

The Effect of modafinil in pulmonary hypertension rat models.

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Introduction: Pulmonary arterial hypertension (PAH) is difficult to treat and is characterized by increased pulmonary arterial pressure. PAH causes right ventricular failure and possibly even death due to progressive increase in pulmonary vascular resistance. PAH has been shown to be refractory to most of the conventional pharmacological therapies. So we want to verify the effect of modafinil in pulmonary hypertension rat models. Modafinil increases cyclic AMP concentrations in aortic smooth muscle cell (SMC)s and phosphorylated KCa3.1 channels. KCa3.1 channels are related to vessel relaxations and proliferation of SMCs. There was no any report about modafinil in pulmonary hypertension.

Methods: Six-week-old male Sprague Dawley rats were used. The rats were grouped as follows: The control (C) group (subcutaneous injection of saline), monocrotaline (MCT) group (subcutaneous injection of MCT 60 mg/kg), modafinil group (MD group) (gavage feeding of modafinil 50 mg/kg/day). One day after MCT injection, rats were sacrificed in weeks 1, 2 and 4. Pulmonary arterial pressure (PAP) was measured by a catheter introduced into the internal jugular vein.

Results: The mean RV pressure significantly increased in the MCT group compared to the C group and significantly decreased in the MD group compared with the MCT group in weeks 1, 2 and 4. Systemic pressure showed no significant changes in the three groups. The ratio of RV/LV+septum significantly increased in the MCT group compared to the C group in weeks 2 and 4 and significantly decreased in the MD group compared to the MCT group in week 4.

Conclusion: After modafinil treatment, there were improvements of RVH and mean RV pressure. Additional research on the dosage and frequency of modafinil is needed to determine the optimal parameters for PAH treatment.