A Study Of Functional Outcome Of Hybrid External Fixator In Fractures Distal End Of Tibia

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Abstract:

Introduction: Managing Distal Tibia Fractures Remains A Challenge Since Centuries. Treating These Fractures Pose A Therapeutic Dilemma Whether To Give Priority For Anatomic Reduction And Articular Congruity Or For Soft Tissue Management.

Materials And Methods: A Prospective Study Was Conducted In Vinayaka Missions Kirupanandavariyar Medical College And Hospital, Salem For A Period Of 2 Years. This Study Included A Series Of Totally 30 Patients With Fracture Distal End Of Tibia. All Patients With Fracture Distal End Of Tibia With Age>18 Years, All Closed And Open Fractures Were Included In The Study. Average Age Of Patients Was 40 Years.

Results: Results Were Analysed Using Ovadia &Beals Scoring System, There Were 33.3% Excellent.43.3% Good,16.7% Fair And 6.7% Poor Outcome.

Conclusion: Hybrid Fixator Is An Effective Method In Treating Compound Fractures Of Distal Tibia. This Modality Gives Good Access To Soft Tissue And Wound Care. The Use Of Hybrid Fixator As Definitive Procedure In Managing Distal Tibia Fractures Produces Satisfactory Functional Outcome With Minimal Complications.

Keywords: Hybrid Fixator, Distal Tibia, Pilon Fracture, Compound Fracture.

Introduction:

Distal Tibial Fractures Are Usually Due To High Velocity Trauma, Commonly Associated With Severe Soft Tissue Compromise. Managing These Fractures Pose A Therapeutic Dilemma Whether To Give Priority For Anatomic Reduction And Articular Congruity Or For Soft Tissue Management. Poor Soft Tissue Envelope, Watershed Zone Of The Distal Third Tibia And Accompanying Soft Tissue Compromise Have Challenged Orthopaedic Surgeons With Problems Of Delayed Union, Malunion, Non-Union And Complicated Wound Care. Restoration Of Alignment, Anatomical Reduction Of The Articular Surface And Early Ankle Mobilization Has Been Shown To Be Effective In The Management Of Most Tibial Fractures. The Various Modalities Of Treatment In Managing Distal Tibia Fractures Includes Initial Joint Spanning External Fixator Followed By Plate Osteosynthesis, Open Reduction And Internal

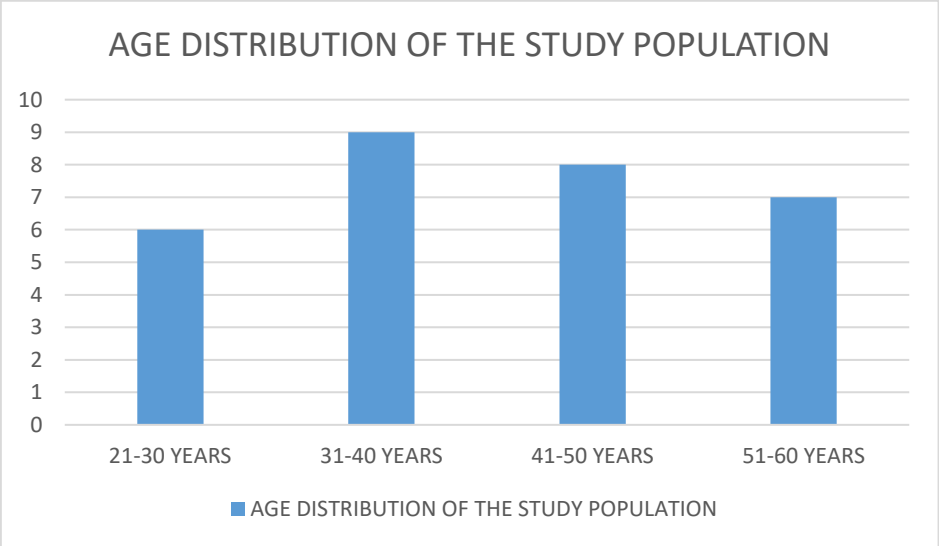
Fixation, Hybrid External Fixator And Ilizarov Fixator Application. Whichever The Method Of Stabilization Is Chosen, The Construct Should Be Sufficiently Stable To Maintain The Reduction And Aids In Early Mobilisation. The Infection And Soft Tissue Compromise Should Be Decreased By Careful Wound Management And Not Operating Through Compromised Soft Tissue.

Aim And Objectives: To Analyse The Functional Outcome Of Hybrid External Fixator In The Surgical Management Of Distal Tibial Fractures As A Definitive Management.

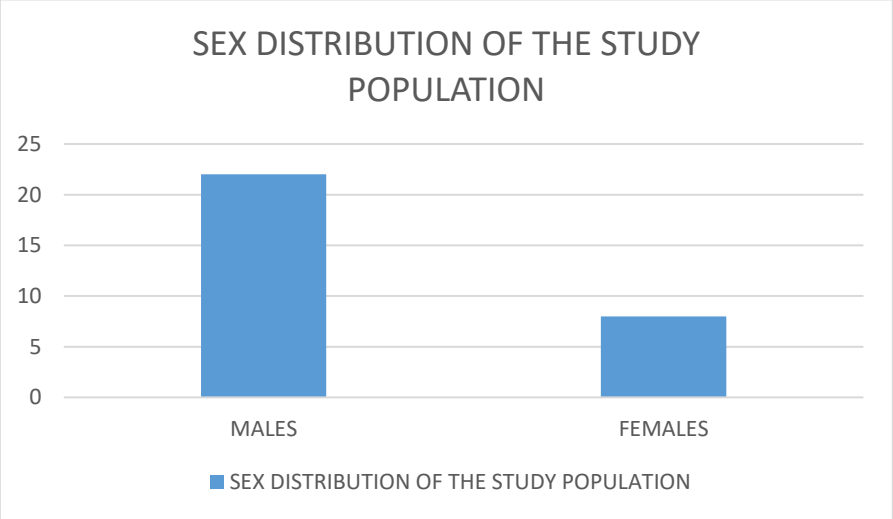
Materials And Methods: A Prospective Study Was Conducted In Vinayaka Missions Kirupanandavariyar Medical College And Hospital, Salem For A Period Of 2 Years. This Study Included A Series Of Totally 30 Patients With Fracture Distal End Of Tibia. All Patients With Fracture Distal End Of Tibia With Age>18 Years, All Closed And Open Fractures Were Included In The Study. Younger Patients Of Age <18 Years, Patients Not Willing For External Fixator Application Were Excluded From The Study.

Results:

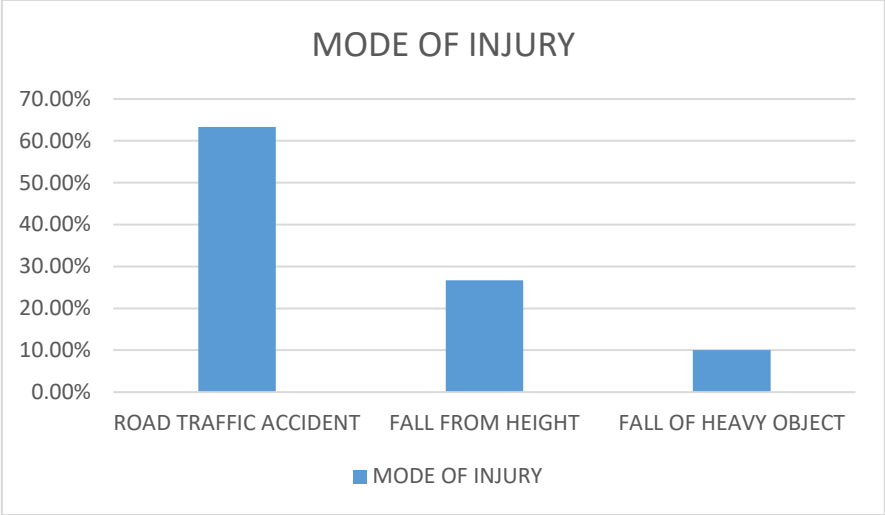
Graph 1: Age Distribution Of The Study Population



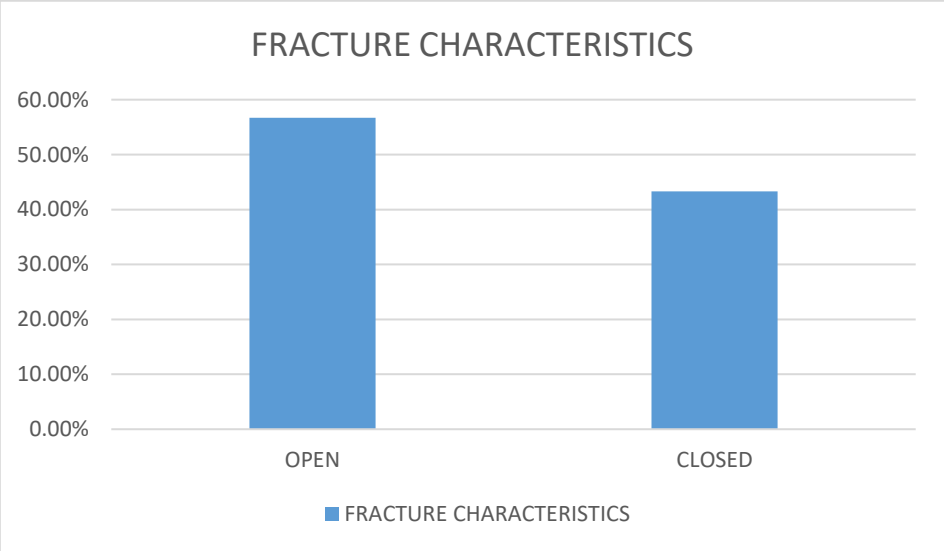
Graph 2: Sex Distribution Of The Study Population



Graph 3: Mode Of Injury



Graph 4: Fracture Characteristics



Graph 5: Gustilo And Anderson Classification Of Fractures

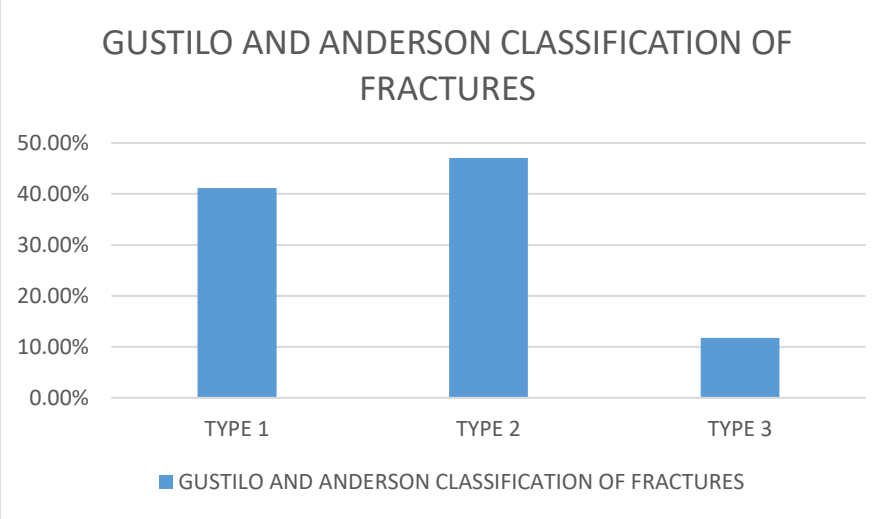


Table 1: Ovadia And Beads Objective Scoring

Parameter	Excellent	Good	Fair	Poor
Rom	>75	50-75	25-50	<25
T-T Alignment	In Axis	In Axis	<5º	>5º
Tibial Shortening	Absent	Absent	<1cm	>1cm
Chronic Edema	Absent	Slight	Moderate	Severe
Pronation,Supination	Normal	Normal	Slightly Reduced	Very Much Reduced
Fixed Deformities	Absent	Absent	Absent	Present

Table 2: Ovadia And Beads Subjective Scoring

Parameter	Excellent	Good	Fair	Poor
Pain	Absent	Slight	Moderate	Severe
Return To Work	Same Job	Same Job	Different Job	Impossible
Recreational Activity	Unchanged	Slight Changed	Gently Changed	Impossible
Limittaions To Walking	Absent	Absent	Present	Present
Analgesics	Not Necessary	Not Necessary	Necessary	Opiates
Limping	Absent	Absent	Occasional	Present

Table 3: Ovadia And Beads Objective Scoring

Results	Patient	Percentage
Excellent	9	30%
Good	13	43.3%
Fair	6	20%
Poor	2	6.7%

Table 4: Ovadia And Beads Subjective Scoring

Results	Patient	Percentage
Excellent	10	33.3%
Good	13	43.3%
Fair	5	16.7%
Poor	2	6.7%

Table 5: Complications Following Management With Hybrid External Fixator

Complication	Patient	Percentage
Pin Tract Infection	16	53.3%
Joint Stiffness	6	13.3%
Mal Union	1	3.3%
Delayed Union	4	20%
Non-Union	2	6.7%
Tendon Impalement	1`	3.3%

Table 6: Association Between Subjective And Objective Ovadia And Beals Scoring

Category	Ovadia And Beals Scoring				K-Value	Significance
	Excellent	Good	Fair	Poor	0.703	0.000
Excellent	8	2	0	0		
Good	1	10	0	0		
Fair	0	1	4	0		
Poor	0	0	0	2		

Discussion:

Distal Tibia Fractures Are One Of The Most Difficult Fractures To Treat. The Soft Tissue Status, The Degree Of Comminution And Articular Damage Sustained Determines The Final Results. The Aim Of The Surgery Is To Obtain Anatomic Reduction Of The Articular Surface And Providing Stability. This Should Be Accomplished Using Procedures That Decrease Osseous And Soft Tissue Devascularisation. Hybrid External Fixator Is One Such Modality. The Present Study Was Undertaken To Determine The Efficacy Of The Hybrid External Fixator In Treatment Of Fractures Of The Distal Tibia. We Evaluated Our Results And Various Factors Are Discussed. Our Study Revealed The Average Age Of Patients With Such Injuries To Be 40 Years Which Is Comparable To Other Studies. In Our Study, The Male Preponderance Was High 73.3% Compared To The Study By Barberi Et Al (5), Which Was 59% And They Showed Good Results As Tensioned Wires Can Provide Stable Fixation Even In Osteoporotic Bones. Gaudinez Et Al (6) Observed 93% High Energy Fractures In His Study. Ovadia And Beals Could Attribute Only 46% Of Such Injuries To Be Of High Energy, However Our Present Study Correlates With The Study Conducted By Agarwal Et Al (7) Who Had 87% Patients With High Energy Injuries. In Our Study Road Traffic Accident (63.3%) Was The Predominant Mode Of Violence. Our Study Had 56.7% Open Injuries. This Is Comparable To Studies Conducted By Guadinez Et Al (6). Ovadia And Beals Reported 20% Open Injuries, Barbieri Et Al (5) Had 30% Of Open Injuries In Their Series. Clinical Outcome Of Patients With Open Fractures Were Fair To Good Mainly Because Of Persistent Mild Swelling Around The Ankle And Delayed Union Time. We Had 26.7% Patients With Extra Articular Fractures (Type 1) And 43.3% Of Patients With Type 2 Fractures Who Showed Good To Excellent Results, While Patients With Type 3 (30%) Fractures Showed Fair To Good Results Mainly Due To Ankle Stiffness, Low Grade Pain While Walking On Uneven Surfaces And Presence Of Chronic Oedema. All Patients Had Fracture Of Fibula, Fibular Length Restoration Was Done In Closed Fractures Where The Fracture Level Is At Or Below The Level Of Syndesmosis As Suggested By Several Studies. In Open Fractures Where The Fibular Fixation Was Not Possible Due To Wound Condition The Final Results Showed Malunion And Change In The Tibiotalar Axis.

Zeman Et Al In A Study Of Using Hybrid External Fixators For Periarticular Fractures Of The Tibia Obtained 5 Excellent (26%),6 Very Good (32%),5 Satisfactory (26%) And 3 Poor Results (16%).Aggarwal Et Al (7) In Their Study Of Hybrid External Fixation Of High Energy Peri Articular Fractures Of The Tibia Had Results That Were Good To Excellent In 30(86%), Fair In 2(6%) And Poor In 3(8%).In The Present Study We Had 30 Distal Metaphyseal Fractures Managed By Hybrid External Fixator. All The Fractures Except Two United. There Were 23 Good To Excellent Results And 5 Fair Results And 2 Poor Results In Our Study. There Were 16 Cases Of Pin Tract Infection (53.3%),6 Cases Of Ankle Stiffness (13.3%0,1(3.3%) Malunion And 2(6.7%) Case Of Non-Union. Hybrid Fixator Can Maintain Length And Alignment While Spanning The Comminuted Region, It Allows Access To Any Open Wound Or Compromised Soft Tissue. The Use Of Olive Wires From Opposite Directions Helps In Achieving Interfragmentary Compression And Articular Congruity But Difficulty In Radiographic Visualization Of The Articular Surface With The Fixator In Placeman Inability To Dynamize The Construct Is Present. Hybrid Fixators, Unlike Well –Constructed Multi – Ring Fixators, Do Not Provide Enough Stability For Early Weight Bearing. The Present Case Series Though Small In Number Sows That Hybrid External Fixator Is An Effective Treatment Method For Distal Tibial Fractures Especially Open Fractures In Terms Of Union Time And Complications Rate Which Is Comparable To The Other Studies.

Conclusion:

Hybrid Fixation For Distal Tibia Fracture Provide Fracture Fixation Without Further Damaging Soft Tissues. Hybrid Fixator Is An Effective Method For Treating Compound Fractures Of Distal Tibia. It Provides Good Access To Soft Tissue And Wound Care. Simultaneous Fibular Fixation Prevents Malunion. Hybrid External Fixation Is A Viable Option In The Management Of Distal Tibial Fractures Especially Fractures With Soft Tissue Compromise And Compound Fractures.

Conflict Of Interest: Nil

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