Which route of induction is best for elective paediatric patients?

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Over 1000 anaesthetics are given to paediatric patients every day. The route of induction is mainly determined by anaesthetist preference and training, although patient, parental and auxiliary staff opinion influences the decision. What are the consequences of gaseous and intravenous induction in children?

PHYSICAL CONSEQUENCES

Propofol and sevoflurane are the gold standards in intravenous and inhalational induction. Viitanen et al (1999) compared propofol and sevoflurane induction in identically maintained paediatric anaesthesia and found that intubating conditions are similar and adverse airway reactions are few in either group. Heart rate and mean arterial pressure decrease but without severe hypotension or bradycardia. Propofol has a longer residual effect in immediate recovery but does not affect discharge or home recovery. An induction dose of propofol does not significantly affect the incidence of vomiting.

When considering the safety of induction route the risk of desaturation is important. Observing pulse oximetry values in a range of elective paediatric cases shows that about 30% of intravenous inductions result in desaturation to below 90% compared to 0% in gaseous inductions (Laycock and McNicol, 1988). Although desaturation occurs more often in intravenous induction it does not mean it is less safe. Securing intravenous access allows the anaesthetist to concentrate fully on the airway which is arguably safer.

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PSYCHOLOGICAL CONSEQUENCES

Several studies have looked at the long-term psychological consequences of induction route. Kotiniemi and Ryhanen (1996) studied 90 premedicated 2–7-year-olds scheduled for ear, nose and throat (ENT) operations. They were randomly assigned to intravenous (thiopentone but no EMLA), gaseous (halothane) or rectal (methohexitone) induction and had subsequent identical maintenance of anaesthesia. A post hospital behavioural questionnaire was issued to all parents. Significantly more children in the inhalational group had negative memories of hospital (61% gaseous, 38% intravenous and 28% rectal). Regarding induction of anaesthesia 21% of inhalational patients had a negative memory of this compared with 7% of intravenous and 3% of rectal.

Hamer-Hodges (1960) published a departmental audit of unpremedicated children admitted for ENT operations. Postoperative questionnaires were circulated to parents asking about postoperative behaviour and memories. The results were compared with a previous departmental audit where children were anaesthetized via open induction.

The significant difference in the results heavily favours those children in whom anaesthesia was induced intravenously. Comparing the 83 children in the gaseous arm with the 119 children in the intravenous arm 11% of the gaseous group did not like hospital compared with 7% of the intravenous group; 25% of the gaseous group cited anaesthesia as a particular fear compared with 14% of the intravenous group; 43% of the gaseous group were reluctant to submit to a similar procedure compared with 13% of the intravenous group; 16% of the gaseous group had postoperative behavioural changes compared with 5% of the intravenous group; 38% of the gaseous group commented unfavourably about induction compared with 8% of the intravenous group. How these figures contribute to long-term hospital phobia and avoidance issues is not known.

CONCLUSION

The physical differences between intravenous and gaseous inhalation appear minimal with both regarded as generally very safe. The psychological outcome is better for children anaesthetized intravenously, and the authors believe this to be the best route for paediatric induction.

Most, but not all, anaesthetists would induce via this route. The extent of perseverance in cases complicated by logistical factors, patient preference or auxiliary staff interference can be attenuated by a number of methods. Improving staff education, improving patient cooperation and improving cannulation rates will help achieve a safer and less traumatic induction for the patient. HM

Hamer-Hodges RJH (1960) Induction of anaesthesia in young children. *Lancet* **i:** 82–7

Kotiniemi LN, Ryhanen PT (1996) Behavioural changes and children's memories after intravenous, inhalation and rectal anaesthesia. *Paediatr Anaesth* **6:** 201–7

Laycock G, McNicol L (1988) Hypoxaemia during induction of anaesthesia – an audit of children who underwent general anaesthesia for routine elective surgery. *Anaesthesia* **43:** 981–4

Viitanen H, Tarkkila P, Mennander S, Viitanen M, Annila P (1999) Sevoflurane-maintained anaesthesia induced with Propofol or Sevoflurane in small children: induction and recovery characteristics. *Can J Anaesth* **46:** 21–8

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