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Original Article

Tibiotalocalcaneal arthrodesis with retrograde intramedullary nailing: 29 patients' clinical and functional evaluation☆,☆☆

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ABSTRACT

Objective: To evaluate clinically and functionally the pos-operative results of patients submitted to tibiotalocalcaneal arthrodesis for the treatment of traumatic arthropathy and neuropathy.

Methods: Retrospective study of 29 patients undergoing ankle arthrodesis with intramedullary retrograde nail. All patients were evaluated for fusion time, AOFAS and VAS scores, satisfaction, and complications of surgery. The mean follow-up was 36 months (range 6–60 months).

Results: The union rate was 82%, and the consolidation occurred on average at 16 weeks (10–24 weeks). The pos-operative AOFAS score improved in 65.5% (average of 57.7 on neurological cases and 75.7 on cases pos-traumatic) and VAS score improved 94.1% (average of 2.3 on neurological cases and 4,2 on post-traumatic cases), and 86% of patients were satisfied with the procedure performed. Complications occurred in 11 patients (38%), including pseudoarthrosis (17.24%), infection (17.24%), material failure (13.8%) and fracture (13.8%).

Conclusion: Tibiotalocalcaneal arthrodesis with retrograde intramedullary nail proved to be a good option for saving the ankle joint, with improvement of clinical and functional scores (AOFAS = 65.5% and VAS = 94.1%).

Artrodese tibiotalocalcaneana com haste intramedular retrógrada: avaliação clínica e funcional de 29 pacientes

Palavras-chave:
Osteoartrite
Artrodese

RESUMO

Objetivo: avaliar clínica e funcionalmente o pós-operatório de pacientes submetidos à artrodese tibiotalocalcaneana para o tratamento das artropatias traumáticas e neurológicas do tornozelo.

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☆☆ Study conducted at the Department of Orthopedics and Traumatology, Hospital das Clínicas, Universidade Federal de Goiás, Goiânia, GO, Brazil.

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Tornozelo
Fixação intramedular de fraturas

Métodos: estudo retrospectivo de 29 pacientes submetidos à artrodese do tornozelo com haste intramedular retrógrada. Todos os pacientes foram avaliados em relação ao tempo de consolidação, escores Aofas e EVA e grau de satisfação, além de complicações do ato cirúrgico. O tempo de seguimento médio foi de 36 meses (variação de 6–60).
Resultados: a taxa de união foi de 82% e o tempo médio de consolidação foi de 16 semanas (10-24). O critério Aofas melhorou no pós-operatório em 65,5% (média de 57,7 nos casos neurológicos e de 75,7 nos pós-traumáticos) e a EVA melhorou 94,1% (média de 2,3 nos casos neurológicos e de 4,2 nos pós-traumáticos) e 86% dos pacientes mostraram-se satisfeitos com o procedimento feito. As complicações ocorreram em 11 pacientes (38%), entre elas pseudartrose (17,24%), infecção (17,24%), falha do material (13,8%) e fratura (13,8%).
Conclusão: a artrodese tibiotalocalcaneana com haste intramedular retrógrada mostrou ser uma boa opção para o salvamento da articulação do tornozelo, com melhoria dos critérios clínicos e funcionais (Aofas = 65,5% e EVA = 94,1%).

Introduction

The tibiotalocalcaneal arthrodesis is used as a salvage procedure for the ankle joint in patients with changes in the subtalar junction of the tibiotarsal joint.[1–4] The indications for this procedure are mostly post-traumatic arthrodesis, rheumatoid arthritis, sequelae of infection, neuromuscular conditions, and failures of total ankle arthroplasty.[2,5–11] In 1906, Lexer described for the first time the tibiotalocalcaneal arthrodesis with intramedullary fixation using cadaveric bone graft among the calcaneus, talus and tibia.[12] Since the introduction of the concept of ankle arthrodesis by compression by Charnley in 1951, more than 30 techniques and a number of technical modifications have been described.[8]

Patients with ankle arthropathy often present with bone loss, osteopenia or severe deformities (Figs. 1 and 2A/B), which hinders the arthrodesis fixation.[2,11,13,14] The literature has pointed to high infection rates (10–20%) and pseudoarthrosis[6,12,15] (10–20%)[8] associated with arthrodesis, especially for the treatment of neuromuscular arthropathies.[5,12,13]

Intramedullary fixation in tibiotalocalcaneal arthrodesis represents a modern approach, with the advantage of promoting rigid internal fixation with minimal periosteal aggression and vascular damage.[6,7,15] In addition, the procedure promotes compression in the focus of the arthrodesis, with high consolidation ratios (85%) and an average arthrodesis fusion time of approximately three months.[14,15] However, the procedure is not free of complications (30–80% in most series).[7,14]

The present study aimed to evaluate clinically and functionally patients undergoing tibiotalocalcaneal arthrodesis using a locked retrograde intramedullary nail for the treatment of neurological and traumatic arthropathy of the ankle and subtalar joint.

Materials and methods

This is a retrospective study with a convenience sample of 29 patients with arthrosis of ankle and subtalar joints by traumatic and neurological causes. The mean age was 41.3 years (13–72), and 15 patients (51.7%) were male and 14 (48.3%) females. Regarding etiology, 16 patients had post-traumatic arthropathy (55.2%), and in 13 (44.8%) the lesion had neurologic causes (Charcot arthropathy, sequelae of cerebral palsy and polio). The average follow-up time was 36 months (6–60) after the arthrodesis.

The surgical technique employed, from January 2005 to January 2011, was tibiotalocalcaneal arthrodesis with retrograde intramedullary nailing of the ankle. The surgical technique follows a protocol with the patient in the lateral position. By a lateral access port of 10 cm, an osteotomy is made at right angles to the resection of distal fibula. The joint surfaces of the talus and distal tibia are decorticated by this access. A medial access is used to facilitate joint debridement and placement of the talus and the medial malleolus. The surgeon removes minimal amounts of bone to prevent shortening of the limb. A medial access is used to facilitate joint debridement and placement of the talus, with the medial malleolus. To make the fixation with the intramedullary nail, the surgeon makes an incision at the junction of middle and distal thirds of the fat pad of the heel. The foot is held in the desired position; then the surgeon passes a guide wire through the calcaneus and the talus to reach the center of the tibia. The position is checked in the image intensifier and then the surgeon proceeds with the milling. Usually, we use the 12 mm-nail and the milling is done up to 11 mm. After the removal of the intramedullary guide wire, the locking screws are inserted percutaneously with the drill guide. We use two medial screws into the tibia for the proximal locking, and one screw into the talus and calcaneus for the distal locking. This procedure does not allow the shank's dynamisation, because it results only in static locking. The procedures were performed by the surgery of the foot and ankle staff, who are members of the Department of Orthopedics and Traumatology, Hospital das Clínicas, Federal University of Goiás (UFG-DOT-HC). The study was approved by the ethics committee of the HC-UFG.

The patients were requested to fill the questionnaires of the American Orthopedic Foot & Ankle Society (AOFAS) and to a Visual Analog Scale (VAS) preoperatively. According to the AOFAS criteria, the patient can be classified with a poor (0–69), fair (70–80), good (80–90) or excellent (90–100) function. The VAS criterion classifies pain as absent (0), mild (1–3), moderate (4–6), high intensity (7–9) and intolerable (10). Patients classified as AOFAS' poor function (less than 69) and severe