stability and minimizes soft tissue settlement as well as the removal of blood vessels from the bone fragments.

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