OPERATIVE MANAGEMENT OF CLOSED ANKLE FRACTURE WITH AO TECHINQUE

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ABSTRACT

Objective: *The purpose of the study was to assess the result of closed ankle fracture with open reduction and internal fixation (ORIF) with AO Technique.*

Material and Methods: *This study was done on thirty patients at Ayub Teaching Hospital Complex, Abbotabad from Jan 2004 to Dec 2004. All the patients had closed bimalleolar fracture. The medial malleolus was fixed with two self tapping malleolar screws with washers and lateral malleolus was fixed with one third tubular plates. The overall results were graded as excellent, good, fair and poor.*

Results: *In 26 patients (86.8%) fractures healed uneventfully and follow up were completed. Two patients (6.6%) developed wound infection, which were superficial and two patients (6.6%) developed skin necrosis. More complications were observed in patients who had high-energy trauma. Radiological and functional assessment was done at each follow up visit.. The results were excellent to good in 93.4%.*

Conclusion: *Displaced closed bi- malleolar fractures should be addressed with open reduction and internal fixation using AO Technique to get functional and anatomical acceptable results.*

Key Words: *Bi- malleolar Fracture, Ankle Fractures, AO Technique.*

INTRODUCTION

Ankle fractures are most commonly seen in elderly people and its incidence is on increase since 1960 due to improvement in life expectancy and increased level of activity in elderly people.[1,2] Due to good safety measures in the automobile which protect the upper part but not necessary the lower limbs from trauma. As ankle joint is the most forgiving joint in the body, most of these injuries resolve satisfactorily and few end up with late sequalea, irrespective of the method of treatment.

Restoration of proper biomechanics, good union and pain free ankle joint should be the goal of treatment. These goals are difficult to achieve with closed methods except in undisplaced fractures. Open reduction and internal fixation with AO Technique is the recommended way to manage these problems with good results. It is the position of the talus in the ankle mortise, which is important, and needs to be restored anatomically while treating ankle fracture. Much attention has been focused on the lateral malleolus, as a significant weight bearing structure in addition to being a lateral buttress in the ankle mortise.[3] Alteration in the position of the lateral malleolus with any tilting or shortening can distort the tibial weight bearing axis's and end up with degenerative arthritis. Ankle and subtaler joints works in close association and these two structures are called Torque converters.[4,5] Which convert axially directed forces into horizontally oriented forces that act about the foot, so obviating any need for body to pivot round during gait.

MATERIAL AND METHODS

This observational study which was based on thirty patients with their mean age of 35(25-55) conducted in the orthopedic department of Ayub Teaching Hospital Abbottabad from Jan 2004 to Dec 2004. All these patients had closed bi-malleolar fractures which were treated by open reduction and internal fixation with AO technique to see the functional and radiological results.

The medial malleolus was fixed with two self tapping malleolar screws with washers and the lateral malleolus with one third tubular plate.

The following patients were included in the study.

- Patients with closed bi- malleolar fracture.
- Age: 20-55 years.

The following patients were excluded from the study

Pilon fractures

Open fractures

Pathological fractures

Pre- existing Ankle pathology

Tri- malleolar fractures

The patients were operated under general anesthesia and pre operative antibiotics (Ist generation cepalosporin) was given in all the cases at the time of induction. The findings were registered on a proforma.

The patients were operated with a pneumatic torniquet over the mid thigh. The medial malleolus was operated with anteromedial incision and lateral malleolus with anterolateral incision. After preparing the fracture and proper reduction two malleolar screws with washers were used for fixation of medial malleolus and lateral malleolus was fixed with one third small fragment tubular plate with 3 bicortical screws in the proximal fragment and two screws in the distal fragment. The wound was closed and below knee plaster of Paris cast was given and split to avoid development of swelling .At first follow up visit after two week the slab and stitches were removed and non weight bearing range of motion exercises was started to achieve range of motion .

Second follow up visit was done with four-week intervals. X-rays were made to see for the union. O learud and Molander scoring system[6] was used for functional assessment

Age

Age	No of Patients	%Age
25-35	19	63.3
33-55	11	36.7

Table 2

FUCTIONAL OUT COME SCORE OLEARUD MOLANDER SCORING SYSTEM[6]

PARAMETER	GRADES	SCORE
Pain	None	25
	While walking on an uneven surface	20
	While walking on an uneven surface outdoor	10
	While walking indoors	5
	Constant and severe	0
Stiffness	None	10
	Present	05
Swelling	None	10
	Only in the evening	05
	Constant	0
Stair Climbing	No Problem	10
	Impaired	05
	Impaired	0
Running	Possible	05
	Impossible	0
Jumping	Possible	05
	Impossible	0
Squatting	No Problem	05
	Impossible	0
Supports	None	10
	Tapping/Wrapping	05
	Stick/Crutches	0
Work activities of daily living	Same as before	20
	Loss of tempo	15
	Change to a simpler job or part time work	10
	Severely impaired work capacity	0
	Total Score	100

Table 1

POST-OPERATIVE COMPLICATIONS

Complications	No of Patients	%Age
Infection	2	6.6
Skin necrosis	2	6.6

Table 3

TYPE OF FRACTURES (WEBER TYPE)

Type of Fracture	No of Patients	%Age
C	5	16.7
B	25	83.3

Table 4

RESULTS

This study, which was based on 30 patients, with their mean age of 35 and male to female ratio of 1.7:1 (Table 2).90% of the patients were operated within 24 hours and the remaining 10% were operated after 10-14 days, because of late presentation and excessive swelling.

All these patients were operated under general anesthesia with prophylactic antibiotic before inflating the tourniquet. No preoperative or immediate postoperative complications were noticed. All patients were followed for a period of six months. At last follow up visit anatomical scorning were done. One patient (3.3%) had unsatisfactory functional results. Two patients (6.6%) developed superficial wound infection (Table 3). These patients' responded well to oral antibiotic and wound care. The anatomical measurements were within normal limit at last follow-up visit and were assigned functional score of 60 (Table 4). They had swelling and pain on uneven surfaces. They were able to sit on feet but felt pain with brisk walking. Two patients (6.6%) developed skin necrosis, which healed with scar formation and had mild pain at last follow up. The functional results were slightly inferior to radiological result in these two patients. They felt mild pain and swelling while walking on uneven surfaces, which subsided with rest, and keeping limbs elevated for some time (Table 5). In four patients loss of tempo were noticed. It was noticed in those patients who had pain, fair and good results. They were reassured.

The overall results were graded excellent to good in 93.4%, poor in 3.3% and fair in 3.3% (Table 6).

DISCUSSION

Ankle fractures are quite common occurrence now a-days and have gained importance because of the increase incidence of trauma and falls. This type of fracture needs good expertise and special facility to handle in time. Lack of Operation Theatre facilities at District level hospital, poverty and lack of health education in the community are different factors, which does not let the patient to be treated properly and end up with some complications.

Closed reductions have been tried in the past but it gives unacceptable results. The goal of operative treatment is to maintain normal bio-mechanics, achieve good range of motion and pain free joint. The open method washed the haemarthrosis, an anatomical reduction is achieved and early mobilization is possible. We have observed post operative infection in two patients i-e 6.6 %.Our infection rate is higher as compared to Brodie et al[7] whose infection rate was 3%. In

RADIOLOGICAL ASSESSMENT SCALE

S.NO	Measurement	Acceptable values
1	Talocrural angle (Difference from	≤5
2	Medial Closed Space	≤4
3	lateral Malleolus shortening compared with normal	≤2
4	Talar tilt	≤2

Table 5

OUTCOME

Grade	Score	No of Patients	% Age
Excellent	>85	26	86.8
Good	70-84	2	6.6
Fair	55-69	1	3.3
Poor	<55	1	3.3

Table 6

Laarhoven CSHM[8] study, which was conducted on 80 patients who were fixed with AO technique complications occurred in 16%. Superficial wound infection, delayed union and sudecks dystrophy were observed. Two patients need further operations. Our overall complication rate was 10%, which is less as compared to other studies.[9-11] In an international study[12] which was conducted on 150 patients who were followed for a long period, unsatisfactory results were achieved in 10%. Most of the patients developed degenerative arthritis. To see such late complication long term follow-up of patients is needed.

Good results depend on good anatomical reduction and restoration of the fibular length and alignment of Talus, open reduction and internal fixation should be performed to achieve these goals.[13,14]

In our study 70% of the ankle injuries were due to fall and the remaining 30%, which were associated with injuries to other part of the body was due to road traffic accidents. Delay in operation due to lack of facilities were the main reason for high rate of infection. Early reduction and internal fixation within 24 hours have less chance of infection as compared to those whose fixation was delayed.

In a local study[15] it is shown that delay in surgery for ankle fracture causes higher rate of complications specially if there are skin abrasions, bullae or fracture dislocation. We recommend early mobilization of the ankle joint after proper fixation with AO technique to achieve good functional results.

CONCLUSION

Open reduction and internal fixation of the bimalleolar fracture with AO technique gives excellent anatomical and functional results.

Bimalleolar fracture should be fixed as early possible to minimize complications.

REFERENCES

1. James DM. Current Concept Review: Fracture about the ankle. J Bone Joint Surg Am 1995;77:142-52.
2. Robert VG, James DM, Lary BB .Fracture of the ankle and distal part of the tibia. J Bone Joint Surg Am 1996; 78: 1772-82.
3. Yablon IG, Heller FG, Shouse L. The key role of lateral malleolus in displaced fractures of the ankle. J Bone Joint Surg Am.1977; 59:169-73.
4. Mateen MA, Zubair J, Afzal H. Evaluation of the results of ankle fractures. Pak J Surg 1997; 13-14:18-9.
5. Hicks JH. Mechanism of foot joints. J Anat 1953; 87:345-57.
6. Olearud C, Molander. Scoring scale for symptom evaluation after ankle fracture. Arch Ortop Trauma Surg 1984; 103:190-4.
7. Brodie AO, Denham RA. The treatment of unstable Ankle fracture. J Bone Joint Surg Br 1974; 56; 256-62.
8. Laarhoven CJHM, Meeuwis JD, Werken CVD. Postoperative treatment of Ankle fractures. J Bone Joint Surg Br 1996; 78:395-9.
9. Egol K A, Dolan R, Koval K J. Functional outcome of surgery for fractures of the ankle. J Bone Joint Surg Br 2000; 82-B:246-9.
10. Makwana NK, Bhowal B, Harpa WM, Hui AW. Conservative versus operative treatment for displaced Ankle fractures in patients over 55 years of age. J Bone Joint Surg Br 2001; 83-B: 525-9.
11. Sakari O, Simo T, Antero H. Stress fractures of the medial malleolus. J Bone Joint Surg Am 1995; 77:362-5.
12. Ponza S, Nasell H, Bergman B, Tomkvist . Functional outcome and quality of life in patients with type B Ankle fractures. a two years follow up study. J Orthop Trauma 1999; 13:363-8.
13. James D,Michelson,Andrew J,Hamel.Kinematic behaviour of the ankle following malleolar fractures.J Bone Joint Surg Am 2002;84:2029-38.
14. Michael HS, John PS.Diastasis with low distal Fibula fractures. Clin Orthop 2001; 382:197-204.
15. Saeed R, Bajwa Z, Bajwa GR. Early complications in the operative treatment of ankle fractures. Pak J Surg 1996; 12:18-9.

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