Evaluating Functional And Clinical Outcomes Of Tibiotalocalcaneal Fusion With Retrograde Intramedullary Nailing

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Abstract:

Introduction:

Tibiotalocalcaneal (Ttc) Fusion Is A Widely Performed Surgical Procedure To Address Severe Ankle Pathological Conditions, Including End-Stage Arthritis, Deformities, Avascular Necrosis, And Post-Traumatic Instability (1). This Study Is To Assess The Effectiveness Of Ttc Fusion Using Retrograde Intramedullary Nailing By Analysing Key Parameters Such As Pain Relief, Mobility Restoration, Radiographic Fusion, And Overall Patient Satisfaction. By Doing So, It Seeks To Contribute Valuable Insights For Optimizing Surgical Practices And Improving Patient Care.

Aim And Objectives:

To Evaluate The Functional And Clinical Outcomes Of Tibiotalocalcaneal Fusion (Ttc) Using Retrograde Intramedullary Nailing (Imn) In Patients With Complex Ankle And Hind Foot Deformities Or Conditions Requiring Stabilization.

Materials And Methods:

A Retrospective Study Was Done On 30 Patients Who Attended Vmmc And Hospital For A Period Of 18 Months. Patients Of Age 18-75 Years With Ankle/Hind Foot Pathologies, Unreduced Dislocation, Neuropathic Joint, Arthritis, Avn, Rheumatoid Arthritis And Those Who Had Poor Response To Conservative Management And Other Surgical Intervention Were Included In The Study.

Results: The Time Taken For Fusion Was6 Months Or Less In 11 Patients,>6 Months' In 18 Patients And Non-Union Was Seen In 1 Patient. Aofas Score Was Good In 5 Patients Pre Op And Post Operatively Aofas Score Was Good In 11 Patients, Pre-Op Aofas Score Was Fair In 8 Patients, Post-Op Aofas Score Was Fair In 19 Patients And Aofas Score Was Poor In 10 Patients Pre-Operatively And None Had Poor Aofas Score Post-Op. P-Value For Comparison Of Aofas Score Was 0.004(<0.05), Statistically Significant.

Conclusion: The Procedure With A Retrograde Hind Foot Intramedullary Nail Is Considered Both Safe And Effective, Demonstrating Positive Clinical Outcomes And Reasonable Rates Of Complications In Patients.

Keywords: Tibiotalocalcaneal (Ttc) Fusion, Intramedullary Nailing (Imn), Ankle/Hind Foot Pathologies,

Introduction:

Tibiotalocalcaneal (Ttc) Fusion Is A Widely Performed Surgical Procedure To Address Severe Ankle Pathological Conditions, Including End-Stage Arthritis, Deformities, Avascular Necrosis, And Post-Traumatic Instability (1). These Debilitating Conditions Often Result In Chronic Pain, Functional Limitations, And A Reduced Quality Of Life, Making Surgical Intervention A Critical Option For Affected Patients (2). Retrograde Intramedullary Nailing Has Emerged As A Reliable Technique For Ttc Fusion, Offering Advantages Such As Enhanced Biomechanical Stability, Minimal Disruption Of Surrounding Tissues, And Improved Load-Sharing Capabilities (3). This Method Is Particularly Beneficial For Patients With Compromised Bone Quality Or Complex Deformities. Despite Its Growing Adoption, There Is A Need For Comprehensive Evaluation Of Its Clinical And Functional Outcomes To Better Understand Its Efficacy And Potential Complications (5). This Study Is To Assess The Effectiveness Of Ttc Fusion Using Retrograde Intramedullary Nailing By Analysing Key Parameters Such As Pain Relief, Mobility Restoration, Radiographic Fusion, And Overall Patient Satisfaction (6). By Doing So, It Seeks To Contribute Valuable Insights For Optimizing Surgical Practices And Improving Patient Care (7).

Aim And Objectives:

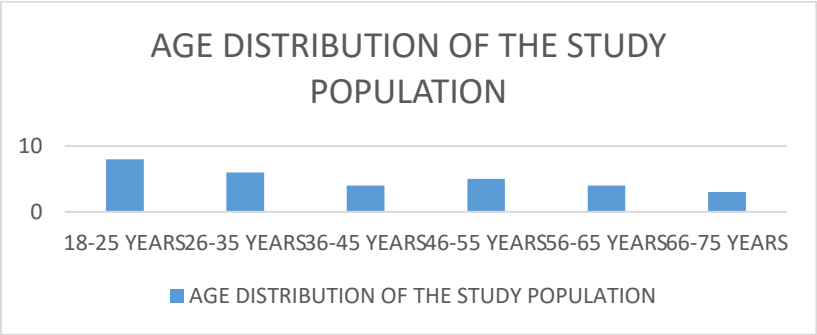
To Evaluate The Functional And Clinical Outcomes Of Tibiotalocalcaneal Fusion (Ttc) Using Retrograde Intramedullary Nailing (Imn) In Patients With Complex Ankle And Hind Foot Deformities Or Conditions Requiring Stabilization. This Evaluation Will Focus On Pain Relief, Functional Improvement, Fusion Rates, And The Occurrence Of Any Complications Associated With The Procedure.

Materials And Methods:

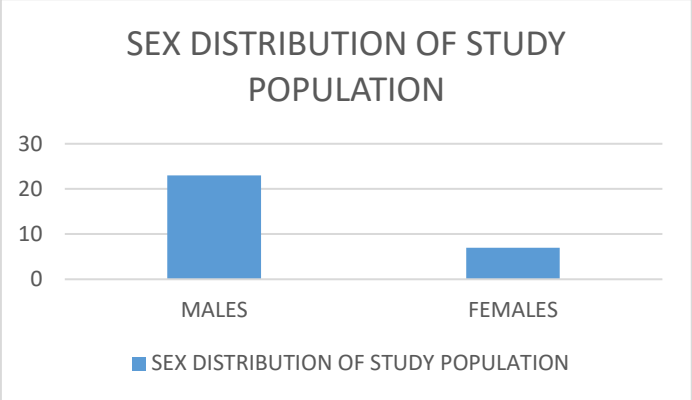
A Retrospective Study Was Done On 30 Patients Who Attended Vmmc And Hospital For A Period Of 18 Months. Patients Of Age 18-75 Years With Ankle/Hind Foot Pathologies, Unreduced Dislocation, Neuropathic Joint, Arthritis, Avn, Rheumatoid Arthritis And Those Who Had Poor Response To Conservative Management And Other Surgical Intervention Were Included In The Study. Patients Of Age < 18 Years, Those With Active Infections, Severe Co-Morbidities, Bone Pathology Like Severe Osteoporosis Or Poor Bone Quality, Tumour Or Significant Bone Pathology That Affects Tibia, Talus Or Calcaneus, Smokers, Pregnant Women Those With Previous Failed Ttc Fusion Were Excluded From The Study.

Results:

Graph 1: Age Distribution Of The Study Population:



Graph 2: Sex Distribution Of The Study Population



Graph 3: Post Operative Complications

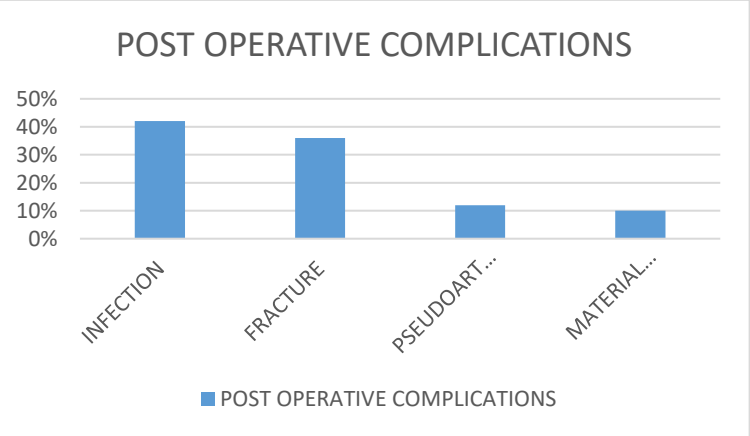


Table 1: Complications

Complication	Number Of Patients
Mal Union	3
Non Union	1
Skin Problems	2
Plantar Pain	4
Infection	3

Table 2: Time For Fusion

Duration	Number Of Patients
6 Months Or Less	11
>6 Months	18
Non-Union	1

Table 3: Comparison Of Aofas Score Of Patients Pre-Op And Post-Op

Aofas Score	Pre Op	Post Op	P-Value
Good(>75)	5	11	0.04
Fair(50-75)	8	9	
Poor(<50)	10	0	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Discussion:

In Our Study 8 Patients Were In Between 18-25 Years,6 Were In Between 26-35 Years,4 Were Of 36-45 Years,5 Were In Between 46-55 Years,4 Were In Between 56-65 Years And 3 Patients Were Of 66-75 Years. Out Of 30 Patients ,23 Were Males And 7 Were Females. In Our Study The Post-Operative Complications Were As Follows: Infection (42%), Fracture (36%), Pseudo Arthrosis (12%), Material Fracture (10%).Mal Union Was Observed In 3 Patients,1 Patient Had Non-Union,2 Patients Had Skin Problems,4 Patients Had Plantar Pain And 3 Patients Had Infection. The Time Taken For Fusion Was6 Months Or Less In 11 Patients,>6 Months' In 18 Patients And Non-Union Was Seen In 1 Patient. Aofas Score Was Good In 5 Patients Pre Op And Post Operatively Aofas Score Was Good In 11 Patients, Pre-Op Aofas Score Was Fair In 8 Patients, Post-Op Aofas Score Was Fair In 19 Patients And Aofas Score Was Poor In 10 Patients Pre-Operatively And None Had Poor Aofas Score Post-Op. P-Value For Comparison Of Aofas Score Was 0.004(<0.05), Statistically Significant. Retrograde Intramedullary Ankle Nail Fixation Has Become Increasingly Popular Due To Its Significant Mechanical Advantages. This Method Provides Stable Fixation, Which Generally Eliminates The Need For Additional External Immobilization Devices Like Casts Or Braces. In Nondiabetic Patients Treated Without Adjunctive Immobilization, Bone Union Rates Range From 88% To 100%. (2). The Literature Contains Only A Limited Number Of Studies That Have Conducted Clinical Evaluations Using An Appropriate Scoring System (3–5). In A Recent Review, Frances Chi Et Al. Highlighted That, Up Until 2016, No Research Had Utilized The Aofas Score For Clinical Assessment In The Context Of Tibiocalcaneal Arthrodesis With An Intramedullary Nail (3). Chrmain Et Al. Reported A Significant Increase Of 46.22 Points In The Aofas Score (From 25.3 To 71.5) Among 18 Patients Who Underwent Hind Foot Arthrodesis With Retrograde Compression Intramedullary Nail Fixation For Charcot Neuroarthropathy (4). Oesman Et Al. Shared Findings From A Two-Patient Case Series On Calcaneotalotibial Arthrodesis Using Retrograde Intramedullary Nail Fixation For Charcot Neuroarthropathy, Noting A 25-Point Improvement In The Aofas Score (From 58 To 83); However, Accurate Data Recording Was Achieved For Only One Patient (13). While Our Study Also Reported Improvements In The Aofas Score Consistent With Existing Literature, The Enhancement Observed In Our Cohort Appears To Be Less Pronounced Than That Reported By Chrmain Et Al., Likely Due To Our Patients Starting With A Higher Mean Aofas Score (40 Compared To 25) (5). Tibiocalcaneal Arthrodesis Is Indicated Only In Select Cases Of Severe Ankle And Hind Foot Dysfunction In Patients Who Lack A History Of Local Deep Infections, Making It Challenging To Find Studies That Include Large Populations Of Diabetic Patients. A Recent Study Sought To Evaluate The Effectiveness Of Retrograde Intramedullary Nail Fixation For Severe Ankle And Hind Foot Pathologies In Individuals With Diabetic Neuropathy, Comparing The Outcomes To Those Of A Non-Diabetic Group. Although 59% Of Patients With Diabetes Experienced Postoperative Complications Compared To 44% Of Those Without Diabetes, The Difference Was Not Statistically Significant Due To The Small Number Of Participants (6). According To Existing Literature, Infection Rates Are Reflective

Of The Incidence Of Infections During The Postoperative Period, Primarily Due To The Short Follow-Up Durations Of 5, 7, Or 10 Months. In Our Study, We Recorded Two Cases Of Deep Infections After A Follow-Up Of 23 Months. Although The Small Number Of Cases Results In Limited Statistical Significance, There Appears To Be A Trend Indicating Mid- To Long-Term Infections. This Trend Could Be Linked To The Known Susceptibility Of Diabetic Patients To Infections, Along With The Substantial Design Of The Internal Fixation Device.

Conclusion:

The Procedure With A Retrograde Hind Foot Intramedullary Nail Is Considered Both Safe And Effective, Demonstrating Positive Clinical Outcomes And Reasonable Rates Of Complications In Patients. A Significant Number Of Patients Attain Independent Mobility And Report Improvements In Their Quality Of Life, Which Often Eliminates The Need For Below-Knee Amputation. Continuous Oversight By A Multi-Disciplinary Team Is Vital For Managing These Complex Cases And Minimizing Complications.

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