A PROSPECTIVE STUDY OF RADIOLOGICAL, CLINICAL AND FUNCTIONAL OUTCOMES OF CALCANEAL FRACTURE FIXATION USING CONVENTIONAL CALCANEAL PLATES

Orthopaedics

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ABSTRACT

This Study Aims To Determine The Radiological, clinical And Functional Outcomes Of Calcaneal Fractures Fixed Using Conventional Calcaneal Plates. The Study Was Conducted Between May 2017 And April 2020 For A Period Of 36 Months In Sree Balaji Medical College Hospital, Chromepet. This Study Comprises 36 Patients Who Sustained Intra Articular Fractures Of Calcaneum And Underwent Plate Fixation With Or Without Bone Grafting . Patients Were Retrieved From May 2017 To April 2019 . The Minimum Follow Up Period Was 12 Months. The Patients Followup Was Done Based On Bohler's Angle (radiological Outcome) , Aofas (clinical And Functional Outcome) .the Outcomes Were Grouped Into Worse , Fair And Good Prognosis .surgical Techniques And Postoperative Complications Were Given Meticulous Importance. Of The 36 Patients, the Outcome Was Better In All Displaced Intraarticular Calcaneal Fractures Treated With Orif Plate Osteosynthesis.

KEYWORDS

INTRODUCTION:

Fractures Of The Calcaneum Occur Due To Many Reasons. Extra Articular Fractures Of Tuberosity, Sustentaculum Or Anterior Process Could Be Due To Avulsion Injuries.

Axial Loads Of The Foot May Cause Tongue Type Or Joint Depression Type Fractures While Extra Articular Fractures Have A Better Prognosis ^[1], intra Articular Fractures Involving The Subtalar Joint Or High Communion Have A Poorer Prognosis ^[2].

The Prognostic Classification Of Calcaneal Fractures Is Sanders , Which Classifies Undisplaced As Type 1 , Displaced 2- Part As Type 2, 3 Part As Type 3 And Four Part As Type 4 ^[3] (fig.1.) Sanders Type 1 Fractures Treated By Both Conservative And Surgical Management Has A Favourable Prognosis But Sander 2 ,3 And 4 Type Fractures Carry A Range From Satisfactory To Poorer Prognosis.as The Number Of Fracture Lines And Communion Increase , The Outcome Of Treatment Worsens Even After Meticulous Surgical Fixation ^[4].

Fig.1. Fracture Lines As Described By Sanders

The Reason For Failure And Complications After Surgery Include Damage To The Vascularity During The Initial Trauma Followed By Surgery And Arthritis That Develop Consecutive To The Trauma . The Multi Faceted Sub Talar Joint Is Difficult To Reconstruct Even With Experienced And Meticulous Surgical Approach ^[5].

The Open Fractures Of The Calcaneum With Soft Tissue Compromise May Be A Surgical Emergency With The Need For Amputation ^[6].

Open Reduction With Reconstruction Of The Posterior Facet Through Lateral And Extensile Lateral Approach May Be The Most Common Treatment Of Choice. this Study Is A Prospective Study To Determine The Effectiveness Of This Surgery And Its Clinical And Functional Outcome.

MATERIALS AND METHODS:

This Study Includes 36 Patients Who Sustained Bilateral Or Unilateral Calcaneal Fractures , Of Which 26 Were Men And 10 Were Women,

Belongs To Age Group Between 18 And 50 . All Sanders Type 1 Fracture Or Those Treated Conservatively Were Excluded.

Open Calcaneal Fractures Treated By Conventional Calcaneal Plating Were Also Included In The Study.

Age Distribution

AGE GROUP	NUMBER OF PATIENTS
18-25	9
26-30	7
31-35	8
36-40	7
41-45	3
46-50	2

Type Of Fracture

OPEN/CLOSED	NUMBER
OPEN	9
CLOSED	27
SANDERS TYPE 2	15
SANDERS TYPE 3	17
SANDERS TYPE 4	4

Time Of Surgery

0-7	20
8-14	12
15-21	0
21-28	1
>28	3

Surgical Technique

LATERAL APPROACH	25
EXTENSILE LATERAL APPROACH	12

With Standard Lateral And Extensile Lateral Approaches , Lateral Surface Was Visualised. A Schanz Pin Passed Through The Posterior Tuberosity And It Was Manipulated And Fixed With K Wires To The Constant Fragment. Then The Posterior Facet Was Reconstructed . Fluoroscopic Images Were Used To Confirm The Reconstruction Of Bohler's Angle. bone Grafting Was Done In The Gap To Avoid Late Collapse ^[7-10].

In Our Study Bone Grafting Was Necessary And Done In 24 Patients And Was Not Required In 12 Patients.

The Mean Duration Of Surgery Was Around 1 hour 30 Minutes. Post Operative Period Was Monitored. Followup X Ray Was Done On 2nd Post Operative Day And Follow Up Was Done Then After Every Three Months.

Aofas Score And Bohler Angle Was Noted On Every Follow Up. moreover Complications Of Surgery Such As Wound Infection , Dehiscence, Deep Infections Were Noted. X Rays Were Looked For

Subtalar Arthrosis And Malunion.

RESULTS:

The Right Calcaneum Was Fractured In 19 Patients And Left Calcaneum Was Fractured In 17 Patients. The Mode Of Injury Is 75%(27 Patients) Roadtraffic Accident And 25%(9 Patients) Fall From Height.

The Mean Aofas Score Was Noted For All 3 Sanders Types Separately And Bohler Angle Was Also Noted.

Mean Aofas Score And Bohler Angle At 12 Months After Surgery

TYPE	MEAN AOFAS SCORE	BOHLER ANGLE
SANDER TYPE 2	81.35+/- (11.2 S.D.)	35.0 +/- 3.5
SANDER TYPE 3	69.3+/- (20.8 S.D.)	20.5 +/- 4.5
SANDER TYPE 4	66.7+/- (12.6 S.D.)	10.4 +/- 5.8

Post Operative Complications

SURGICAL SITE INFECTION	3 PATIENTS
OSTEOMYELITIS	NIL
PERSISTENT DISCHARGE	NIL
SUB TALAR OSTEOARTHRITIS	2 PATIENTS
MALUNION	9 PATIENTS

DISCUSSION:

In Our Study , Calcaneum Fractures Were Common In Young Males And Were Most Commonly Due To Fall From Height.

In Our Study, Aofas Score And Bohler Angle Noted Was Satisfactory In All Three Types Of Sanders Fracture Types. Sanders Type 2 Fractures Demonstrate Improved Outcome And Type 3 And 4 Fractures Demonstrate Nearly Same Outcome.

Improved Bohler Angle Is The Key To Improved Functional Outcome In Our Study. Makki Et^[1] Al In His Review Of 47 Cases Has Demonstrated That The Reconstructed Bohler Angle With Plate Osteosynthesis Has Better Functional Outcomes.

Post Operative Complications Of Surgery Such As Ssi, Arthritis And Malunion Did Not Significantly Affect The Functional Outcome After Reconstruction.

In Conclusion , The Outcomes Of Orif With Plate Osteosynthesis Was Significantly Better In All Displaced Intra Articular Calcaneal Fractures.

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