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SURVEY ON DILUTION OF POTENT VASOACTIVE MEDICATIONS FOR INFUSION DURING HEART SURGERY IN CHILDREN AND INFANTS

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Introduction and aims

Vasoactive medications are commonly used during congenital cardiac surgery. The Neonatal and Paediatric Pharmacist Group (NPPG), in conjunction with the RCPCH, has produced guidance which seeks to standardise infusions of intravenous medications. This includes vasoactive medications used during cardiac surgery. Accurate and timely administration of vasoactive medications is vital to ensure safe care of patients. The aim of this survey was to identify current practice, beliefs, and preferences about drug dilution and whether these were in keeping with the proposed guidance.

Methods

Two surveys were distributed to members of the congenital cardiac anaesthesia network (CCAN). An organisational survey questioned which vasoactive drugs are currently in use and how they are prepared in each institution. A member's survey interrogated respondents' beliefs and preferences about optimal drug dilutions, use of programmable pumps and safety around vasoactive drug infusions. This was done by asking their degree of agreement or disagreement with several statements; their preferred dilution of adrenaline for children of different weights; and for general comments.

Results

Organisational survey responses were received from all 12 paediatric cardiac surgical centres in the UK and Ireland. A range of vasoactive medications are in use, with 12/12 centres using milrinone and 11/12 centres using noradrenaline / adrenaline. Dilution methods varied, with programmable pumps in use in 6/12 centres.

51 responses were received from CCAN members including 39 UK consultant anaesthetists and 12 working abroad. 48/51 (94%) respondents agreed drug errors pose a risk to patient safety and steps should be taken to minimise them. 41/51 (80%) believe programmable pumps improve patient safety and 35/51 (69%) would welcome the supply of pre-diluted drugs.

Discussion and conclusion

The survey results demonstrated variation in dilution. In smaller patients broadly similar concentrations are used to those recommended by the RCPCH, however in patients ≥ 20 kg, the majority would prefer more dilute concentrations of adrenaline. This shows a need for flexibility that considers different requirements relating to vasoactives in PICU compared with cardiac anaesthesia. The RCPCH guidelines' tendency towards more concentrated infusions reduces fluid load.

Intraoperatively, for the short-acting catecholamines adrenaline and noradrenaline, more dilute infusions allow delivery of variable doses in response to rapidly changing physiology. These drugs have a wide dosage range of 0.01-5mcg/kg/min, with intraoperative requirements at the lower end compared to general PICU requirements, especially those used in patients with sepsis. With higher concentrations, lower infusion rates are dependent on highly accurate infusion pumps. As a result, there needs to be flexibility in any guidelines that allow for variation in disease process and clinical requirements, as well as input from manufacturers regarding the accuracy of infusion pumps. Guidelines such as this require wider consultation in order to ensure that these issues are considered.

Reference

1. Neonatal & Paediatric Pharmacists Group. 2021. Standardising Intravenous Infusion Concentrations for Children in the UK. A Proposal for a National Approach <https://www.rcpch.ac.uk/sites/default/files/2021-05/Standard%20Infusions%20JMC%20Paper%20v0.2.pdf>