

# **Direct Epicardial Shock Wave Therapy in a Porcine Model of Myocardial Infarction – Pre-clinical Safety and Feasibility Aspects**

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## **Device and producing company:**

CardioGold® CG050 (CRT Cardiac Regeneration Technologies, Woodstock, USA / manufactured by MTS-Europe)

## **Introduction:**

Animal trials with a rodent model of myocardial infarction showed promising results of direct epicardial shock wave therapy (DESWT). Cardiac function improved to a normal level however, safety and feasibility in a large animal model with hearts comparable to human hearts remain unknown.

## **Methods:**

Pigs were subdivided in 3 groups: unharmed myocardium with DESWT (healthy control, n=2), infarcted myocardium with DESWT (SWT-group, n=6) and infarcted myocardium without DESWT (control, n=2). Four weeks following myocardial infarction (MI), DESWT (300 impulses at 0.15 mJ/mm<sup>2</sup>) was applied directly to the infarcted area in the healthy control and the SWT-group; controls were left untreated. According to human cardiac surgery, some animals were treated with heparin prior to DESWT. Cardiac function was evaluated using echocardiography before MI, 4 weeks after MI and 4 weeks after DESWT. Electrocardiographic recording was performed during and after treatment.

## **Results:**

After DESWT, 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 arrhythmias were observed during treatment. In histological examinations no lesions of cardiac cells could be found.

## **Discussion:**

DESWT improves left ventricular function in a porcine model of myocardial infarction. No adverse effects, in particular no arrhythmias or cell lesions, were observed. Even in heparin treated animals DESWT showed no side-effects.

## **Conclusion:**

DESWT therefore seems to be an effective and safe therapeutic strategy for the treatment of ischemic heart disease.