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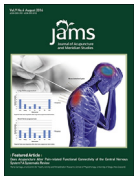

Research Article

Electroacupuncture for the Treatment of Calcific Tendonitis. A Pilot Study

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Abstract
Current treatment for calcific tendonitis consists of arm rest, antiinflammatory medications, and corticosteroid injections. If unsuccessful, a lot of clinicians suggest several physiotherapy modalities, such as shockwave therapy and electrotherapy. The purpose of our study was to assess the efficacy of electroacupuncture, as a substitute for failed medical treatment in calcific tendonitis.

In a pilot study, we prospectively followed 10 patients treated with electroacupuncture for calcific tendonitis who failed to respond to medical treatment. Its efficacy was assessed by evaluating the level of pain, the Beck Depression Inventory, the range of active elbow mobility, and by repeated radiological evaluation of the course of calcific deposits. All clinical and radiological observations were recorded before and within 6 months after the onset of treatment.

After electroacupuncture treatment (2 Hz, 180 mA for 30—60 seconds at GB21, GB34, LI4, LI 14, LI15, TW5, TW14, Chien Chien SI9, SI12, S37, S38), the visual analog score decreased notably, and the range of motion returned to normal. Radiological evaluation

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demonstrated almost complete absorption of calcific deposits within 6 months, after treatment.

We conclude that electroacupuncture relieved skeletal pain, improved the quality of patient's life, and contributed to total regression of the calcific depositions in followed patients. So, electroacupuncture may be a valuable treatment option for calcific tendonitis, when medical treatment fails to relieve symptoms.

Introduction

Calcific tendonitis is a common disorder of the shoulder, resulting in significant pain and substantial decrease of the range of motion. It mainly affects women aged 30—50 years [1—5]. The exact cause of the disease and the pathogenetic mechanism remain unclear and controversial. Calcific deposits on the rotator cuff are found in 2.7—22% of patients presenting for routine radiological examination, but only 34—45% of them are clinically symptomatic [6,7].

Uhthoff and Loehr described four subsequent phases of the disease. The first is the formative phase during which yet unknown triggers (hypoxia is a possible trigger) induce a fibrocartilage metaplasia, usually in some part of the supraspinatus tendon. The metaplastic tissues deposit hydroxyapatite crystals which form deposits that progressively increase in size. The next phase is the resting phase. In this stage, the deposits enter a stable period in terms of size but, if large enough, they may produce mechanical symptoms. These two phases may last from 1 to 6 years. The third phase is called resorptive, during which the calcific deposits are progressively being absorbed despite a still unfolding painful inflammatory reaction, thus making this phase the most painful. Last comes the postcalcific phase where the metaplastic fibroblasts reconstitute the normal collagen architecture of the tendon and lasts between 12 and 16 months [7,8].

Treatment of calcific tendonitis include a variety of methods, ranging from conservative methods to operative removal of the calcific deposits [3,7,9]. Simple conservative treatment regimens consist of antiinflammatory and analgesic medications, corticosteroid injections and arm rest, while surgical removal is carried out by either open or arthroscopic procedures. Other treatment options include a minimal invasive technique with needle destruction of the deposits and several alternative physiotherapeutic methods like extracorporeal shockwave therapy, transcutaneous electronic nerve stimulation and ultrasound and acetic acid iontophoresis, with extracorporeal shockwave therapy conferring the most satisfactory results [10—13].

Acupuncture was proposed in 1979 from World Health Organization as a clinically useful treatment for various skeletal pain syndromes like the "frozen shoulder syndrome" [13] because electroacupuncture, as an adjunct to exercise, was shown to significantly improve its functional state [14].

The aim of this pilot study was to prospectively evaluate the impact of electroacupuncture on pain intensity, changes in functional status, and radiological imaging in a small study cohort of patients with calcific tendonitis of the shoulder.

Material and methods

We conducted a prospective pilot study on 10 consecutive patients with calcific tendonitis who were referred by orthopedic surgeons to the pain management unit of our hospital. After institutional ethics committee approval, the study enrolled formally consenting patients between June 2012 and June 2014.

None of the enrolled patients had responded to conservative treatment courses with oral antiinflammatory drugs, minor opioids, and arm rest that lasted from 1 to 12 months before our intervention.

All patients received electroacupuncture trials with alternating current (2 Hz, 180 mA) at acupuncture points (0.25 $\times$ 25 mm needles without tonification or dispersion): GB21, GB34, LI4, LI 14, LI15, TW5, TW14, Chien Chien SI9, SI12, S37, S38 that lasted 60 seconds on each point and was repeated every 4 days (Scheme 1) [15,16]. During the electroacupuncture treatment, the patients were seated with their arm resting on a table.

All patients were evaluated before, at six months, and 1 year after treatment. The evaluation included assessment of pain level using the visual analog scale (VAS), measurements of active range of motion (in degrees) and assessment of the Beck Depression Inventory (BDI) on each presentation at the pain management unit [17]. We suggested active exercise with pendular movements of the arm to all patients and ordered radiological evaluation with standard shoulder X-ray imaging 2—6 months after acupuncture treatment to evaluate the progression of the calcific deposits.

Statistical analysis consisted of paired Student t test for nominal variables, and the level of statistical significance was set at p value < 0.05. Values are expressed as mean $\pm$ standard deviation.

Results

Ten patients (eight males and two females), aged 36—65 years (46 $\pm$ 12) with 12 calcific tendonitis episodes were treated. Eight ($n = 8$) of them were affecting the right shoulder and four ($n = 4$) the left. The duration of each episode under medical treatment was variable, ranging from 1 to 11 months (6.4 $\pm$ 3.3).

Before acupuncture treatment, the pain was rated by the patients in the range of 6—10 (8.2 $\pm$ 1.4) of the VAS and as they stated was intolerable during the night, preventing them from sleep. BDI values were between 7 and 16 (10.2 $\pm$ 2.6, normal range: 0—9) and six patients ($n = 6$) reported values from 10 to 16 (Table 1).

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