

Evaluation with ultrasound and color doppler of the results of ESWT for the control of hypervascular areas in Non-Insertional Achilles tendinosis. Power Doppler: new tool for ESWT

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Device and producing company:

Dornier Epos, Dornier Medical; Logic 5, GE

Introduction: There is considerable controversy regarding the origin of pain in chronic tendinosis. Even though tendon biopsies have shown an absence of inflammatory cell infiltration, recent studies indicate that the pain is closely related to the presence of hypervascularization of the tendon. The preliminary study indicates that the effectiveness of ESWT on the neovessels correlates with reduced pain. The purpose of this study was to confirm the preliminary result and to determine if ultrasound with Power Doppler could be a new tool for determining the appropriate level of ESWT energy for the treatment.

Methods:

We studied patients with Achilles tendinosis. Tendon hypervascularization was rated as: none (0), mild (1), moderate (2), or intense (3), based on Power Doppler ultrasound findings. The effect on pain during Achilles tendon loading activity was evaluated using a visual analogue scale (VAS). In this study 24 Achilles tendons in 23 patients with pain symptoms from the mid-portion of the Achilles tendon were included in the investigation; 18 chronic tendinoses (pain more than 3 months) and 6 recent tendinoses. At follow-up, all patients answered a questionnaire assessing their satisfaction with the result of their treatment, the level of present tendon loading activity, and tendon related symptoms. Clinical and ultrasound follow-up was done three to six weeks after three sonographically-guided shock wave treatments. We compare whether these results indicate an effect on the neovessels similar to that of Eccentric training or US- and CD-guided injections of the sclerosing agent Polidocanol.

Results:

Neovascularization was found inside and outside the ventral side of the region with structural tendon changes in all tendons with chronic painful mid-portion Achilles tendinosis. Only one mild case of neovascularization was found in the recent tendinosis group. Before treatment, the mean VAS-score evaluating the amount of pain during Achilles tendon loading activity was 65 . At the six-week follow up, 22 of 24 patients were satisfied with the treatment, mean VAS score had decreased to 14, and in the majority of the tendons all neovessels had decreased. In the 2 patients that not were satisfied with the treatment (remaining tendon pain), multiple neovessels remained. In the chronic group, the mean VASscore before treatment was 64 and decreased to 18. In the recent tendinosis group VAS-score initially was 68 and decreased to 10, all patients were satisfied, and in one case mild neovascularization appeared for a short time during the treatment.

Discussion:

Treatment subjects received three sessions of ESWT of 2,000 shocks each at maximum energy level 4 (0.17 mJ/mm²). Because the patients receive neither sedation nor anesthesia, the energy level was determined by the maximum pain induced by ESWT that could be tolerated by each patient. In the recent group the mean energy level was 2 (low energy) and in the chronic group the mean level was 4 (mid and high energy). Better results were found in the recent group (VAS divided by 7), which indicate ESWT is effective for early tendinosis. In one case in the recent group, mild neovascularization was found for a short time during the treatment, which could indicate that the mechanism of ESWT on neovessels is different than

that of polidocanol injections (biologic effect and no direct destruction). Good results were found in the chronic group (VAS divided by 3.5) correlating with the decrease of neovascularization.

Conclusion:

This study indicates that the effect of ESWT on the neovessels correlates well with reduced pain. This effect maybe different than the destruction of neovessels by polidocanol injection (biological effect for tendon repair in the Wang model). Ultrasound with Power Doppler could be a tool to determine the level of energy (low energy for tendinosis within neovessels and high energy for hypervascular tendinosis), but additional randomized controlled trials are needed.