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ASSESSING OUTCOME OF PROXIMAL ONE-THIRD TIBIAL FRACTURES MANAGED BY INTRAMEDULLARY NAILING ALONG WITH REDUCTION PLATE

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ABSTRACT

BACKGROUND: ***Proximal one-third tibial fractures are very commonly encountered in orthoemergencies.The management options include nailing and plating with each having its own downfalls.Usually very long plates have to be used in such fractures creating therefore soft tissue related problems in future.However,the use of nails in such fractures is often marred with malalignment.***

MATERIALS AND METHODS: ***A total number of seven subjects who were managed with intramedullary nailing along with small reduction plates were included in our study.The study was prospective in nature and was carried from MAR'20 to JUN'20.***

RESULTS: ***The patients were followed-up for a minimum period of 4 months and outcomes were deduced on the basis of Johner and Wruh's criteria.***

CONCLUSION: ***Intra-medullary nailing of proximal one-third fractures along with small reduction plate can be used for management of these injuries in properly selected cases.However,one has to be very meticulous and vigilant regarding the soft tissue status in such injuries.***

KEY-WORDS:Proximal tibia fracture, closed interlocking nail, malalignment, nailing techniques,small reduction plates.

INTRODUCTION

Tibial fractures are one of the most common fractures encountered in practise.Intramedullary nailing(IMN) became the gold standard in surgical fixation of diaphyseal tibia fractures. Of all tibialfractures, extra-articular proximal diaphyseal tibial fractures account for 5–9% [1,2].Although various treatment options are available [3-7], there is no consensus regarding the optimal treatment for extra-articular proximal tibial diaphysealfractures. Open reduction and fixation with load bearing plates is a commonapproach[8,9].Though it permits a direct view of the fracture and anatomical reduction, but open reductionand plate fixation may be associated with an extensive soft tissue dissection which eventuallymay increase the risk of wound dehiscence and infection [2,6,10-12]. Minimally invasive plateosteosynthesis (MIPO) may overcome this, but

reduction and proper alignment of the fractureis much more difficult, and rarely possible, compared to open procedures[10,13,14].Temporary or definitive external fracture fixation is usually not recommended except for cases with extensive soft tissue damage[10,16,20].Intramedullary nailing of extra-articular proximal fractures canbe considered a feasible solution to avoid soft tissue complications[11,15]. But high rates ofmalunion have been reported for nailing, which is debated[16-21].The most common problem encountered with these fractures in anterior translation of proximal fracture segment over the distal one.The use of small reduction plate via mini-incision holds the fracture in place and subsequently nail can be locked with fracture reduced in accurate alignment.

MATERIALS & METHODS:

This is a prospective study done in department oforthopaedics,Government Medical College and Hospital,Jammu from MAR'20 toJUN'20.

INCLUSION CRITERIA:

All subjects sustaining fractures of tibia in the proximal one-third area were included in the study.

EXCLUSION CRITERIA:

- Compound fractures.
- Proximal one-third fractures which were extending intra-articularly.
- Paediatric fractures.
- Pathological fractures.
- Any other associated fractures other than ipsilateral fibula.

The patients were first managed on the lines of ATLS protocols and once stabilized and all other injuries excluded were planned for surgery after proper AP and Lat radiographs of the injured extremity.

FIGURE 1:AP and Lat x-ray of a patient with proximal one-third tibial fracture.

FIGURE 2:AP and Lat x-ray of another patient with proximal one-third tibial fracture.

In our normal(pre-covid) routine work days we when planning fixation of such fractures always kept c-arm handy and also nails with high Herzog bend(which lack distal targeting/locking zig) were kept along with regular nails.However,due to the current prevailing covid crisis being at its peak and due to intermittent shutting down of our main ot complexes we were forced to do such cases in ER without any c-arm guidance.

Normal routine incision was used for all patients.Entry made with awl at the medial edge of lateral condylar eminence.Once guide-wire was passed fracture and on reaming the anterior translation of proximal fragment was there,a mini-incison was given over the fracture site and 2-4 hole plate was placed after reducing the fracture.Nail was locked with plate holding the fracture in proper alignment.Allgower-Donati sutures were given over the skin incison.Broad-spectrum antibiotics were administered for 5-7 days.Sutures were removed at 14 days of surgery.Patient was ambulated the next day of surgery with gradual weight bearing allowed after 2 weeks.

FIGURE 3

FIGURE 4

Figure 3 and 4 depicting the post-op x-ray images of a patient of proximal one-third tibial fractures managed by intra-medullary nailing with reduction plate.

RESULTS

Patients werefollowed up for clinical and radiological evaluation using Johner and Wruh's [37] criteria.

	Excellent (left = right)	Good	Fair	Poor
Non-union, osteomyelitis, amputation	None	None	None	Yes
Neurovascular disturbances	None	Minimal	Moderate	Severe
Deformity				
Varus/valgus, °	None	2–5	6–10	>10
Anteversion/recurvation, °	0–5	6–10	11–20	>20
Rotation, °	0–5	6–10	11–20	>20
Shortening, mm	0–5	6–10	11–20	>20
Mobility, %				
Knee	Normal	>80	>75	<75
Ankle	Normal	>75	>50	<50
Subtalar joint	>75	>50	<50	
Pain	None	Occasional	Moderate	Severe
Gait	Normal	Normal	Insignificant limp	Significant limp
Strenuous activities	Possible	Limited	Severely limited	Impossible

Table 5: Table showing the parameters of Johner and Wruh's criteria.

Out of seven subjects 5 were male(72%) and two female(28%).The cause of fracture was RTA in six of seven subjects(86%) while one sustained injury due to being hit by a domestic cattle. Out of the seven subjects which were included in our study,5 had excellent outcome(72%),1 had good outcome(14%),while one patient had poor outcome(14%).Six of the seven fractures started showing signs of union at an average time of 3.6±0.9 weeks,while one case had delayed union.No case showed loss of alignment whatsoever at any stage of follow-up.Post-op ROM was excellent in all case except for one.

There were two cases of infection (28%),out of which one was managed by oral antibiotics and regular ASDs, however one subject had a deep infection(14%) of the mini-incision site which required debridement along with removal of the hardware after about 3 weeks of the initial surgery.This case presented with delayed union.

DISCUSSION

Proximal one-third tibial extraarticular fractures have posed atreatment challenge fororthopedic surgeons. Intra-medullary nailing definitely has advantage over plating in terms of tissue handling as well as load shearing nature of the nails.Malalignment,however,is common with nailing techniques in these set of tibial fractures as demonstrated by several series since early times also[22,23].

In a radiographic analysis of 133 tibia fracturestreated with IMN fixation, Freedman and Johnson [22] reportedthat 7(58%) of the 12 proximal tibiadiaphyseal fracture were malaligned,compared with an overall rate of 12% in the whole cohort.

Lang *et al*. too [23]. Bhandari *etal*. evaluated the outcome of surgical techniques in themanagement of extra-articular proximal third tibial fractureswith regard to rates of nonunion, malunion, infection,compartment syndrome, and implant failure [24].Their studies also showed higher malalignment associated with IMN.

CONCLUSION

In properly selected cases,proximal one-third tibial fractures can be well managed with IMN along with reduction plate.However,one must be vigilant for any signs of infection in such cases. However,small number of cases is a limiting factor in our study.

CONFLICT OF INTEREST:

There are no conflicts of interest.

DECLARATION OF PATIENT CONSENT:

Well informed consent was taken from all patients/their guardians for our study.

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