

Reply to 'Transnasal humidified rapid-insufflation ventilatory exchange (THRIVE) in children: a randomized controlled trial'

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Editor—We read with great interest the article by Humphreys and colleagues¹ and accompanying editorial² describing the assessment of apnoeic times in children of different age groups using transnasal humidified high-flow nasal cannulae oxygenation (referred to as THRIVE). We note that the majority of the literature presented to date relates to prolonging apnoeic oxygenation time during induction of anaesthesia and intubation, particularly in patients at higher risk of hypoxaemia, such as children, those under critical care, and emergency intubations. Our institutional experience suggests that there is a significant group of paediatric patients who would benefit from THRIVE techniques, who were excluded from the study by Humphreys and colleagues,¹ namely those with known airway abnormalities.

Rather than focusing on the use of THRIVE techniques during apnoea, our goal is to preserve spontaneous ventilation at all times during airway assessment and intervention procedures by the ear, nose, and throat (ENT) and respiratory teams in our tertiary children's hospital. The combination of THRIVE oxygenation with propofol and remifentanyl total i.v. anaesthesia (TIVA) has been used successfully in >30 patients recently, the majority in infants and neonates, such that this has now become the institutional standard approach for these patients. The benefits of the THRIVE and TIVA combination are that both ventilation and maintenance of anaesthesia are delivered concurrently, but independently of each other, allowing titration of each to patient vital signs and responses.

Our technique involves i.v. induction of anaesthesia with a propofol and remifentanyl mixture using the Paedfusor TCI model (Alaris PK Syringe Pump, Carefusion, Basingstoke, UK), with gradual titration to a target plasma concentration of 2.5–3.5 µg ml⁻¹. At this concentration, spontaneous ventilation is uniformly preserved. Once depth is assessed as adequate, the supraglottis, larynx, and trachea are topically anaesthetized with lidocaine 1 or 2% under direct vision using videolaryngoscopy (Mac McGrath Videolaryngoscope; Medtronic). THRIVE nasal oxygenation is then applied (Fisher and Paykel), with a flow rate of 2 litres kg⁻¹ min⁻¹ (up to a maximum of 30 litres min⁻¹), and the fractional inspired O₂ is titrated to maintain haemoglobin oxygen saturation of 95–99%. The patient is then placed in suspended laryngoscopy using a Parsons laryngoscope by the ENT surgeons and the procedure commenced. The target controlled infusion (TCI) target is titrated

to preserve a respiratory rate of 10–20 min⁻¹. End-tidal capnometry is obtained by connecting a sampling line to the sampling port of the Parsons laryngoscope. We were pleased to see transcutaneous capnometry being used by Humphreys and colleagues¹ as we have also used this in smaller neonates to demonstrate transcutaneous CO₂ partial pressure values of 6.5–7 kPa measured after 30–40 min of operating time, similar to findings in adults,³ providing reassurance that adequate ventilation, not only oxygenation, is occurring.

The benefit of preserving spontaneous ventilation is that it facilitates dynamic assessment of vocal cord function, laryngomalacia, and tracheomalacia, which would not be possible during apnoea. Surgical interventions that have been performed include aryepiglottoplasty, subglottic cyst excision, tracheal dilatations, and endoscopic cricoid splits in patients with ages of 6 days to 13 yr and weights ranging from 2.1 to 45 kg.

We commend Humphreys and colleagues¹ for highlighting the use of this technique in paediatric practice and would like to propose an extended utility of this technique, in combination with propofol and remifentanyl TIVA, to facilitate excellent tubeless field operating conditions for paediatric airway surgery.

Declaration of interest

None declared.

References

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