

# P14

## ESTIMATED PROPOFOL VOLUMES FOR PAEDIATRIC TCI RELATED TO PATIENT WEIGHT, TARGET CONCENTRATION AND PROCEDURE DURATION

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### **Background/Context**

Total Intravenous Anaesthesia (TIVA) has become increasingly popular in Paediatric Anaesthetic practice in recent years.<sup>1</sup> Part of the reason for this is the realisation that volatile anaesthetic gases and nitrous oxide are greenhouse gases and contribute to global warming. Propofol is the mainstay of TIVA, and has been shown to have a much lower global warming potential (GWP) than anaesthetic gases.

### **Problem**

Although propofol has less GWP than anaesthetic gases, it does still potentially have an environmental impact. Waste propofol needs to be incinerated at very high temperatures to destroy the molecule and the drug has been found in aquatic marine life.<sup>2</sup> Therefore, minimising propofol wastage as part of TIVA should be a consideration for all Paediatric Anaesthetists.

### **Strategy for change**

Minimising propofol wastage relies on the anaesthetist having some idea of the volume of propofol required for each case undertaken. In paediatric anaesthetic practice this will vary depending on the age and size of the child, the target concentration of propofol administered, and the duration of the procedure.

Using the TIVA Trainer programme, anaesthetics up to 60 minutes duration were simulated using the Paedfusor model, at weights from 10 to 60 kg, and at propofol plasma target concentrations of 3, 4 and 5 µg/ml. The total volume of propofol used in each scenario was calculated and recorded.

Modelling demonstrated that for patients up to 25 kg in weight, you would never need more than 50 mls of propofol for a procedure of 60 minutes duration, as long as the propofol target concentration was 5 µg.ml<sup>-1</sup> or less.

It also demonstrated that for patients between the weights of 45 and 60 kg, a standard volume of propofol can be used, as the pharmacokinetic changes in the Paedfusor model appear to negate much of the variation in volume with weight seen in smaller children.

## **Measure of improvement**

By using the information provided from this modelling exercise, Paediatric Anaesthetists can better assess the volume of propofol required for each procedure. Documentation of the wastage of propofol for each case over a period of time, will give an indication of how accurately the calculated values reflect actual clinical practice.

## **Lessons learnt**

Estimation of the amount of propofol required for short anaesthetics can be made prior to starting. This will potentially reduce the amount of propofol wastage, which may have both environmental and financial benefits.

## **Message for others**

Modelling can never be totally accurate, as it relies on too many different variables to be constant. However, it does give the anaesthetist some idea of the amount of propofol that will be needed for each case undertaken with TIVA.

## **References**

1. Goh AN, Bagshaw O, Courtman S. A follow-up survey of total intravenous anesthesia usage in children in the U.K. and Ireland. *Paediatr Anaesth.* 2019; 29:180-185.
2. Allen C, Baxter I, Oyedele O, Childs J. But what about the fish? Ecotoxicology and anaesthesia. *Anaesthesia News* 2021; 404-1.