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Surgical management of Bimalleolar ankle fractures: A narrative review

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Abstract

Bimalleolar injuries are the most common significant lower extremity fractures. Open reduction of the fracture and internal fixation methods have become the good option of the treatment for bimalleolar fractures. The aim of the study is to assess the outcome following surgical management of ankle fracture. Classifications used is Danis-Weber. The outcome is assessed using the Olerud and Molander scoring system. We performed a narrative review to assess the functional outcome of surgically managed bimalleolar ankle fractures. An extensive search of articles was done electronically using databases like PUBMED, Google scholar, reference checking. We concluded that internal fixation for bimalleolar ankle fractures gives better reduction, and functional outcome showing significant improvement in the function of the ankle joint.

Keywords: Bimalleolar ankle fractures, functional outcome, Olerud and Molander scoring

Introduction

Bimalleolar ankle fractures are the most common injuries treated by orthopaedic surgeons^[1-3]. Bimalleolar ankle fracture is usually caused by twisting injury with multiple force mechanisms^[4-6]. The ligaments around the medial and lateral malleoli provides stability to the ankle joint^[7]. Identification of these injuries and their treatments involve not only bone injuries, but also identification of damage to soft tissue and ligaments around them^[8-9]. Bimalleolar fractures are intra-articular injuries^[10-12]. The main goal in the management of these fractures is to restore normal anatomy. Anatomy and contact-loading characteristic of joint are restored by the operative method. Other advantages in this methods are, we can mobilise the patient as early as possible, no need for cast application, the patient can weight bear earlier and rehabilitation will be easier^[13]. The diagnosis is made by proper history taking and examination.

Investigations

x-rays are taken in 3 different views- Anterior-posterior view, a Lateral view and a Mortise view^[14].

CT scan and MRI is also taken

The various modalities for internal fixation of bimalleolar ankle fractures are plating, Screw fixation, K-wire fixation and Tension band wiring^[15-17]. Only a few researchers performed a study in examining the outcomes and recovery of patients followed by internal fixation of fractures of the ankle. This study purpose is to evaluate the outcome of operated bimalleolar fractures using C Olerud and H Molander scoring scale^[3].

Methodology

Extensive search of articles was done electronically using databases like PUBMED, Google scholar, reference checking. Since the type of studies are different and the outcomes are measured using various different methods, a narrative review was appropriate for this study. Number of articles found were 212, in which 11 studies were selected which satisfied the inclusion criteria. The articles were from august 2000 to august 2020.

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Danis-Weber/AO Classification ^[18]

Type A: Lateral malleolar fractures below the level of the ankle joint space.

Type B: Oblique fractures of the lateral malleolus that start at level of joint space and then extend proximally.

Type C: Distal shaft of the fibula proximal to the ankle joint

Olerud-Molander Ankle Score

The scale is a functional rating scale and it consists of nine parameters, which are listed below ^[3, 19].

Such as pain, then Running, then Stiffness, then Swelling, Stair climbing, Jumping, Squatting, Supports, daily living activities

Results

Ramana *et al.* did a study on internal fixation of 48 cases bimalleolar fractures from Vijayawada. They concluded that pronation – abduction type of mechanism was common and then followed by supination & external rotation mode of injury. The most common cause was slip and fall ^[20].

Vivian *et al.* conducted a study on the functional outcome of operated cases of 45 ankle fractures from Mangalore. Olerud and Molander scoring system was used in this study. They observed fractures with internal fixation yield good outcomes. They concluded early treatment of fractures of the ankle without delay, provides better anatomical reduction and fixation in 16 cases. Better post-operative mobilization and rehabilitation helps in improving outcome in operated ankle fractures ^[21].

Alamgir *et al.* did a study on tension band wiring for displaced lateral malleoli fractures and for bimalleolar fractures, plating was done in 20 patients. They concluded displaced lateral malleolus fractures demands surgical management accompanied with tension band wiring with the use of 2 k-wires which gives a stable fixation and helps in the union of fracture ^[22].

Ayyoub A. Mohammed *et al.* performed a study to compare tension band wiring and screw fixation for medial malleoli fractures among 20 patients. The outcome was good in four fifth of patients of malleolar screw fixation and 90% of tension band wiring cases ^[23].

Dhoom Singh Jhatoh did a study to evaluate the outcomes in 27 patients who underwent internal fixation. Baird & Jackson scoring system is used. It was observed that 83.2% as Good, 8.3% as Fair and 8.3% as poor outcome ^[24].

Vijay *et al.* performed a prospective study in assessing surgical management of 36 cases of malleolar fractures from Pune. The outcome were based on Baird & Jackson scoring system and they observed excellent results in 30.6% patients, 55.6% had good results, 8.3% patients had fair results and results were poor in 5.5% ^[25].

Mohan *et al.* did a study to assess the clinical outcome of 45 cases of ankle fractures from a period of June 2015- February 2016 in Mangalore. They observed improvement in pain and also in activity levels ^[26].

Ostrum *et al.* did a study on open reduction internal fixation of bimalleolar fracture of ankle along with syndesmotom injury and stated that failure to sufficiently recognise and treat injuries to syndesmosis may outcome in continued ankle instability and poor patient outcomes ^[27].

K. Ramkumar Reddy *et al.* Did A study in which he did tension band wiring for fractures of the medial malleolus and assessed their outcome in 30 patients who are in Warangal. They concluded understanding the mechanism of fracture

preoperatively is significant for reduction and fixation procedure, in terms of better outcomes of procedures ^[28].

Dhoju D performed a study on Outcome of 32 cases of Bimalleolar Fractures in Nepal. Excellent results were found in surgically treated cases. They concluded syndesmotom screw was not a significant association in comparing outcomes ^[29].

Conclusion

As per the review of literature done, studies suggest that internal fixation for bimalleolar ankle fractures gives better reduction, and functional outcome. In our study all patients had Good functional outcome. In our study ankle joint was mobilised early to achieve good range of movements. Early weight bearing and mobilisation is achieved in all patients. Further studies can be performed with better period of follow up and better assessment using radiological methods.

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