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Title: Feasibility of eccentric exercise training (ECCt) in monocrotaline (MT) rats: Effects on survival, echocardiographic and hemodynamic parameters

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Body: ECCt may be of interest in patients with pulmonary hypertension (PH) because cardiac solicitation is much lower during ECC than during concentric exercise, performed at the same mechanical power. Aims: We assessed the feasibility, hemodynamic and survival effects of ECCt in MT rats with PH. Methods: ECCt on treadmill was initiated 2 weeks after MT injection (40mg/kg) (30 minutes at 50% of maximal speed, slope: -15°, 5 days/week for 4 weeks). Trained rats (MTecc, n=13, control ECC (CLEcc), n=7) were compared with sedentary rats (MTsed, n=13, CLsed, n=7). Before and after 2 and 4 weeks training, maximal speed measurement and echocardiography were performed. At 4w, right ventricular (RV) catheterisation was performed. Results: The RV systolic pressure was 40±2 mmHg in MT, and 22±1mmHg in CL rats (p<0.001). Exercise was generally well tolerated. In the MTecc and MTsed groups, 3 and 2 rats developed right heart failure and died. Maximal speed significantly increased in trained rats at 4 w (p<0.001) [figure]. Echocardiographic parameters were not significantly different in MTsed and MTecc (cardiac output (CO), tricuspid annular plane systolic excursion (TAPSE), pulmonary artery flow acceleration time (PAAT) [figure]. RV systolic pressure was not different in MTecc (36±4mmHg) and in MTsed (42±3mmHg).

Conclusion In this PH model, ECCt was well tolerated and not detrimental to the hemodynamic condition and survival. Whether ECCt could be an adjuvant therapy in PH deserve to be further investigated.