

Inhaled Nitric Oxide after Superior Cavopulmonary Anastomosis – Effects on Cavopulmonary Pressure and Oxygen Saturation

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Introduction. Possible clinical problems in patients early after superior cavopulmonary anastomosis include low arterial oxygen saturation and/or high cavopulmonary pressure, which results in upper body congestion. Mild hypercapnea in order to lower cerebral vascular resistance was proposed for managing hypoxemia in such patients. The role of selective pulmonary vasodilation after superior cavopulmonary anastomosis remains unclear. This study aims to investigate the hemodynamic effects of inhaled nitric oxide (iNO) in children early after superior cavopulmonary anastomosis.

Methods. The medical files of 18 patients treated with iNO early after superior cavopulmonary anastomosis were retrospectively studied. The cavopulmonary pressure and the arterial oxygen saturation were serially measured before iNO treatment and in the first 24 hours after initiating it. Their changes were investigated with the paired samples T-test. A potential correlation between the arterial oxygen saturation and the arterial partial CO₂ pressure (pCO₂) was also searched. A value of $p \leq 0.05$ was considered significant.

Results. The age of the patients ranged from 3 months to 2.5 years, median – 9 months. Median dose of iNO was 20ppm (range 10-20ppm). Initial cavopulmonary pressure was 17.5 ± 2.96 mm Hg and it changed to: 16.9 ± 3.1 mm Hg at the first hour ($p=0.35$); 16.2 ± 2.6 mm Hg at the 6th hour ($p=0.045$); 15.8 ± 2.8 mm Hg at the 12th hour ($p=0.008$) and 14.9 ± 2.5 mm Hg at the 24th hour ($p=0.010$). Initial arterial oxygen saturation was $78.2 \pm 10.1\%$ and it changed to: $79.2 \pm 10.4\%$ at the first hour ($p=0.255$); $80.1 \pm 9.4\%$ at the 6th hour ($p=0.051$); $81.3 \pm 9.2\%$ at the 12th hour ($p=0.068$) and $80.5 \pm 9.7\%$ at the 24th hour ($p=0.126$). The pCO₂ did not change significantly during the 24 hours of treatment and there was an insignificant slight negative correlation between pCO₂ and arterial oxygen saturation (Pearson coefficient = -0.21, $p=0.054$).

Conclusions. Patients after superior cavopulmonary anastomoses with cavopulmonary pressures above 15mm Hg and/or arterial oxygen saturation below 80% may benefit from iNO inhalation. We observed significant reduction of the cavopulmonary pressure for 24 hours after initiating the treatment. There was also a tendency for elevation of the arterial oxygen saturation, which was unrelated to changes in pCO₂.