

# **Epicardial Shock Wave Therapy Induces Neoangiogenesis and Improves Left Ventricular Function After Myocardial Infarction in Pigs in Vivo**

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## **Device and producing company:**

CardioGold® CG050 (CRT Cardiac Regeneration Technologies, a subsidiary of TRT, Woodstock, GA, USA / manufactured by MTS-Europe GmbH, Konstanz, Germany)

## **Introduction:**

Therapeutic options of ischemic heart failure are limited. Shock wave therapy (SWT) reportedly induces VEGF overexpression in ischemic myocardium. We hypothesized that epicardial SWT improves ventricular function in an experimental model of ischemic heart failure by inducing neoangiogenesis.

## **Methods:**

Pigs were subdivided in 3 groups: unharmed myocardium with epicardial SWT (healthy control, n=2), infarcted myocardium with epicardial SWT (SWT-group, n=6) and infarcted myocardium without epicardial SWT (control, n=2). Four weeks following myocardial infarction (MI), epicardial SWT (300 impulses at 0.15 mJ/m<sup>2</sup>) was applied directly to the infarcted area in the healthy control and the SWT-group; controls were left untreated. Cardiac function was evaluated using echocardiography before MI, 4 weeks after MI and 4 weeks after SWT. Angiogenesis was evaluated 4 weeks after treatment by immunohistology with vonWillebrand Factor antibody, which was morphometried with Lucia software.

## **Results:**

Compared to healthy controls (68±0.7%), left ventricular ejection fraction decreased in the SWT (43±2.5%, p<0.001) and control group (41±4.2%, p=0.012) 4 weeks after MI. After epicardial SWT, ejection fraction improved in the SWT-group as compared to 4 weeks after MI (62±9.1%, p=0.006), no improvement was observed in the control group (46±5%, p=0.126). As compared to healthy controls (69±1.4%) ejection fraction normalized in the SWT-group 4 weeks after SWT (p=0.358), it remained decreased in the control group (**p=0.031**). **No adverse effects were observed.**

**Discussion:** Epicardial SWT improves left ventricular function after myocardial infarction in pigs.

**Conclusion:** Epicardial SWT therefore seems to be an effective and safe therapeutic strategy for the treatment of ischemic heart disease.