A565 - Use of hypoxic gas mixture in neonates with single ventricle physiology prior to the norwood procedure

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Introduction:
In neonates with univentricular physiology, there is a delicate balance between pulmonary and systemic circulations, with a tendency towards generous pulmonary blood flow, and a risk of systemic underperfusion. Preoperatively, the use of hypoxic gas mixture (HM) has been advocated as a therapy to increase PVR, with the aim of improving systemic oxygen delivery. It is a therapy which has been routinely initiated in our institution in the setting of signs of pulmonary overcirculation.

Methods:
We performed a retrospective analysis of all patients in our institution who underwent a Norwood procedure and who received HM preoperatively. We compared peripheral saturations, arterial blood gas analysis, serum lactate, regional cerebral and renal saturations and invasive blood pressure, prior to, and then 4, 8 and 24 hours after HM was commenced.

Results:
Between 2014 and 2018 (inclusive), 49 patients underwent the Norwood procedure. 18 patients received preoperative HM. Average FiO2 was 17% during administration of HM. Average peripheral saturations were 96.1% prior to HM, and dropped to 87.4% at 4 hours, and 88% at 8 and 24 hours after initiation (p < 0.05). There was no change in any of the measured markers of systemic oxygen delivery, including regional cerebral and renal saturations, lactate, urine output or blood pressure. There was an association between an extended period of HM (> 48 hours) and the need for pulmonary vasodilator therapy post Norwood procedure.

Conclusion:
Hypoxic gas mixture in patients with parallel systemic and pulmonary circulations causes desaturation and hypoxia. It does not lead to an increase in systemic perfusion and thus an improvement in systemic oxygen delivery. Its ongoing use in this fragile population should be considered.