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ANALYSIS OF THE OUTCOMES OF SURGICAL TREATMENT OF INTRA-ARTICULAR CALCANEAL FRACTURES

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Abstract: This article examines the outcomes of surgical treatment of intra-articular calcaneal fractures. These injuries may involve damage to the subtalar joint, displacement of fracture fragments, and disruption of the normal anatomical structure of the calcaneus. The article focuses on modern diagnostic methods, principles of surgical treatment, plate-and-screw osteosynthesis, restoration of anatomical reduction, and maintenance of fixation stability. Assessment of treatment outcomes includes radiological, clinical, and functional parameters, as well as postoperative complications and rehabilitation. Comprehensive evaluation of surgical treatment outcomes provides an opportunity to optimize treatment strategies aimed at improving functional recovery and long-term outcomes in patients with intra-articular calcaneal fractures.

Keywords: Calcaneus, intra-articular fracture, surgical treatment, osteosynthesis, plate and screws, subtalar joint, anatomical reduction, computed tomography, functional outcomes, rehabilitation

Introduction

Intra-articular calcaneal fractures are complex injuries that involve the subtalar joint and may impair foot function and mobility. These fractures are commonly caused by high-energy trauma and may result in displacement of bone fragments, loss of calcaneal height, and disruption of the articular surface. Computed tomography is important for assessing fracture morphology and planning treatment. Surgical management aims to restore the anatomy of the calcaneus, achieve stable fixation, and preserve subtalar joint function. Analysis of surgical outcomes includes radiological reduction, fracture healing, postoperative complications, pain, mobility, and functional recovery. Therefore, evaluation of surgical treatment results is important for improving the management of patients with intra-articular calcaneal fractures.

Relevance

Intra-articular calcaneal fractures are severe injuries that can impair the anatomical structure and functional capacity of the foot. Damage to the subtalar joint, displacement of fracture fragments, and changes in calcaneal height and width may lead to persistent pain, limited joint mobility, gait disturbance, and post-traumatic degenerative changes. The complexity of these fractures makes the choice of an appropriate surgical treatment particularly important.

Main part

Intra-articular calcaneal fractures are complex injuries involving the subtalar articular surface. These fractures are commonly associated with high-energy trauma, including falls from height and road traffic accidents. Clinical manifestations usually include severe heel pain, swelling, tenderness, and inability to bear weight. Soft-tissue swelling and fracture blisters may also occur. Radiological examination is essential for determining the type and severity of the fracture. Conventional radiography allows assessment of calcaneal height, width, alignment, and Böhler's angle. Computed tomography provides more detailed information about fracture lines, displacement, comminution, and involvement of the posterior facet. The Sanders classification is commonly used to describe intra-articular fracture patterns. Assessment of the subtalar and calcaneocuboid joints is important during diagnostic evaluation. The condition of the surrounding soft tissues should also be considered before surgical treatment. Accurate determination of fracture morphology provides a basis for selecting the appropriate treatment method. Detailed clinical and radiological assessment is therefore an important component of managing patients with intra-articular calcaneal fractures.

Surgical treatment of displaced intra-articular calcaneal fractures is directed toward restoration of the anatomical structure of the calcaneus. The main objectives include reduction of the posterior articular facet, restoration of calcaneal height and width, and stable fixation of the fracture fragments. Plate-and-screw osteosynthesis is used in selected patients with displaced intra-articular fractures. The fixation method is selected according to the fracture pattern, degree of comminution, bone quality, and condition of the soft tissues. Preoperative computed tomography is useful for planning the surgical approach and determining the position of the major fracture fragments. During surgery, anatomical reduction of the subtalar joint surface is performed when possible. Plates provide structural support, while screws provide fixation of individual fragments. Intraoperative fluoroscopy may be used to control fracture reduction and implant position. The surgical approach may include an extensile lateral or sinus tarsi approach depending on the fracture characteristics. Proper implant positioning is necessary to avoid intra-articular screw penetration. Stable fixation provides conditions for fracture healing and subsequent rehabilitation.

Evaluation of surgical treatment outcomes in patients with intra-articular calcaneal fractures includes radiological, clinical, and functional assessment. Radiological follow-up is used to evaluate fracture union, maintenance of anatomical reduction, calcaneal height and width, and implant position. Clinical assessment includes postoperative pain, swelling, range of motion, and ability to bear weight. Functional recovery can be assessed by evaluating walking ability, daily activities, and return to previous levels of physical activity. The American Orthopaedic Foot and Ankle Society score and other validated functional scales may be used for objective assessment. Postoperative complications include wound-healing problems, infection, nerve irritation, implant-related complications, loss of reduction, and subtalar stiffness. Long-term follow-up is important for detecting post-traumatic subtalar arthritis and persistent functional limitations. The quality of anatomical reduction and stability of fixation are important parameters in postoperative evaluation. Rehabilitation includes gradual restoration of joint mobility, muscle strength, balance, and weight-bearing. Radiological and clinical examinations should be performed at appropriate follow-up intervals. Comprehensive assessment of these parameters allows the results of surgical treatment to be evaluated systematically.

Conclusion

Surgical treatment of intra-articular calcaneal fractures is aimed at restoring the anatomical structure of the calcaneus, achieving stable fixation, and preserving subtalar joint function. Accurate preoperative radiological assessment and appropriate selection of the surgical technique are important components of treatment. Plate-and-screw osteosynthesis provides stable fixation of displaced fracture fragments and allows restoration of calcaneal anatomy in appropriately selected patients. Assessment of radiological, clinical, and functional outcomes, together with postoperative rehabilitation and monitoring of complications, is essential for determining the effectiveness of surgical treatment. A

comprehensive approach to surgical management may contribute to improved functional recovery and better long-term outcomes in patients with intra-articular calcaneal fractures.

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