

PW1-9

Comparison of the effect of inhaled with intravenous anaesthetic on pulmonary vascular resistance measurement at cardiac catheterisation

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Introduction: Children with pulmonary hypertension (PH) require assessment of pulmonary vascular resistance (PVR) to determine the effectiveness of medical therapy and whether cardiac surgery is safe to perform. It is crucial that anaesthetic drugs have minimal effect on PVR. Propofol has been evaluated in children with congenital heart disease, and isoflurane in adults with PH, but the effect of these anaesthetic drugs on haemodynamics in PH is unknown. We aimed to undertake a randomised cross-over pilot study of 10 children to evaluate the equivalence of isoflurane and propofol on PVR in children with pulmonary hypertension

Methods: After ethical and MHRA approval we recruited 10 children undergoing cardiac catheterisation for assessment of PVR. All children had PH (tricuspid regurgitant velocity of more than 2.8 m/s) with evidence of raised PVR and were randomised to receive propofol or isoflurane. Blinded measurements were taken at baseline, response to Nitric oxide (NO) 10 parts per million (ppm), NO 20 ppm, and NO 20 ppm with 100% oxygen. Baseline measurements were repeated using the other anaesthetic drug after wash in / wash out of 15 minutes. BIS (alertness) monitoring was used to reduce the risk of awareness.

Results: 10 children were studied, median age 20 months, median weight 9.5kg. 6 children received propofol (Pro) then isoflurane (iso), 4 children received Iso then Pro. There was no significant difference in baseline PVR (Iso: 3.5 U.m2, Pro: 3.2 U.m2, $p = 0.16$) or SVR (systemic vascular resistance) (Iso: 14.1 U.m2, Pro: 16.4 U.m2, $p = 0.24$) or shunt fraction (Qp/Qs) (Iso: 0.32, Pro: 0.32, $p = 0.86$) when measured under isoflurane or propofol anaesthesia. There was no significant difference in BIS values (Iso: 50, Pro: 47, $p = 0.12$) or lung compliance (Iso: 11.8 ml.cmH2O, Pro: 11.6 ml.cmH2O, $p = 0.64$) between isoflurane and propofol anaesthesia. There were no adverse incidents.

Discussion: Propofol and isoflurane are equivalent with respect to their effects on PVR in children with pulmonary hypertension. The effects on SVR and shunt fraction are also equivalent. This pilot study suggests that either can be used for the assessment of children with PH.