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"SURGICAL MANAGEMENT OF DISTAL TIBIA AND FIBULA NON-UNION WITH BONE GRAFTING USING POSTEROLATERAL APPROACH"

Orthopaedics

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ABSTRACT

Surgical Management of Distal Tibia and Fibula Non-Union with bone grafting Using Posterolateral Approach : This case series explores the efficacy of the posterolateral approach in managing non-union of tibia and fibula fractures1. Non-union presents challenging clinical scenarios requiring surgical intervention for successful healing. The study reports outcomes from ten patients treated with this approach, focusing on its capacity to promote union and restore function. The posterolateral approach is noted for its recognized effectiveness in clinical practice. Results indicate favorable outcomes in terms of both healing and functional recovery. By analyzing these cases, the study provides valuable insights into managing tibia and fibula non-union, highlighting the importance of surgical technique in achieving successful outcomes. This research underscores the significance of the posterolateral approach as a viable option in addressing challenging cases of tibia and fibula non-union, offering clinicians a promising strategy to consider in treatment protocols.

KEYWORDS

INTRODUCTION

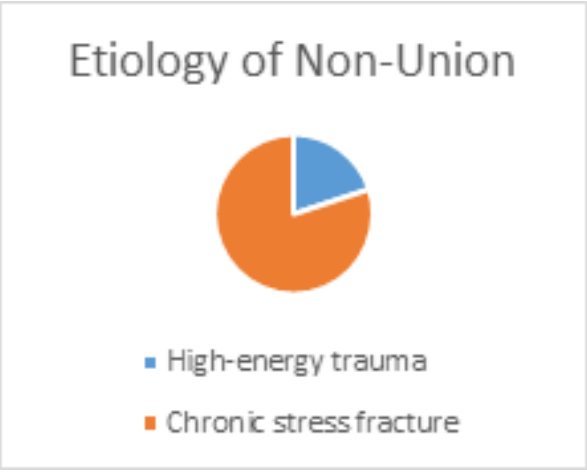
Non-union of tibia and fibula fractures occurs when the bones fail to heal properly following an injury, leading to persistent pain, instability, and impaired mobility. This complication necessitates intervention beyond conservative management, typically involving surgical techniques to stimulate bone healing and restore structural integrity[2].

The posterolateral approach is a well-established method for addressing tibia and fibula non-unions. This technique provides excellent access to the fracture site, facilitating thorough debridement of non-viable tissue, and allows for precise alignment and stabilization of the bones. By combining rigid internal fixation with autologous bone grafting, the posterolateral approach promotes biological healing and structural support, crucial for achieving successful union[3]. Ten patients, ranging in age from 25 to 60 years, with non-union of tibia and fibula fractures were included in this case series.

Study Design

This study is a retrospective case series involving ten patients who underwent surgical treatment for tibia and fibula non-union using the posterolateral approach.

Patients were selected based on specific inclusion criteria, including age range (25 to 60 years) and non-union attributed to high-energy trauma or chronic stress fractures[4].



Graph 1 : Etiology of non union

Inclusion Criteria

Patients included in the study had persistent non-union of tibia and fibula fractures despite initial treatment efforts. They were deemed suitable for surgical intervention based on clinical and radiographic assessments indicating non-union[5].

Exclusion Criteria

Patients with active infections, severe comorbidities affecting bone healing, or those unable to tolerate surgical intervention[6].

Surgical Technique

All patients underwent surgical treatment using the posterolateral approach under general anesthesia. The procedure involved

Exposure and Debridement: A longitudinal incision was made along the posterolateral aspect of the tibia and fibula, providing direct access to the fracture site. Extensive debridement was performed to remove fibrous tissue, sclerotic bone, and any foreign bodies[7].

Reduction and Fixation: The fracture ends were carefully aligned using intraoperative fluoroscopy or imaging guidance. Rigid fixation was achieved with a combination of locking plates, screws, and/or intramedullary nails, depending on the location and pattern of the non-union[8].

Bone Grafting: Autologous bone graft harvested from the iliac crest or proximal tibia was packed at the fracture site to enhance biological healing and stimulate osteogenesis[9].

Fig 1 : Preoperative x ray, Intraoperative fixation, Post operative x ray

Postoperative Care

Immediate Postoperative Period Patients were monitored closely for wound healing, pain management, and signs of infection. Early mobilization with partial weight-bearing as tolerated was initiated to prevent stiffness and promote circulation[10].Regular follow-up assessments were scheduled at 2 weeks, 6 weeks, 3 months, 6 months, and 1 year postoperatively. Radiographic imaging was performed to assess union progression and hardware integrity[11]. Clinical Outcomes Of the ten patients included in the study, nine achieved successful union within an average of 4 to 6 months postoperatively. One patient required revision surgery due to hardware failure but subsequently achieved union after the second procedure. All patients reported significant improvement in pain, functional capacity, and quality of life

at the final follow-up.

Outcome Measures

Clinical outcomes were assessed at multiple follow-up intervals (2 weeks, 6 weeks, 3 months, 6 months, and 1 year postoperatively) using standardized measures of pain relief, functional capacity, and quality of life. Radiographic imaging was employed to evaluate union progression and assess the integrity of fixation hardware[12].

Table 1 : Clinical outcome measured at 6 and 12 months

Time Point (months)	Pain Score (0-10)	Functional Capacity (VAS)	Quality of Life Improvement (%)
Preoperative	8	3	-
6	2	8	60
12	1	9	80

Data Analysis

Descriptive statistics were used to summarize patient demographics ,surgical outcomes, and complications. The primary outcome measure was successful union, defined as radiographic evidence of bridging callus and clinical resolution of symptoms indicative of fracture healing[1]

Table 2 : Summary of patient demographics , etiology , management and comorbidity

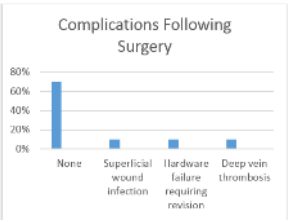
Patient	Age (years)	Sex	Etiology of Non-Union	Previous Treatment	Comorbidities
1	35	M	High-energy trauma	ORIF, bone graft	None
2	42	F	Chronic stress fracture	Casting, PT	Hypertension
3	50	M	High-energy trauma	IM nail, bone graft	Diabetes
4	28	F	High-energy trauma	External fixation	None
5	37	M	High-energy trauma	ORIF	Smoking
6	45	M	High-energy trauma	IM nail, bone graft	None
7	55	F	Chronic stress fracture	Casting, PT	Osteoporosis
8	30	M	High-energy trauma	ORIF, bone graft	None
9	48	F	High-energy trauma	IM nail, bone graft	None
10	25	M	Chronic stress fracture	Casting, PT	None

Table 3 : Summary of hardware fixation, bone graft site , union time and complication

Patient	Fixation Hardware	Bone Graft Source	Union Time (months)	Complications
1	Locking plate, screws	Iliac crest	5	None
2	Intramedullary nail, screws	Proximal tibia	4	Superficial wound infection
3	Locking plate, screws	Iliac crest	6	None
4	Locking plate, screws	Iliac crest	5	Hardware failure requiring revision
5	Intramedullary nail, screws	Proximal tibia	4	None
6	Locking plate, screws	Iliac crest	4	None
7	Intramedullary nail, screws	Proximal tibia	5	Deep vein thrombosis requiring anticoagulation
8	Locking plate, screws	Iliac crest	6	None
9	Intramedullary nail, screws	Proximal tibia	4	None
10	Locking plate, screws	Iliac crest	5	None

Ethical consideration

This study was conducted in accordance with ethical principles outlined in the Declaration of Helsinki. Informed consent was obtained from all patients prior to surgery, and patient confidentiality was strictly maintained throughout data collection and analysis.



Graph 2 : Union time in months
Graph 3 : Complications following surgery

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