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## Editorial

# Tracheal intubation without neuromuscular blocking drugs in children

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Studies of tracheal intubation without neuromuscular blocking drugs in adults and children have focussed on intubating conditions, hemodynamic responses and changes in intraocular and intracranial pressure or cerebral blood flow velocity. These studies go back some 20 years and techniques have evolved as new drugs have been introduced (1). Thus, volatile or intravenous agents have been used alone or in combination, or with opioids, nitrous oxide, lignocaine or premedication. Study designs have varied widely from open dose-finding studies to double blind randomized controlled trials. Comparisons of single drugs with combinations of drugs or with muscle relaxants have been made and clinical practice surveys have shown that these techniques have become quite popular (2,3). The assessment of intubating conditions has largely been standardized (4) but the blinding of observers and inter-observer variability in the assessment of intubating conditions and in the timing of tracheal intubation has not been well controlled in some studies. Why have clinicians adopted these techniques when neuromuscular blocking agents have become 'cleaner', shorter acting, more easily reversible, or possess characteristics which make reversal unnecessary (5)? The initial motivation was to avoid suxamethonium particularly after induction with halothane or to avoid relatively long acting muscle relaxant agents for relatively short surgical procedures (6,7). There was also interest around this time in techniques for ameliorating the pressor response to tracheal intubation and consequently also the rises in intra-ocular and intracranial pressure (8–14). With the introduction of propofol and analogues of fentanyl with rapid onset and offset of effect, techniques were developed to secure adequate intubating conditions rapidly without neuromuscular blocking drugs whilst concurrently controlling the pressor response to intubation (4,15–28). Sevoflurane has largely replaced halothane for inhalational induction in the last 15 years and it was natural, that intubating conditions produced by this newer agent should be assessed (29–35) and compared with other agents and techniques (36–39). Adjuvants to sevoflurane which have been studied include nitrous oxide (40), lignocaine (41), clonidine (42–45) and remifentanyl (46,47). In this issue of *Pediatric Anesthesia* (48), a study of sevoflurane induction with propofol supplementation for tracheal intubation attempts to formally analyse a technique which is quite widely employed but has not been widely reported. With increased use of the laryngeal mask airway in children, the number of

children requiring tracheal intubation has reduced significantly but for many operations where a tracheal tube is required, muscle relaxation is not necessary and this literature now strongly supports relaxant-free techniques in children for elective surgery. It is clear that neuromuscular blocking agents are among the most common triggers of anaphylactoid reactions associated with anesthesia (49) and there is now a school of thought which suggests that their use must be justified when alternative methods are available to reduce the risk of such reactions. As always, the alternative techniques are not without risk, and cases of hypotension, bradycardia, sinus arrest, asystole and airway damage have been reported when relaxant-free methods have been used. The administration of vagolytic agents prior to attempting intubation has been recommended when such \_vagotonic\_ drug combinations are administered to children. Continued vigilance and critical incident reporting systems

will reveal the prevalence of such adverse events. It is also important to emphasize that nearly all studies have been in healthy, elective children with normal airway anatomy and the results cannot be extrapolated to emergency cases, ill children and those with airway abnormalities. The doses of drugs and combinations of drugs recommended from this body of literature may result in serious adverse effects in sick children. Where control of hemodynamics, intraocular pressure or intracranial pressure is critical, techniques involving muscle relaxants with opioid adjuvants will still be recommended (50–53). However, relaxant-free techniques of tracheal intubation do work well in the majority of pediatric cases and should be in the repertoire of every pediatric anesthetist. The most useful techniques are propofol or remifentanyl supplementation after a sevoflurane induction or either a propofol/alfentanil or a propofol/remifentanyl induction sequence.

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