

Severe complications of posterior ankle arthroscopy

Complicações graves em artroscopia posterior do tornozelo

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ABSTRACT

Posterior ankle and hindfoot arthroscopic procedures are associated with a series of possible complications that must be taken into consideration by physicians when performing surgery. This article intends to assess the severe complications, such as subtalar ankle arthrodesis, occurring in patients undergoing ankle arthroscopy procedures in which at least one posterior portal is used. A series of five consecutive patients undergoing posterior ankle arthroscopy-related procedures were assessed. All the complications described in this article were considered severe by the group. We suggest that extreme care is necessary for the training and indications of this very useful but underestimated and complex tool.

Level of Evidence V; Therapeutic Studies; Expert Opinion.

Keywords: Foot; Ankle; Arthroscopy; Postoperative complications.

RESUMO

A artroscopia posterior do tornozelo e retopé está associada com uma série de possíveis complicações que devem ser levadas em consideração pelos especialistas quando indicada. Este artigo discorre sobre as complicações graves em pacientes submetidos a procedimentos artroscópicos, como artrodese subtalar, em que pelo menos um portal posterior é utilizado. Uma série de cinco pacientes consecutivos submetidos a procedimentos envolvendo artroscopia posterior do tornozelo são analisados. Todas as complicações apresentadas neste artigo são consideradas graves pelo grupo de pesquisadores. Sugerimos extrema cautela no treinamento e indicação de tais procedimentos que podem ser muito úteis, porém complexos e de dificuldade subestimada.

Nível de Evidência V; Estudos Terapêuticos; Opinião do Especialista.

Descritores: Pé; Tornozelo; Artroscopia; Complicações pós-operatórias.

How to cite this article: Dias CGP, Mansur NSB, Asaumi ID, Lemos AVK, Azevedo RM, Nery CAS. Severe complications of posterior ankle arthroscopy. *Sci J Foot Ankle*. 2019;13(3):223-7.

INTRODUCTION

Posterior ankle and hindfoot problems are a challenge to diagnose and treat given the deep location and surrounding anatomy^(1,2). When surgery is indicated for treating diseases affecting the posterior structures of the foot and ankle, conventional arthroscopic portals might be inadequate, and approaches that utilize a large incision are much too invasive⁽²⁾.

The posterior portals that have been described in order to assess the posterior structures of those joints are the (1) posterolateral (PL) portal, between the Achilles and the peroneal tendons; (2) posteromedial (PM) portal, just medial to the Achilles tendon; (3) trans-Achilles tendon (TAT) portal, passing through the fibers of the Achilles tendon; and (4) posterior tibial tendon sheath (PTTS) portal. These portals may be used alone, with the patient in the prone

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Conflicts of interest: none. Caio Nery is a consultant and speaker for Arthrex Inc, Wright Medical and Gleistlich Biomaterials. **Source of funding:** none.

Date received: March 15, 2019. **Date accepted:** September 03, 2019. **Online:** September 30, 2019



position, or in association with anterior portals to assist the surgeon when assessing posterior structures of the ankle and hindfoot joints. To visualize and treat certain posterior pathologies, such as posttraumatic calcifications, soft-tissue impingement, symptomatic os trigonum or flexor hallucis longus tendinitis, a two-portal arthroscopic approach is generally indicated⁽²⁾ (Figure 1).

CASE REPORT

This study was approved by the Research Ethics Committee with registration in the Brazil Platform under CAAE number: 03654318.7.0000.5505.

A series of five patients undergoing posterior ankle arthroscopy-related procedures were assessed, and each patient was treated by a different surgeon who had been previously trained in posterior ankle arthroscopy. The research was approved by the Ethics and Research Commission of the institution, and it has met all requirements regarding the rights of human beings.



Figure 1. Surgical technique. (A) patient positioning, (B) skin marking, and (C) ongoing procedure.

Source: Authors' personal archive.

Our experience with complications associated with posterior ankle and hindfoot arthroscopy is discussed using the following five cases.

Case 1: Subtalar arthrosis resulting in tibiotalocalcaneal arthrodesis

A 34-year-old female presented with progressive pain, stiffness and swelling of her right ankle after high-energy trauma two years earlier that led to a talus fracture. The patient was treated percutaneously at another hospital at the time of the injury. Radiographic images revealed severe compromise of the talus due to osteonecrosis with advanced degeneration of the subtalar joint. Arthroscopic subtalar arthrodesis was indicated with previous concern about the risk and possible complications but was also considered to provide good postoperative results for the patient. Surgery was performed on January 4, 2016. During the procedure, the operating surgeons did not check the positioning of the arthroscope with fluoroscopy. After inadvertent preparation of the tibiotalar joint, fluoroscopic imaging was utilized to prepare for the cannulated screw insertion, and the complication was noted. Surgery was interrupted, and the patient was given all the explanation she needed before discharge. The patient was given further clarification of the complication that took place, and she had mild complaints, but her pain was being controlled with opioids. Occasionally, the range of motion was limited (-5 to 20 degrees of flexion-extension of the ankle), and pain became a challenge to manage; additionally, open tibiotalocalcaneal arthrodesis was indicated. The team kept in mind that this could have been avoided had there been greater precaution during the intraoperative radiographic assessment of the positioning of the instrument. The open approach was performed on February 2, 2017. Six months after the second procedure, the patient presented with a good alignment (Figure 2), a VAS (Visual Analog Scale) score of two and an AOFAS (American Orthopaedic Foot and Ankle Society) score of 63, which was considered fair given the inherent stiffness due to arthrodesis. In 2018, a CT scan was performed, revealing good positioning of the screws and consolidation.

Case 2: Posterior tibial tendon tenoscopy and a medial plantar nerve lesion

A 36-year-old female ballet dancer presented with pain and snapping in the left ankle for one month (Figure 3). The snapping symptom was reproduced when standing on the tip of the hallux. The condition of *hallux saltans* was diagnosed, and the patient underwent tenoscopic tenoplasty



Figure 2. Late postoperative outcomes.
Source: Authors' personal archive.



Figure 3. Preoperative pain and swelling site.
Source: Authors' personal archive.

of the posterior tibial tendon (PTT) with radiofrequency in 2012. She progressed with the remission of symptoms. The tenoscopic procedure was chosen thoroughly, aiming for better cosmetic and functional outcomes. Since the intervention, she has complained of permanent numbness over the trajectory of the medial plantar nerve. No further surgical approaches were indicated, and the patient tolerated the outcomes well, reinforcing the importance of a strong patient-physician relationship.

Case 3: Os trigonum resection resulting in a tibial nerve lesion

A 43-year-old male underwent posterior arthroscopic resection of an os trigonum for the treatment of posterior ankle impingement one month earlier (Figure 4) at another hospital. He declared that five days after the procedure, he noted severe neurologic symptoms (paresthesia and dysesthesia) on the ipsilateral plantar surface and that his doctor had prescribed him anticonvulsants (GABAergic stimulators) and B complex for neurologic pain. Although the minimally invasive procedure was chosen in terms of the patient's well-being, a common complication occurred (i.e., nerve lesion) that could have possibly been avoided if more attention had been given to the instrumentation limits. We noted complete anesthesia on the left plantar surface, no action of the intrinsic muscles of the left foot and a positive Tinel sign at the level of the posteromedial arthroscopic portal incision. Anti-equine orthosis was prescribed, and electroneuromyography (ENMG) was requested. A CT scan was also requested to inspect the resection of the os trigonum (Figure 4). The ENMG revealed severe axonal compromise of the left tibial nerve at the level of the ankle. At the next meeting, he presented with no improvements in his symptoms, and a nerve exploration procedure was indicated.

Case 4: Os trigonum resection resulting in a symptomatic hematoma

A 54-year-old female presented with posterior impingement syndrome of the ankle (Figure 5). The decision of a posterior arthroscopic procedure was based on the possibility of a small incisions and a fast rehabilitation and was performed in 2014 for the resection of the os trigonum with adequate excision of the impinging bone (Figure 5). On the 7th day postoperatively, she presented to the clinic with severe pain within the trajectory of the tibial nerve. The neurologic symptoms progressed to dysesthesia and paresthesia in the following weeks. An MRI revealed signs of neuropathy around the tibial nerve. A second arthroscopic examination was performed on the 18th day postoperatively, revealing and aspirating a large amount of hematomas and blood clots, which might have been avoided with the postoperative use of drains, but this complication has not been well described in the literature so far. The patient progressed well and was pain-free with paresthesia 3 months after the reoperation but still complained of a restricted range of motion and impingement sensations on the hindfoot (Figure 5).

Case 5: Tibial nerve lesion during arthroscopic instrumentation

A 48-year-old male presented with posttraumatic subtalar arthrosis after a calcaneus fracture. Posterior arthros-

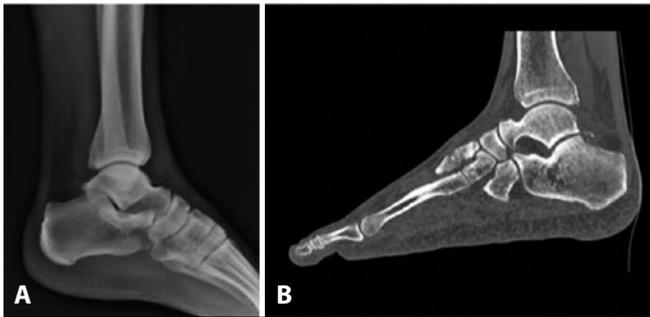


Figure 4. Imaging studies. (A) preoperative X-ray. (B) postoperative CT scan.

Source: Authors' personal archive.



Figure 5. Sagittal T1 images. (A) preoperative. (B) postoperative.

Source: Authors' personal archive.

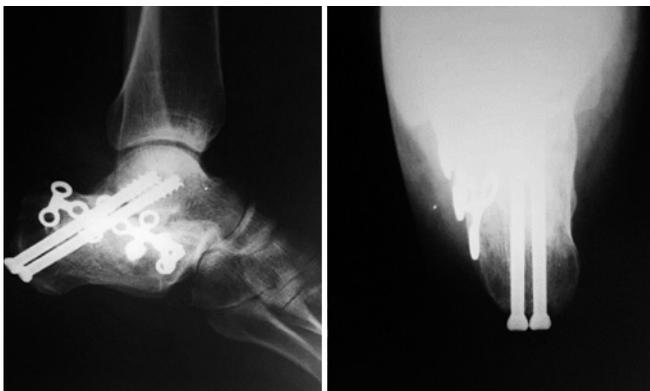


Figure 6. Radiographic aspect of the ankle with chronic subtalar arthrodesis.

Source: Authors' personal archive.

copic arthrodesis, in an attempt to preserve vascularization, was performed on July 18, 2017 (Figure 6). One week after the surgery, the patient presented with intense neurologic symptoms associated with the tibial nerve. A second examination was performed with an open approach, and neurolysis was performed on the tibial nerve, revealing a partial lesion of this nerve without an indication of neuro-rhaphy, suggesting that adequate training and perfection

of the posterior arthroscopic technique is still needed to bring complication rates to those at the open procedure level. The progressive remission of symptoms occurred in the following months, and the patient was asymptomatic after eight months.

DISCUSSION

In our review of the literature, we found some interesting reports on outcomes after ankle arthroscopy in general as well as some studies that specifically focused on the use of posterior portals during ankle/hindfoot arthroscopy. Dijk reported a complication incidence of 1.4% in 146 patients undergoing hindfoot arthroscopic procedures⁽²⁾. Galla and Lobenhoffer⁽³⁾ reported a series of 36 patients and observed one patient with superficial wound dehiscence (3.3%), one patient with deep infection of the posterolateral portal (3.3%), two patients with paresthesia within the sensory supply of the sural nerve (6.6%) and two patients with recurring symptoms (6.6%). Amendola et al.⁽¹⁾ reported the results of ten cases of posterior arthroscopic subtalar arthrodesis, with one patient who had nonunion leading to unsatisfactory results (10%). Leeuw recently reported in a series of 40 patients that two of them (5%) underwent a reoperation for the repositioning of screws but experienced satisfactory consolidation of posterior endoscopic arthrodesis at the tibiotalar joint less than three months after the first surgery⁽⁴⁾. In a cadaveric study, Lui and Chan⁽⁵⁾ reported the observation of nerve injury in 14 specimens and observed neurovascular compression in 11 specimens (79%). Willits reported six temporary complications in his 15 patient series, ranging from the presence of scar tissue to postoperative stiffness⁽⁶⁾.

Nickisch et al.⁽⁷⁾ observed a complication rate of 8.5% (16 of 186 patients) after posterior arthroscopic procedures, including complications of plantar numbness, dysesthesia of the sural nerve, tightness of the Achilles tendon, complex regional pain syndrome, infection and posteromedial portal cysts.

Donnenwerth and Roukis's review reported a complication rate of 3.8% (17 of 452 patients) after posterior ankle arthroscopy. The most common complication was wound dehiscence⁽⁸⁾.

CONCLUSION

Studies have revealed a low frequency of complications after hindfoot endoscopy, but a high incidence of neurologic injuries seems to occur following these procedures.

When planning for a posterolateral portal, we recommend making the incisions just lateral to the Achilles tendon to avoid injury to the sural nerve and placing the posteromedial portal lateral to the flexor hallucis longus to avoid in-

jury to the medial calcaneal nerve⁽⁹⁾. Placing the foot in the varus position for the PL portal and placing all portals more proximally might provide a greater margin of safety during the procedure⁽¹⁰⁾.

Authors' contributions: Each author contributed individually and significantly to the development of this article: CGPD *(<https://orcid.org/0000-0001-6771-7354>) wrote the article, conceived and planned the activities that led to the study, participated in the review process, approved the final version; NSBM *(<https://orcid.org/0000-0003-1067-727X>) conceived and planned the activities that led to the study, participated in the review process, participated in the review process, approved the final version; IDA *(<https://orcid.org/0000-0002-4074-0412>) participated in the review process, contributed to the data of the clinical cases presented and reviewed the suitability of the information provided; AVKCL *(<https://orcid.org/0000-0001-8974-5815>) participated in the review process, contributed to the data of the clinical cases presented and reviewed the suitability of the information provided; RMA *(<https://orcid.org/0000-0001-9229-8008>) participated in the review process, contributed to the data of the clinical cases presented and reviewed the suitability of the information provided; CASN *(<https://orcid.org/0000-0002-9286-1750>) participated in the review process, contributed to the data of the clinical cases presented and reviewed the suitability of the information provided. *ORCID (Open Researcher and Contributor ID).

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