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Results of Shockwave Treatment in Lateral Epicondylitis in Relation to Tendon Changes in Power Doppler

Markus Gleitz

Institution: Orthopaedic Practice, Luxembourg, Luxembourg

Device and producing company: Orthogold 100 (MTS) with planar applicator, Storz Duolith

Introduction:
Although ESW treatment of lateral epicondylitis is judged as a standard indication according to the ISMST/DIGEST guidelines, results vary more than for other standard indications. As ESWT is considered as a regenerative treatment stimulating tissue repair the question arises, whether the pre-treatment tissue conditions might have an influence on the treatment results.

Methods:
In a prospective study of 41 patients with chronic unilateral epicondylitis (> 3 months) ultrasound examinations including grey-scale changes and Power Doppler were performed (1 examiner, not blinded) before and 3 months after 3 ESWT sessions, that have been applied at weekly intervals. Power Doppler changes were quantified according to the percentage of surface of neovessels within the common extensor insertion area. Treatment results after 3 months were evaluated using the Visual Analogue Scale (VAS in mm, 0-100) during function. The correlation between pre-treatment ultrasonographic changes and the treatment pain as well as the VAS during function 3 months after ESWT was calculated.

Results:
The amount of neovessels correlated with the treatment pain during ESWT ($r=0.68$, $p<0.05$), making the use of significantly lower treatment energies necessary. The VAS during function 3 months after ESWT was significantly higher ($r=0.76$, $p<0.05$) in patients with an increased amount of neovessels before ESWT.
No correlation was found between the amount of neovascularity and the duration of symptoms before ESWT and the amount of neovascularity and the mean pain VAS before ESWT.

Discussion:
Hypervascularity is considered to be associated with an active inflammatory response and is highly correlated with pain severity. The presence of neovessels and accompanying nerves in areas of tendinopathy are associated with an increased tendon pain.
Neovascularity in Power Doppler seems to be a valid parameter for the estimation of pain during ESWT and predictive estimation of treatment results.
The classical parameters (duration of symptoms, functional scores) are of minor use for the estimation of treatment results.
The unknown presence of neovessels might be the reason for the heterogeneous study results in the literature, as this parameter has never been considered in the highly ranked studies that are usually taken as a reference.

Conclusion:
Pre-treatment tissue conditions vary and determine the treatment results. For this reason ultrasound examinations using grey-scale pictures and Power Doppler should be performed as a routine before ESWT.