

Microcirculatory response to shockwave therapy in acute model - preliminary report

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Device and producing company:

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Introduction:

Regardless of clinical application the exact mechanism of Extracorporeal Shock Wave Therapy (ESWT) remains unknown. The aim of this study was to evaluate influence of ESWT on microcirculation in cremaster muscle flap model and its role in neovascularization and angiogenesis.

Methods:

Cremaster muscles were dissected in 22 Lewis rats divided into 3 groups: 1) Nonischemic baseline controls (n=10); 2) ESWT with 500 impulses (n=6) and 3) ESWT with 200 impulses (n=6) immediately before dissection. Microcirculatory hemodynamic parameters (vessel diameters, functional capillary index, RBC velocity number of rolling, sticking and transmigrating leukocytes in postcapillary venule) were recorded at 1, 2, 3, and 4 hours after ESWT. Tissue Oxygen Partial Pressure (Licox) was measured to check ESWT's influence on tissue oxygenation. Histological evaluation was performed to observe microscopical changes.

Results:

In group 2 we noticed an increased level of functional capillary density (13%) during the first two hours of recordings when compared to the control group. Increased number of rolling, sticking and transmigrated leukocytes (30%) in group 2 was recorded in contrast to group 1. Licox oxygen showed no significant difference between the control group and groups 2 and 3 (18-20mm Hg versus 18.03±1.8mm Hg). Histological evaluation demonstrated no damage to small vessels and capillaries after ESWT nor any increase in inflammatory infiltrates.

Discussion:

Our study showed that following ESWT increased capillary perfusion and leukocyte activation is observed.

Conclusion:

Our results proved that 500 impulses of ESWT does not have negative impact on microcirculation. ESWT may have future application in clinical situations due its role in modification of inflammatory responses and stimulation of capillary perfusion. Further studies are currently underway to evaluate cytokines level and neovascularization factors.