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EVALUATION OF COMPARATIVE STUDY OF MEDIAL MALLEOLUS FRACTURE FIXATION IN BIMALLEOLAR ANKLE FRACTURE.

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ABSTRACT

Introduction: Ankle injuries due to its complex anatomy and high congruency need to be anatomically reduced to get a good functional outcome and to avoid complication. In our study we have compared outcome of two commonly performed procedures over medial malleoli fracture i.e Tension band wiring (TBW) vs Malleolar Screw (MS).

Material and Methods: The study was conducted over 40 patients who were followed for 6 month atleast and outcome was compared in terms of The Modified Ankle Score of Olerud and Molander.

Results: Functional results on basis of The Modified Ankle Score of Olerud and Molander score were excellent + good in 90% cases of TBW and 80% cases of MS (P=0.04) and Radiological union in 9.4 weeks in TBW group and 11.2 weeks in MS group (P=0.03).

Conclusion: Our study showed better outcome with TBW as compared to MS in terms of both functional and radiological union. We recommend use of Tension band wiring for medial malleolus fracture fixation

KEYWORDS :

INTRODUCTION

Ankle fractures are among the most common injuries treated by orthopaedic surgeons.1 Ankle joint due to its complex anatomy and varied fracture pattern have constantly baffled surgeons working on it. Because of its high frequency and associated morbidity these injuries are becoming enormous burden to society. Ankle injuries are very common injuries in elderly population after hip and wrist injuries and in young it's even more common.[2]

Goal of treatment is restoration of normal joint anatomy and function. Since it is a tight fitting highly congruent weight bearing joint so it allows very narrow margin of error from its anatomical reduction and it must be perfectly reduced to avoid future complication like arthritis. Various modalities of treatment are available for these fractures like conservative treatment with Plaster of paris cast in undisplaced fracture. For displaced fracture modalities like Closed/OpenReduction and Internal fixation with Cancellous Screw/Tension Band Wiring/Malleolar Screw/K-Wire. Every method has their own merits and demerits.

Majority of fracture require Open Reduction and Internal Fixation due to interposition of Periosteum and Cartilage preventing Close Reduction. Benefits of surgery include high rates of union, early return to work and Avoids prolonged immobilization and prevention of residual displacement.

Here we have compared two most common performed procedures for medial malleoli fracture i.e Tension Band Wiring Vs Malleolar Screw

MATERIAL AND METHODS.

Present study was carried out in total of 40 patient presented with Bi-Malleolar fracture to our trauma centre between august 2015 to august 2017, treated with either malleolar screw or tension band wiring and choice of allocation was on alternate basis. Ethical committe approval was obtained and patient was recruited when written informed consent had been provided. Minimum follow up period was 6 month.

Inclusion criteria were closed displaced fracture in patient over 18 year of age and exclusion criteria were severe communition, vertical compression injury, medically unfit patient, patient who were non cooperative or chronic alcoholic and patient with other major injuries preventing ankle rehabilitation.

SURGICAL TECHNIQUE: Under spinal anaesthesia and under tourniquet control in supine position after al aseptic precaution sterile painting and draping was done and medial malleoli fracture was exposed via antero-medial incision that began approximately 2 cm proximal to the fracture line, extended distally and slightly posteriorly, and ended approximately 2 cm distal to the tip of the medial malleolus. Skin flaps were carefully reflected and fracture site was cleaned of all interpostions.

For Tension Band group after temporarily holding reduction with help of towel clip 2 K-wire were inserted parallel to each other and perpendicular to fracture surface, then one stainless steel wire was passed through the hole made in antero-posterior direction in tibia. Around K-wire it was tightened in figure of 8 fashion. K-wire were bent, cut and turned medially.

For Malleolar screw group fracture temporarily reduced and hold with K-wire and hole was drilled in medial malleoli from distal to proximal and then appropriate size screw were inserted.

Surgical site was thoroughly cleaned with normal saline, tourniquet deflated, good haemostasis achieved, wound closed in layer. Below knee plaster of paris slab applied.

Third generation cephalosporin were given in suitable doses, limb elevation and active toe movement encouraged to control postoperative swelling. Patient was asked to remain non-weight bearing for 6 weeks. Suture removal done after 12 to 14 days. Patient followed up after 2 week, 6 week, 12 weeks then at 6 month and then at 1 year.

The Modified Ankle Score of Olerud and Molander:

PARAMETER	SCORE
1.PAIN	
None	25
Minor	20
During sports	15
During walking	10
Constant and severe	0
2. STIFFNESS	
None	10
In the morning	5
Constant	0

3.SWELLING	
None	10
In the evening	5
Constant	0
4. STAIR CLIMBING	
Normal	10
Impaired	5
Impossible	0
5. SPORTS	
Normal	10
Impaired	5
Impossible	0
6. SUPPORTS	
None	10
Tape or wrap	5
Stick or crutch	0
7. DAILY ACTIVITIES	
Normal	25
Normal but slow	20
Reduced	10
Impaired	0
TOTAL	100

RESULTS: There were 28 males and 12 females in our study with average age of 32.45(range 18-65 yrs). Majority of patient sustained injury due to road traffic accident(80%) followed by fall(16%). Most common pattern of injury in our study was Supination External Rotation which was around 50%. Mean time for radiological union was 9.4 weeks in TBW group and in MS group it was 11.4 weeks.(P=0.03) According to the modified ankle scoring system of Olerud and Molander, 8(40%) patients in TBW group and 4(20%) patients in MS group were excellent: good in 10(50%) patients in TBW group and 12(60%) in MS group: fair in 2(10%) patients in TBW group and 3(15%) in MS group: poor in Zero patients in TBW group and 1(5%) in MS group patients. Excellent and good results were achieved in 90% in TBW group patients and 80% in MS group patients. (p=0.04)

Mean Time for Radiological Union:

GROUP	MEAN TIME (WEEKS)	P Value
TBW	9.4	0.03
MALLEOLAR SCREW	11.2	

Follow up assessment using modified Olerud and Molander scoring system

OUTCOME	TBW(n=20)	MALLEOLAR SCREW(n=20)
EXCELLENT	8	4
GOOD	10	12
FAIR	2	3
POOR	0	1

OUTCOME	TBW	MALLEOLAR SCREW	P Value
EXCELLENT+GOOD	90%	80%	0.04

Complication observed in our series were superficial infection in 2 patient one of each group which was managed with regular dressing and antibiotics. Another was limition of ankle ROM which at final follow up was greater than 15 degree of dorsiflexion in 70% patient of TBW group and 80% patient of Malleolar screw group.

DISCUSSION

According to the modified ankle scoring system of Olerud and Molander3 our study showed excellent and good results in 90% of TBW group patients and 80% in Malleolar screw group patients. This matches results of Sang Hanko and Young Junpark4 who achieved excellent and good results in about 78% of cases treated with malleolar screws and 89% of cases treated with tension-band wiring. In our study mean time for radiological bone union was 9.4 weeks (ranging from 6 to 12 weeks) for TBW group and 11.2 weeks (ranging from 8 to 18 weeks) for Malleolar screw group. This is similar to Nurul SK and Shahidi P5 study that reported a mean time of 12 weeks for malleolar screws and 9 weeks for tension-band wiring. We had experienced no cases of delayed union & non-union. This result also matches results of Nurul SK and Shahidi P5 who achieved 100% union rate in both groups without any case of delayed union.6,7,8 Ostrum and Litski9 recently demonstrated the biomechanic advantages of the tension-band over other fixation techniques for medial malleolus. When resisting pronation forces and applying compression force tension-band were four times stronger than malleolar screw.10 This might explain the faster union rate we achieved in TBW group. Rovinsky et al in his study showed that the tension-band is more technically advantageous over other types of fixation for fixation of small fragment fracture of medial malleolus and is not recommended for the fixation of vertical fracture11. We excluded them from the Study. Screw fixation alone may provide poor stability against torsional forces.12,13 This may requires an additional point of fixation, which may be a second screw or a Kirschner wire. In the current study we use additional point of fixation (second screw and K. wire) in cases in which the fragment was large and tend to rotate. Limitation of movements and swelling of the ankle are usually the result of neglect in treatment of soft tissue. Although better range of motion was noticed in Malleolar screw group of patients (80%) as compared with TBW group (70%), it did not reach significance (p=0.6). This could be attributed to wide soft tissue dissection that was needed with the use of tension-band. These results may show similarity with the results of Nurul SK and Shahidi P5 who reported in his study that the group treated with malleolar screw showed better range of motion.

Authors have reported loss of reduction with the use of tension band technique as a result of K- wires become loosened and migrate,14 while many authors denied and reported that with the proper surgical techniques, wire migration was not a problem15,16 . In this study we did not see any such complication.

CONCLUSION

Our study showed better outcome with TBW than with Malleolar screw in medial malleolus fracture fixation The tension-band wiring may be more easily available and it is even economically superior to screw. Limitation of our study is that sample size and follow up period is short so further studies are required to validate the results.

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