**T3 VERSUS METOPROLOL TREATMENT OF RATS WITH MYOCARDIAL INFARCTION- AND THE WINNER IS?**

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**Background:** Beta blockers are standard therapy for myocardial infarction (MI). Preclinical studies have shown efficacy and safety of thyroid hormone (TH) treatment of cardiovascular disorders. Since THs regulate β-adrenergic receptor expression, we aimed to compare changes in pathophysiology and gene expression between triiodothyronine (T3) and metoprolol (Met) treated rats after MI.

**Method:**Adult Female Sprague-Dawley rats underwent left anterior descending coronary artery ligation (MI) or sham surgeries. T3 (5 µg/kg/d) or Met (100 mg/kg/d) were given in drinking water immediately after surgery for 8 weeks. At terminal experiments, rats were subjected to morphological, functional, and molecular examination.

**Results:**Compared to MI untreated, there were no changes in heart rate or heart weight with either treatment. T3 and Met significantly enhanced left ventricular (LV) contractility (LVFS 21.4±2.6% and 21.1±3.7%, respectively) compared to untreated MI (17.9±1.2%) and decreased the incidence of inducible atrial tachyarrhythmia by 87.5% and 62.5%, respectively. Although both treatments showed efficacy, T3 but not Met showed statistically significant improvements compared to MI in arrhythmia duration, left atrial diameter (T3 vs MI 4.3±0.6 vs. 5.7±1.3 mm, p<0.05), and fibrosis (6.1±0.6%, 6.6±0.6% vs. 8.2±0.7%, T3, Met vs. MI, respectively). Quantitative PCR showed that T3 and Met attenuated expression of genes associated with inflammation and oxidative stress and restored expression of ion channels and contractile proteins. Importantly, thyroid and β-adrenergic signaling genes were favorably regulated by both treatments. However, there were few statistically significant differences between T3 and Met treated MI rats.

**Conclusion:**These results show similar efficacy of long-term treatment with a physiological dose of T3 and Met. Results also suggest T3 as a potential therapeutic alternative for patients intolerant to treatment with β-blockers after MI.