Available online at www.sciencedirect.com

ScienceDirect

Asia-Pacific Journal of Sports Medicine, Arthroscopy, Rehabilitation and Technology 7 (2017) 21–26
www.ap-smart.com

Original article

Comparison of treatment effects on lateral epicondylitis between acupuncture and extracorporeal shockwave therapy

Clara Wing-Yee Wong, Elaine Yin-Ling Ng, Pui-Wa Fung, Kam-Ming Mok, Patrick Shu-Hang Yung, Kai-Ming Chan*

Department of Orthopaedics and Traumatology, Prince of Wales Hospital, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong, China

Received 21 July 2016; revised 17 October 2016; accepted 18 October 2016

Abstract

Background: Lateral epicondylitis is one of the most common overuse injuries, and has been reported to reduce function and affect daily activities. There is no standard therapy for lateral epicondylitis. In Hong Kong, acupuncture and extracorporeal shockwave therapy (ESWT) have been popular in treating lateral epicondylitis in recent years.
Objective: This study is to compare the treatment effects of acupuncture and ESWT on lateral epicondylitis.
Methods: In this study, we evaluated 34 patients (34 elbows) with lateral epicondylitis. Seventeen patients were treated by 3-week ESWT, one session per week. Another 17 were treated by 3-week acupuncture therapy, two sessions per week. The outcome measures included pain score by visual analogue scale, maximum grip strength by Jamar dynamometer, and level of functional impairment by disability of arms, shoulders, and hands questionnaire. Participants were assessed at three time points: baseline; after treatment; and 2-week follow-up.
Results: The two treatments showed no significant difference at any assessment time-point. Both treatment groups had significant improvement in pain score in longitudinal comparisons. No significant difference was found in maximum grip strength and functional impairment in either treatment group, but a trend of improvement could be observed. In addition, improvement in pain relief stopped when treatment ended for either groups.
Conclusions: The treatment effects of acupuncture and ESWT on lateral epicondylitis were similar. The pain relief persisted for at least two weeks after treatment.

Keywords: conservative treatment; lateral epicondylalgia; lateral epicondylitis; tendinopathy; tennis elbow

Introduction

Lateral epicondylitis, known as tennis elbow, is one of the most common overuse injuries, with reported incidence of 1–3% in the general population[1,2] and 2–23% among occupational populations.[3] It has accounted for 4–7 out of 1000 patients among all general clinical cases.[4] Patients with lateral epicondylitis are aged from 45 years to 64 years, with higher incidence in women than men.[3] The affected duration is reported to vary from 6 months to 2 years.[5,6] Longer exposure to repetitive and forceful activities,[3] and eccentric contraction of extensor carpi radialis brevis have been reported to be strongly associated with lateral epicondylitis.[7] In short, senior female adults, who have worked with repetitive movements, have higher opportunity to develop lateral epicondylitis.

The symptom of lateral epicondylitis is a form of degenerative tendinopathy characterized with tenderness at lateral epicondyle of the humerus (LE).[8] The degenerative tendinopathy symptoms are less precisely defined but frequently

* Corresponding author. Department of Orthopaedics and Traumatology, Prince of Wales Hospital, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong, China.
E-mail address: kaimingchan@cuhk.edu.hk (K.-M. Chan).

http://dx.doi.org/10.1016/j.asmart.2016.10.001

include local tenderness at the origin of extensor musculotendinous structure at the LE. The pain could be reproduced as follows: (1) palpation at facet of the LE; (2) resisted wrist extension with or without resisted third finger extension in elbow extension; and (3) grip an object.[9–12] Lateral epicondylitis reduces function and affects daily activities.[13]

There is still no standard treatment for lateral epicondylitis. The choice of treatment depended on the general practice of medical institutions and clinics. Apart from surgical treatment, the physical interventions can be categorized into two aspects: electrotherapeutic and nonelectrotherapeutic. Electrotherapeutic interventions include ultrasound, laser therapy, extracorporeal shockwave therapy (ESWT), and ionization and electromagnetic field.[14] Those exogenous energy sources in electrotherapeutic interventions are believed to increase membrane potential and in turn the general cell activity, which may lead to physiological changes and therapeutic benefits.[15] Nonelectrotherapeutic interventions include acupuncture, manipulation treatment, exercise, taping, and bracing.[14]

In Hong Kong, the use of acupuncture and ESWT has been more popular in treating lateral epicondylitis in recent years. By stimulating certain acupoints, studies have shown that acupuncture can reduce sensitivity to pain and stress.[16] Furthermore, it was reported to increase the release of adenosine, which has antinociceptive properties.[17] In addition, it was found to improve local microcirculation which helps removal of swelling.[18] However, the mechanism of its pain alleviation effect is still unclear.[19] In contrast, ESWT is a noninvasive treatment with acoustic pressure disturbance produced to reduce pain through hyperstimulation and increased vascularity, also to stimulate and reactivate healing promotion of tendon, bones, and other soft tissues.[20,21] Modulation of pain signals was also one of the proposed mechanisms.[22]

Although both treatments have been used to treat lateral epicondylitis in general practice, their treatment effect is conflicting. Two systematic reviews indicated that acupuncture can only relieve pain for lateral epicondylitis in the short term.[14,23] By contrast, ESWT was reported to have little or no effect on lateral epicondylitis in a meta-analysis.[24] However, this meta-analysis was criticized for overlooking the variation of generation principles of shock wave between studies, including the use of local anesthesia which may diminish the treatment effect of ESWT and acute cases included in studies.[25] A study investigating the duration of pain and success of ESWT also reported patients with chronic symptoms may benefit more from ESWT.[26] The use of ESWT was recommended for lateral epicondylitis for patients with symptoms lasting for at least 3 months. In short, more effort is needed to investigate the treatment effect of both acupuncture and ESWT on lateral epicondylitis.

Comprehensive evaluation of validated functional outcome was lacking in previous studies regarding the effect of ESWT.[24] There are other approaches available to access the functional outcome such as the disabilities of the arm, shoulder and hand questionnaire (DASH)[27] and upper extremity functional scale,[28] which are well-validated. In this study, DASH was employed to help evaluate the treatment effect of acupuncture and ESWT on lateral epicondylitis.

The objective of this study is to compare the treatment effects of acupuncture and ESWT on lateral epicondylitis.

Materials and methods

This was a parallel-study design. Patients were randomly assigned to receive acupuncture or ESWT. Both treatments were performed by the same registered physiotherapy with qualifications in acupuncture.

Patient recruitment

Patients were diagnosed as lateral epicondylitis by registered physiotherapists and orthopedic specialists. Exclusion criteria included: (1) surgical treatment for lateral epicondylitis; (2) deformities of elbow, cervical radiculopathy; (3) referred pain from neck and shoulder; (4) treatment in the last 12 months for lateral epicondylitis with corticosteroid injection or extracorporeal shockwave or acupuncture; (5) patients with systemic conditions that involve joints and connective tissues; (6) hemophilia; or (7) patients who reject the acupuncture treatment for personal reasons. Patients with lateral epicondylitis diagnosed were classified into six phases in accordance to the Nirschl's classification.[29] No analgesia was prescribed in parallel to the treatment.

Patients recruited were given written consent form. And the study protocol was explained to patients preceding the treatment. The study protocol was approved by The Joint Chinese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee. All experimental procedures were performed in accordance with the approved procedures.

Treatment protocol

In the ESWT group, an extracorporeal shockwave generator machine (focused extracorporeal shockwave Piezowave basic set; Richard Wolf, Knittlingen, Germany) was used to perform the treatment. ESWT was applied on the common extensor origin of the affected elbow.[22,30] The whole treatment lasted for 3 weeks. According to previous studies,[31–33] three sessions of treatment in total were assigned and performed once a week. Each treatment was initiated by a low energy level (1–3), and gradually increased to the patient's tolerance limit. The pulse for treatment was set to 2000 Hz. The energy flux density was within 0.032–0.822 mJ/mm^2, which varies according to the energy intensity applied.

Treatment protocols of lateral epicondylitis using acupuncture are too diversified among different studies.[19] In the acupuncture group, the treatment protocol adopted was a standard protocol of the clinic, which had been shown to be effective in relief of pain provoked by lateral epicondylitis.[34] The six acupoints were point *Ah-shi*, LI.10, LI.11, Lu.5, LI.4, and SJ.5. The *Ah-shi*, LI.10, and LI.11 acupoints were over the muscular origin of the lateral extensor group of the forearm (Figure 1); Lu.5 was over the cubital region; and SJ.5 and LI.4