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CASE REPORT

Transarterial Embolization for Refractory Ankle Synovitis in an Adult Patient With a History of Juvenile Idiopathic Arthritis

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Juvenile idiopathic arthritis is a rare but severe childhood-onset arthritis that carries a high risk of structural joint damage. We report the case of a 32-year-old man with a history of juvenile idiopathic arthritis who underwent bilateral hip arthroplasty at age 23 and bilateral ankle arthroplasty at age 24. His subsequent orthopedic course was complex, involving a left ankle prosthetic infection, spacer implantation, and eventual reimplantation of the prosthesis. Despite these interventions, he developed persistent left ankle pain, swelling, and warmth, consistent with residual synovitis. The patient was treated with adalimumab and had no evidence of active arthritis at other sites. Non-steroidal anti-inflammatory drugs, sural nerve neuromodulation, and intra-articular glucocorticoid injections failed to provide adequate relief. Selective transarterial embolization of the malleolar branch of the anterior tibial artery was therefore performed, resulting in marked improvement in pain and swelling. In conclusion, transarterial embolization proved feasible and led to meaningful short-term clinical benefit, supporting its potential as an adjunctive therapeutic option in carefully selected cases of residual refractory ankle arthritis.

Introduction

Juvenile idiopathic arthritis is a rare but severe type of arthritis, typically presenting in early childhood with arthritis and systemic features such as fever and rash.[1] Despite the availability of disease-modifying antirheumatic drugs, including biologic agents, a subset of patients develops progressive structural joint damage and may require joint replacement already in young adulthood.[1]

Case report

We present the case of a 32-year-old man with longstanding juvenile idiopathic arthritis, diagnosed at the age of 1 year old and previously treated with methotrexate and etanercept. Despite therapy, he developed severe joint damage, requiring bilateral hip arthroplasty at 23 years old and bilateral ankle arthroplasty at 24 years old. The subsequent orthopedic course was complex. At 28 years old, he required removal of the left ankle prosthesis due to loosening associated with *Staphylococcus aureus* and *Staphylococcus epidermidis* infection, followed by placement of an antibiotic-loaded spacer. In the following years, he underwent further procedures for management of local complications, including debridement and coverage with local flaps for a chronic ulcer, removal of the spacer, and ultimately implantation of a custom-made, three-dimensional printed total ankle prosthesis (Supplementary Figure 1) at the age of 31 years old, more than one year before the present rheumatologic reassessment. Surgical debridement of perimalleolar calcifications was undertaken, with intraoperative cultures yielding negative results and histology revealing no evidence of acute inflammation, thereby confirming complete resolution of the infection.

Nevertheless, he continued to experience persistent pain and swelling in the lateral and anterolateral aspects of the left ankle. Pain intensity was severe, with a score of 9 out of 10 on a visual analog scale. His systemic disease activity was well controlled under treatment with adalimumab, which had been reintroduced after resolution of the infection. There was no evidence of arthritis outside the left ankle and markers of inflammation were within normal limits.

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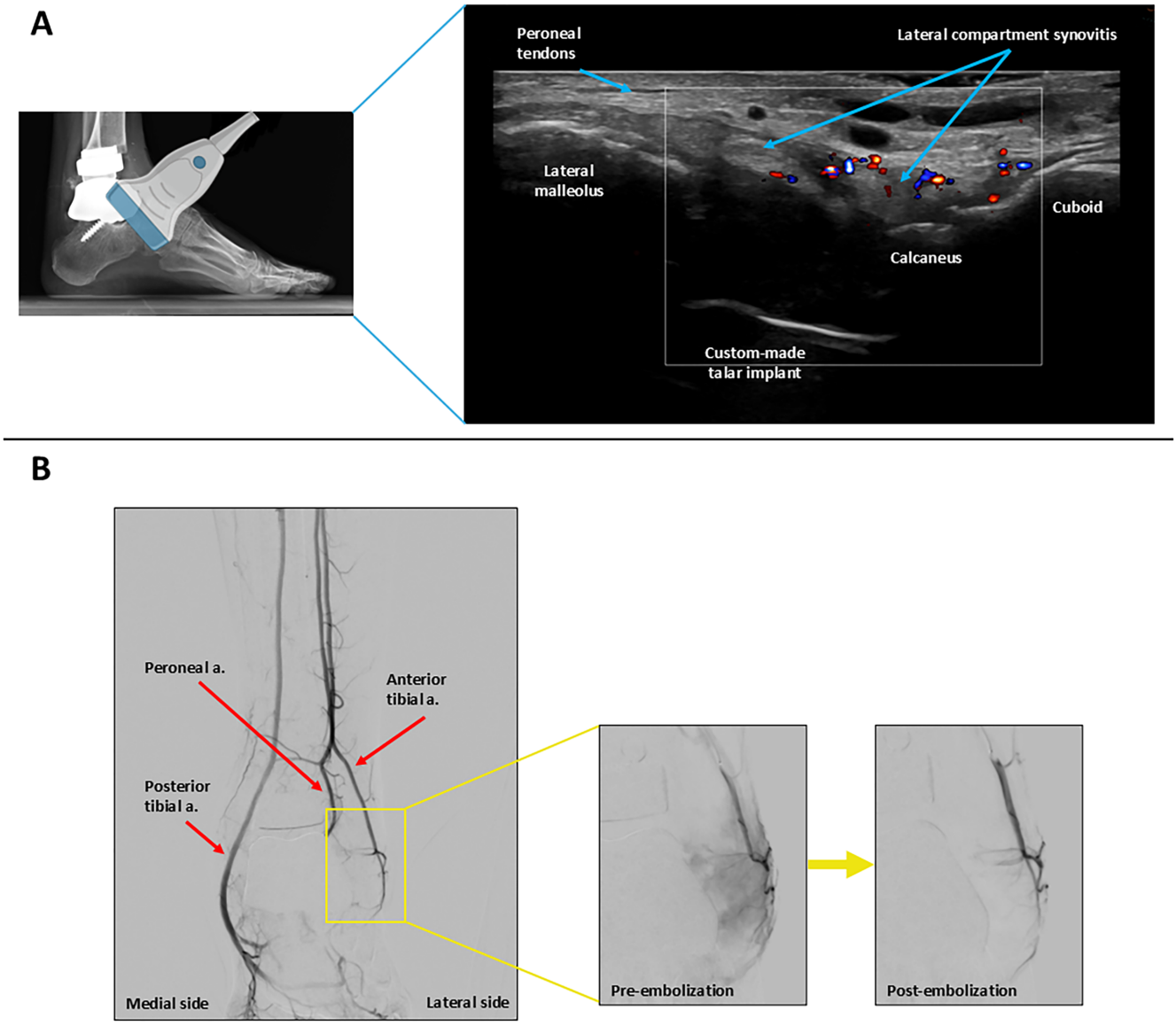

Figure 1. Ultrasound of the anterolateral left ankle demonstrating grade 2 synovial hypertrophy and grade 2 hypervascularity on color Doppler, consistent with active synovitis. Angiographic findings of the left ankle. (A) Baseline angiogram showing the distal tibial arterial vasculature. (B) Superselective catheterization of the malleolar branch of the anterior tibial artery revealing intense perimalleolar blush in the lateral compartment of the ankle. (C) Postembolization angiogram demonstrating near-complete disappearance of the abnormal perimalleolar blush.

From a rheumatologic perspective, changing systemic therapy was considered inappropriate, because this might have compromised the overall disease control that had been achieved. At the same time, however, there was a clear need to address the localized refractory ankle arthritis. The patient had previously been treated with nonsteroidal anti-inflammatory drugs without meaningful benefit and had undergone three cycles of sural nerve radiofrequency ablation, each followed by intraarticular injection of triamcinolone acetonide 40 mg. These procedures had provided only transient improvement.

Ultrasound examination of the ankle showed grade 2 synovial hypertrophy in the anterolateral recess, with color Doppler grade 2 hypervascularization, consistent with active synovitis (Figure 1A). In view of the persistent localized arthritis and the unsatisfactory response to nonsteroidal anti-inflammatory drugs, neuromodulation and intra-articular glucocorticoids, the patient was referred for consideration of transarterial embolization (TAE).

Diagnostic angiography confirmed patency of the popliteal, anterior tibial, posterior tibial, and peroneal arteries (Figure 1B). Through a femoral arterial puncture, a microcatheter was advanced into the distal anterior tibial artery, and superselective catheterization of the malleolar branch was achieved. Intense perimalleolar arterial blush was observed, corresponding to the patient's most symptomatic region and sonographically confirmed synovitis

(Figure 1B). Embolization was then conducted with resorbable gelatin microspheres measuring 100 to 300 μm (Nexsphere-F, NextBioMedical), injected under fluoroscopic control until near-complete disappearance of the abnormal blush was obtained.

The patient was monitored overnight according to institutional protocol and discharged the following day without complications. He was reassessed at one month, showing a marked reduction in swelling and an improvement in pain, with a visual analog scale score of 4 out of 10. This level of pain control was maintained at the three-month follow-up, with no recurrence of swelling.

Discussion

This case highlights the complex interplay among systemic rheumatologic disease, orthopedic sequelae, and therapeutic limitations. In patients who undergo multiple orthopedic surgery procedures, the risk of prosthetic joint infection becomes an additional challenge, with important implications for immunosuppressive management. Balancing the need to maintain systemic disease control with the risks of infection is a daily concern for rheumatologists, and it may limit pharmacologic options when localized arthritis persists.

In recent years, TAE has emerged as an interventional radiology technique for the treatment of musculoskeletal pain syndromes.[2] Beyond knee osteoarthritis, evidence is also expanding to include tendinopathies and enthesopathies, with promising results in selected refractory cases.[3] More recently, TAE has been applied to inflammatory musculoskeletal conditions, with encouraging early data suggesting that embolization of pathologic hypervascularity may help control pain and local inflammation, thus supporting its feasibility and potential use in different clinical contexts.[4,5]

In this case, TAE was considered an adjunctive option in a context in which pharmacologic adjustment was not indicated, and previous treatments had failed to achieve lasting relief. Although anecdotal, such observations may offer valuable insights and support further investigation of interventional radiology as a complementary strategy in the management of refractory inflammatory arthritis in particularly complex scenarios.

Written informed consent was obtained from the patient for publication of the case details and accompanying images.

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AUTHOR CONTRIBUTIONS

All authors contributed to at least one of the following manuscript preparation roles: conceptualization AND/OR methodology, software, investigation, formal analysis, data curation, visualization, and validation AND drafting or reviewing/editing the final draft. As corresponding author, Dr Ciaffi confirms that all authors have provided the final approval of the version to be published and takes responsibility for the affirmations regarding article submission (eg, not under consideration by another journal), the integrity of the data presented, and the statements regarding compliance with institutional review board/Declaration of Helsinki requirements.

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