Sildenafil Inhibits pulmonary hypertension induced by left heart pressure overload in rats

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Pulmonary hypertension (PH) induced by pressure overload of the left heart has recently attracted attention in clinical practice. No specific treatment of PH is approved for this group of patients. We previously described a simple rodent model of this condition. We used this model to test a hypothesis that sildenafil can be beneficial in PH induced by experimental left ventricle pressure overload induced in adult male Wistar rats by partial intravascular obstruction of the ascending aorta. Three weeks after induction of PH, sildenafil was given (25mg/kg), by esophageal gavage once a day for the next 2 weeks (group HFS, N=7). The group HFS was compared to the group of rats with left heart pressure overload lasting 3 weeks with no additional use of sildenafil (group HF, N=9) and with the controls (group C, N=6). Mean pulmonary arterial pressure was significantly lower in the group HFS compared to the group HF (12.9±0.8 mmHg vs. 20.3±1.0 mmHg, p<0.0001, respectively) but was not different from the group C (10.7±1.1 mmHg). Weight of the right ventricle relative to the body weight (RV/BW ratio) as well as right ventricle weight relative to the left ventricle plus septum (RV/LV+S ratio) were significantly lower in the group HFS compared to the group HF (RV/BW ratio: 4.1±0.3.10⁻⁴ vs. 6.3±0.8.10⁻⁴; p<0.01, respectively and RV/LV+S ratio: 0.23±0.02 vs. 0.41±0.07; p<0.05, respectively) but they were not different in the group HFS compared to the group C in both parameters. The amount of expired nitric oxide, measured by chemiluminescent method on day 10 of the left heart pressure overload, was significantly increased in the group HF compared to the group C (343.0±30.5 pg/min/100g vs. 239.8±18.2 pg/min/100g; p<0.05, respectively).

Sildenafil attenuated the developed pulmonary hypertension caused by the left heart pressure overload in the rats.

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