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Effectiveness of transcutaneous electrical nerve stimulation on relieving pain during radial extracorporeal shock wave therapy, in tennis elbow.

Morral A, Fernández P, Costa L, Bretones JC.

Salut i Esport Rehabilitation Center. Santa Perpetua de Mogoda. E.U.I.Fisioterapia Blanquerna. Universitat Ramon Llull. Barcelona. Spain.
antonimf@blanquerna.url.edu

Introduction

Radial extracorporeal shock wave therapy (rESWT) is widely used as an alternative treatment option in chronic tendinopathies. Beside tennis elbow and chronic plantar fasciitis rESWT was effectively used in chronic calcific tendonitis of the shoulder and also in chronic patella syndrome. Good and excellent results were found in clinical trials which also did not report any relevant clinical side effects. rESWT is designed as a local anaesthetic-free procedure. (Gerdesmeyer, 2004). Although for most patients with tennis elbow, rESWT is an uncomfortable and often painful procedure.
On the other hand, the influence of local anaesthesia on the clinical outcome of ESWT is in discussion. The results of ESWT on plantar heel spur without local anaesthesia has been significantly better than with local anaesthesia (Auersperg 2002, Rompe 2004, Labek 2005).
These problems have stimulated a search for safe and effective analgesia. Transcutaneous electrical nerve stimulation (TENS) is a widely used and safe analgesic which is effective in both acute and chronic pain. TENS has also been used successfully as an analgesic during painful procedures in children, and there have been no important side effects (Lander 1993).
The use of TENS is effective in decreasing the analgesic requirements during extracorporeal shock wave lithotripsy. (Reichelt 1999, Kararmaz 2004, Resim 2005).

The aim of this prospective, randomised, sham controlled study was to evaluate the efficacy of TENS on relieving pain during rESWT in tennis elbow.

Subjects
Between June 2005 and January 2006, a total of 32 patients with tennis elbow (18 men, 14 women) aged 26-61 years (mean 49). Inclusion criteria: Chronic symptoms (history of at least 6 months) and an unsuccessful conservative treatment.

Methods
A randomized, sham controlled study was utilized. The patients were randomly assigned to two groups:

Group I (n=16): Conventional TENS. Parameters: Pulse duration: 150 microseconds. Frequency: 80 Hz. Waveform: Biphasic symmetrical square. Intensity: tingling sensation (15-45 mA).

Group II (n=16): Placebo ("sham TENS"): Identical and fully functional unit but with non-functioning output leads.

The TENS machine used in the study was the Megasonic 313 (Electromedicarin-Spain)
TENS and Placebo was administered for the 10 minutes before rESWT, during the procedure, and for 10 minutes afterwards.

The rESWT was applied on the lateral epicondyle, the pain center was detected by biofeedback.

Electrodes were positioned around the treatment area (bipolar electrode configuration).
The patients were informed that they may or may not experience a slight tingling sensation.

The rESWT device used was Swiss Dolor Clast (EMS-Switzerland). Parameters: 2000 shockwaves. Pressure of 2.4 bar (Energy flux density: 0.08 mJ/mm2 approx.) and 8 Hz of frequency.

The pain intensity perceived during radial extracorporeal shock wave therapy was evaluated using a Standard 100-mm visual analogue scale (VAS). The patients were treated in 3 sessions (at intervals of one week). The evaluation was performed only during the first session.

Analyses
The differences between groups were carried out using U of Mann-Whitney test. Some factors that had no effect, such as age and sex were checked out using multivariate logistic regression analysis. The statistical analysis was carried out without knowledge of the treatments used.(TENS or Placebo)

Results
There were no statistically significant differences between the two groups. (P>0.05).
The median VAS score was 52 (range 20-100), in the TENS group while it was 60 (range 20-100) in the Placebo group. The patients in the TENS group had lower median scores of VAS than patients in the Placebo group, but this difference was not significant (P=0.402) Side effects and complications were not observed.

Conclusion
We conclude that the use of TENS is not effective in decreasing the pain intensity perceived during radial extracorporeal shock wave therapy in tennis elbow.
Further studies of significantly larger groups of patients are necessary to underline the results of this investigation.