Middle East J Rehabil Health Stud. 2018 April; 5(2):e62397. doi: 10.5812/mejrh.62397.

Published online 2018 January 14. **Case Report**

Bilateral Calcification of Achilles' Tendons, and Acetic Acid Iontophoresis Plus Ultrasound Effectivenness

Marcos Edgar Fernandez-Cuadros,[1,2,*] Olga Susana Perez-Moro,[1] Maria Jesus Albaladejo-Florin,[1] Luz Otilia Casique-Bocanegra,[2] and Ruben Algarra-Lopez[1]

[1]Rehabilitacion y Medicina Fisica, Hospital Universitario Santa Cristina, Madrid, Spain
[2]Rehabilitacion y Medicina Fisica, Fundacion Hospital de la Santisima Trinidad, Salamanca, Spain

[*]*Corresponding author*: Marcos Edgar Fernandez-Cuadros, Calle del Ansar 44, piso Segundo, CP 28047, Madrid, Spain. Tel: +34-620314558, E-mail: marcosefc@hotmail.com

Received 2017 October 02; **Revised** 2017 November 07; **Accepted** 2017 November 18.

Abstract

Introduction: Calcifying tendonitis is the deposition of hydroxyapatite within tendons. It could affect different tendons. In the current case report, bilateral Achilles' tendons were affected. The etiology is multifactorial. The treatment is conservative and surgical. Iontophoresis is a conservative technique that favors the penetration of 5% acetic acid, based on the attraction and repulsion of charges with the help of continuous electric current.
Case Presentation: A 57-year-old female presented a 12-month experience of bilateral Achilles' tendon pain. Conservative treatment (nonsteroidal anti-inflammatory drugs (NSAIDs), laser therapy, and physiotherapy) and advanced treatment (shock waves) did not alleviate her pain. Radiography and ultrasound scan showed bilateral insertional formative calcification on both Achilles' tendons, 9.3 mm on left Achilles' tendon and 6.6 mm on right one. After 15 sessions of 5% acetic acid iontophoresis (2 mL, 4.7 mA × 10 minutes) and continuous ultrasound (1 W/cm^2,1 MHz × 5 minutes) over the calcification area, calcification sizes decreased from 9.3 to 4.3 mm (left Achille's tendon) and disappeared on right Achille's tendon. Pain also decreased from 9/10 to 4/10 on left Achille's tendon and from 5/10 to nothing on right tendon.
Conclusions: Based on the authors' best knowledge, the current study was the first case report that confirmed the effectiveness of 5% acetic acid iontophoresis plus ultrasound to treat bilateral Achilles' calcifying tendonitis.

Keywords: Achilles' Tendon, Tendinopathy, Calcifying Tendonitis, Iontophoresis, Ultrasound

1. Introduction

Calcifying tendonitis (CT) is defined as the deposition of hydroxyapatite within tendons. CT could affect different tendons, as the rotator cuff, Achilles, patella, forearm extensors, biceps brachi, and tibialis posterior tendons. The etiology is multifactorial and its pathophysiology is still unclear; degeneration plays and important role in CT. Literature described 3 stages with clinical/histological and radiological correlation: 1, Precalcification: tenocyte metaplasia/chondrocyte transformation; 2, Calcification: a. formative, b. resorptive (spontaneous resorption/phagocytosis); 3, Postcalcification: collagen remodeling/tendon repair. CT diagnosis is both clinical and radiological. Conservative treatment includes nonsteroidal anti-inflammatory drugs (NSAIDs), physiotherapy, electrotherapy (micro-waves, short-waves, transcutaneous electrical nerve stimulation (TENS), ultrasounds, iontophoresis, interferential, and pulsed electromagnetic therapy). Advanced treatment includes shock-waves, eco-guided aspiration, and arthroscopy (1-3).

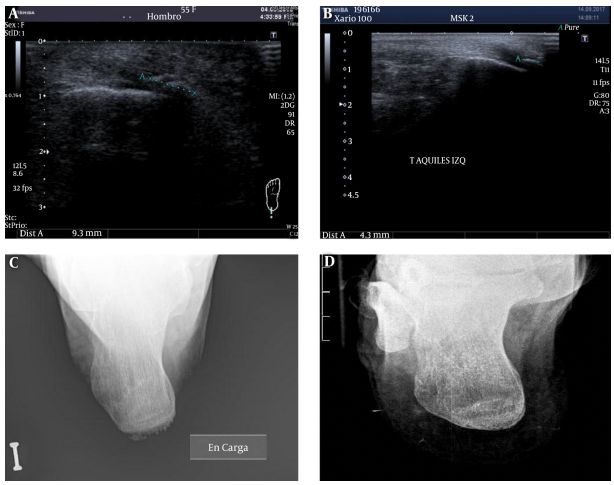
Iontophoresis is a conservative, non-surgical technique that favors the penetration of transdermal substances/drugs through the skin with the help of electric current, based on physical-chemical properties of attraction and repulsion of charges. In the 1950s, Psaki and Carroll were the first to use acetic acid iontophoresis as an effective treatment for shoulder CT (4). However, there are controversial results on CT, and limited case reports on effectiveness in other tendons such as gluteus medium and minimum and Achilles' tendons (5). To the best of authors' knowledge, there is no report on the effectiveness of acetic acid iontophoresis and ultrasound on bilateral calcifying tendonitis of Achilles' tendons.

2. Case Presentation

The current study reports the case of a 57-year-old female with a 12-month experience of bilateral Achilles' tendon pain that increased with walking and using tight shoes. She was a right-handed housewife, with no important antecedents. NSAIDs did not alleviate pain. She already went through physical therapies (laser and physiotherapy) without any success. Due to failure, she also went through bilateral shock wave therapy, but no alleviation was observed on pain or the calcification. Radiography showed bilateral insertional formative calcification on both Achilles' tendons confirmed by ultrasound scan (Figures 1 and 2); 9.6 mm length in its longer axis, at the insertion of the left Achilles' tendon, and 6.6 mm length on the right Achilles' tendon. After 15 sessions of 5% acetic acid iontophoresis (2 mL, 4.7 mA × 10 minutes) and continuous

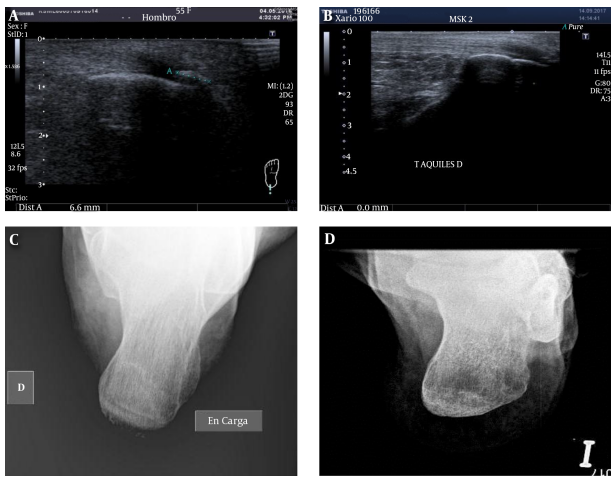
ultrasound (1 W/cm^2,1 MHz × 5 minutes) over the calcification area, pain decreased from 9/10 to 4/10 (left tendon) and from 5/10 to 0/10 (right tendon) on visual analogical scale (VAS). Calcification disappeared after treatment (from 6.6 to 0 mm) on the right tendon and decreased from 9.3 to 4.3 mm on the left tendon, after radiographic and ultrasound evaluation.

Figure 1. Left Achille's Tendon



Before treatment: pain measured by VAS 9/10, calcification 9.3 mm evaluated by sonography (A) and radiography (C). After treatment pain measured by VAS 4/10, calcification 4.3 mm evaluated by sonography (B) and radiography (D).

Figure 2. Right Achille's Tendon



Before treatment: pain measured by VAS 5/10, calcification 6.6 mm evaluated by sonography (A) and radiography (C). After treatment: pain measured by VAS 0/10, calcification 0 mm evaluated by sonography (B) and radiography (D).

The treatment protocol consisted of 2 mL of 5% acetic acid iontophoresis dropped into a gauze and placed onto the moistened cation electrode (negative electrode), covered by a 10 × 10 cm sponge, and it was directly put in contact with the ankle, next to Achilles insertion (Figure 3A). The Anion electrode (positive electrode) was placed 10 cm distal to the ankle, over the ventral part of the foot, covered by a moistened 10x10 cm sponge. Subsequently, continuous Ultrasound with an intensity of 1 W/cm^2 and 1 MHz frequency was applied for 5 minutes at the insertion of the Achilles' tendon on the affected ankle.

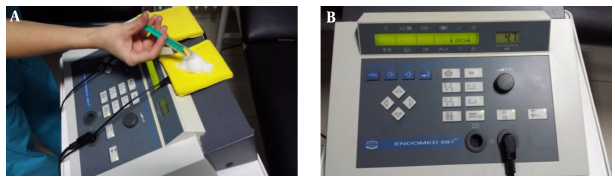


Figure 3. Acetic Acid 5%, 2 mL in a Gauze (A) are Dropped at the Cation Electrode (Negative Electrode), For Iontophoresis Treatment, a Galvanic Current at 4.7 mA Intensity Was Applied for 10 Minutes (B)

To perform the treatment protocol, 2 European medical devices were used: 1, for Iontophoresis, ENDOMED 581 ID (Enraf Nonius® CE 0197; Salamanca, Spain) (Figure 3B); and 2, for ultrasound, SONOPULS 490 (Enraf Nonius® CE 0197; Salamanca, Spain).

3. Conclusion

The current case report confirmed that 5% acetic acid iontophoresis plus ultrasound was safe and effective to treat bilateral calcifying tendonitis of Achilles' tendons.

References

1. Fernandez Cuadros M, Perez Moro O. Effectiveness of acetic acid iontophoresis and ultrasound on calcifying tendonitis of the shoulder. *J Womens Health Care*. 2016;**5**:328. doi: 10.4172/2167-0420.1000328.
2. Fernandez Cuadros ME, Perez Moro OS, Nieto Blasco J, Rivera Garcia V, Olazar Pardeiro A, Miron Canelo JA. Calcifying tendonitis of the shoulder, risk factors and effectiveness of physical therapy. *Occup Med Health Aff*. 2015;**3**(220):2. doi: 10.4172/2329-6879.1000220.
3. Fernandez Cuadros ME, Perez Moro OS, Albaladejo Florin MJ. *Calcifying tendonitis, effect of physical therapy and iontophoresis*. Germany: Lambert Academic Publishing; 2017.
4. Fernandez Cuadros ME, Parez Moro OS, Alava Rabasa S, Garcia Gonzalez JM, Miron Canelo JA. Calcifying tendonitis of the shoulder, risk factors and effectiveness of acetic acid iontophoresis and ultrasound. *Middle East J Rehabil Health*. 2016;**3**(4). doi: 10.17795/mejrh-41112.
5. Fernandez Cuadros M, Perez Moro O, Diez Ramos F, Albaladejo Florin MJ. Acetic acid iontophoresis and ultrasound effectiveness on calcifying tendonitis of the shoulder, elbow, wrist, hip, knee and ankle, a non randomized multicenter control trial. *Orthop Rheumatol*. 2016;**3**(3). doi: 10.19080/oroaj.2016.03.555611.