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CARDIAC FUNCTION AND HEART FAILURE

THERAPY WITH ADULT BONE MARROW-DERIVED MESENCHYMAL STEM CELLS AMELIORATES DOXORUBICIN-INDUCED CARDIOMYOPATHY

ACC Poster Contributions
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Background: The cardiotoxicity of doxorubicin (DOX) is a major limitation for its use as an anticancer drug. We sought to determine whether transplantation of adult bone marrow-derived mesenchymal stem cells (MSCs) will attenuate DOX-induced cardiomyopathy.

Methods: Three groups of female Sprague Dawley rats were used. Group I (sham, n=6) received vehicle, while groups II (n=14) and III (n=11) received DOX (10 mg/kg i.p. divided in 4 doses over 2 wk). MSCs were isolated from adult male rats, expanded in culture, and labeled with DiI. One week after the first dose of DOX, groups II and III received i.v. injection of either vehicle or 10 million MSCs, respectively. Echocardiography was performed prior to DOX injection (BSL), before MSC injection (BSL2), and at 1, 2, and 4 wk after cell therapy.

Results: Four wks after cell therapy, compared with group I, LV EF was significantly lower and LV end-systolic diameter and end-diastolic volume were significantly greater in group II, consistent with DOX-induced cardiomyopathy; while MSC therapy in group III alleviated these adverse outcomes (Fig). MSC therapy also mitigated the progressive increase in LV mass associated with dilated cardiomyopathy in group II (Fig). During the entire study period, the overall mortality in DOX-treated rats reached 50%, and MSC therapy improved survival.

Conclusions: Transplantation of MSCs protects against adverse cardiac consequences of DOX. This novel therapy may be useful to prevent cardiomyopathy in DOX-treated cancer patients.