



Granulocyte colony-stimulating factor improves early remodeling in isoproterenol-induced cardiac injury in rats

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Abstract:

Background: Granulocyte colony-stimulating factor (G-CSF) has been used in some animal models and humans with well-established cardiovascular diseases. However, its effects in the initial stage of progressive non-ischemic heart failure are unknown.

Methods: Wistar rats (260–300 g) were divided into three groups: control (without any intervention), ISO (150 mg/kg isoproterenol hydrochloride *sc*, once a day for two consecutive days), and ISO-GCSF (50 µg/kg/d G-CSF for 7 days beginning 24 h after the last administration of ISO). Echocardiography was performed at baseline and after 30 days of follow-up. Subsequently, animals were anesthetized for hemodynamic analysis. The left ventricle was removed for analysis of interstitial collagen deposition and cardiomyocyte hypertrophy.

Results: Isoproterenol led to left ventricular dilation (control, 7.7 ± 0.14 mm; ISO, 8.7 ± 0.16 mm; ISO-GCSF 7.8 ± 0.09 mm; $p < 0.05$), myocardial fibrosis (control, $2.0 \pm 0.18\%$; ISO, $9.1 \pm 0.81\%$; ISO-GCSF $5.9 \pm 0.58\%$; $p < 0.05$) and cardiomyocyte hypertrophy (control, 303 ± 10 µm²; ISO, 356 ± 18 µm²; ISO-GCSF 338 ± 11 µm²; $p < 0.05$). However, G-CSF partially prevented collagen deposition and left ventricular enlargement, with a slight effect on hypertrophy. Characterizing a compensated stage of disease, hemodynamic analysis did not change.

Conclusion: G-CSF administered for 7 days was effective in preventing the onset of ventricular remodeling induced by high-dose isoproterenol with decreased collagen deposition and chamber preservation.

Key words: isoproterenol, heart failure, G-CSF, collagen
