

PROPOFOL (Comment)

Brief use during intubation

Quite a lot babies still undergo endotracheal intubation in the first few weeks of life without prior anaesthesia, analgesia, or sedation (Chaudhary *et al.*, 2009), and the premedication used when time does allow is often complex (as is outlined in this *Formulary's* monograph on suxamethonium). Many strategies involve the use of an opiate to relieve pain, although it is recognised that most opiates only provide good analgesia several minutes after IV administration. Many clinicians also use suxamethonium (q.v.) because it reduces muscle tone, making intubation much easier, and some still hold that, if suxamethonium is used, atropine (q.v.) or glycopyrronium (q.v.) also needs to be used as (although the case for this in a neonate has been challenged). Some clinicians now use mivacurium (q.v.) because it does not cause the brief period of muscle fasciculation sometimes seen initially with suxamethonium, although it does leave the baby paralysed for some 10–20 minutes. All would acknowledge that laryngeal intubation is not a manoeuvre that would ever be attempted in an older child except under general anaesthesia or following the use of a local anaesthetic (such as a lidocaine spray).

Some centres are now using the opioid remifentanyl (q.v.) to provide brief but rapid analgesia within less than a minute, and a 2–3 microgram/kg dose given over 60 seconds seems to provide enough relaxation to render muscle paralysis unnecessary in the neonate (Welzing *et al.*, 2009) although it does often cause some transient apnoea. Whether it reduces the distress and fear involved when used for older children is less clear. Indeed the need for *any* opiate can be questioned because, while intubation, if skilfully done, will still be frightening, and stressful, it should only cause transient pain. So while a good case can be made for using an opiate during intubation if an opiate infusion is then going to be continued, at least initially, while the child is receiving respiratory support, controlled trials have now thrown doubt on the routine use of opiate sedation in most ventilated babies (see this *Formulary's* morphine web commentary).

It could, therefore, be argued that all that is *really* needed to make intubation stress free is to render the patient briefly unconscious. Ketamine (q.v.) has long been used to cover minor surgical procedures in older children, but there is almost no experience of its use in the neonate. However it is now being suggested that propofol might be an excellent agent for taking the stress out of neonatal intubation, and that a 2.5 mg/kg IV dose is almost always enough, on its own, to cause relaxation without apnoea and render the baby oblivious to the stress involved (Ghanta *et al.*, 2007). In the few babies in which such a dose did not rapidly make it easy to visualise the larynx, a second similar dose was always effective. A 2–3 mg/kg IV dose of propofol under light sevoflurane anaesthesia certainly seems to make the use of a muscle relaxant and/or opiate unnecessary in slightly older children (Lerman *et al.* 2009). The use of propofol could certainly make intubation less stressful for infants being cared for by the many appropriately trained but non-medically qualified members of staff who can now give most medicines in the UK, but who are not allowed to use opiates or other controlled drugs on their own authority. Even though *sustained* propofol use is clearly hazardous in young children (Kam and Cardone, 2007) there is no evidence that short term use is dangerous and, in the hands of suitably trained nurses or doctors, it can provide one way to provide safe short term sedation in slightly older children (Vespasiano, *et al.* 2007).

References

- Anand KJS, Whit Hall R, Desai N, *et al.* Effects of morphine analgesia in ventilated preterm infants: primary outcomes from the NEOPAIN randomised trial. *Lancet* 2004;**363**:1673–82. [RCT]
- Hall RW, Kronsberg SS, Barton BA, *et al.* Morphine, hypotension, and adverse outcomes among preterm neonates: Who's to blame? Secondary results from the NEOPAIN trial. *Pediatrics* 2005;**115**:1351–9. (See also 1416–8. and **117**:250–3.) [Secondary NEOPAIN trial outcomes.]
- Carbaja R, Lenchen R, Jugie M, *et al.* Morphine does not provide adequate analgesia for acute procedural pain among preterm neonates. *Pediatrics* 2005;**115**:1494–500. [Nested study within the NEOPAIN trial.]
- Bhandari V, Bergqvist LL, Kronsberg SS, *et al.* Morphine administration and short-term pulmonary outcomes among ventilated preterm infants. *Pediatrics* 2005;**116**:352–9. (See also 492–3.) [Secondary NEOPAIN trial outcomes.]
- Crawford MW, Hayes J, Tan JM. Dose-response of remifentanyl for tracheal intubation in infants. *Anesth Analg* 2005;**100**:1599–604.
- Simons SHP, Roofthoof DWE, van Dijk M, *et al.* Morphine in ventilated babies: its effects on arterial blood pressure. *Arch Dis Child* 2006;**91**:F46–51. [Secondary Dutch RCT outcomes.]
- Dempsey EM, Al Hazzani F, Faucher D, *et al.* Facilitation of neonatal endotracheal intubation with mivacurium and fentanyl in the neonatal intensive care unit. *Arch Dis Child* 2006;**91**:F279–82.
- Roberts KD, Leone TA, Edwards WH, *et al.* Premedication for nonemergent neonatal intubations: a randomized, controlled trial comparing atropine and fentanyl to atropine, fentanyl, and mivacurium. *Pediatrics* 2006;**118**:1583–91. [RCT]
- Bergqvist LL, Ersson M, Kronsberg AA, *et al.* Seeing through the blind! Ability of hospital staff to differentiate morphine from placebo, in neonates at a placebo controlled trial. *Acta Paediatr* 2007;**96**:1004–7
- e Silva YP, Gomez RS, Marcatte J de O, *et al.* Morphine versus remifentanyl for intubating preterm neonates. *Arch Dis Child* 2007;**92**:F293–4. [RCT]
- Allgaert K, Peeters MY, Verbesselt T, *et al.* Inter-individual variability in propofol pharmacokinetics in preterm and term neonates. *Br J Anaesth* 2007;**99**:864–70.

Ghanta SW, Abdel-Latif ME, Lui K, *et al.* Propofol compared with the morphine, atropine, and suxamethonium regimen as induction agents for neonatal endotracheal intubation: a randomized, controlled trial. *Pediatrics* 2007;**119**:e1248–55. [RCT] (See also **120**:932–3, and **121**:448–9.)

Vespasiano M, Finkelstein M, Kurachek S. Propofol sedation: intensivists' experience with 7304 cases in a children's hospital. *Pediatrics* 2007;**120**:e1411–7

Wyllie JP. Neonatal endotracheal intubation. [Review] *Arch Dis Child Educ Pract Ed* 2008;**93**:44–9.

Allegaert K. Is propofol the perfect hypnotic agent for procedural sedation in neonates? *Curr Clin Pharmacol* 2009;**4**:84–6.

Lerman J, Houle TT, Matthews BT, *et al.* Propofol for tracheal intubation in children anesthetized with sevoflurane: a dose-response study. *Pediatr Anesth* 2009;**19**:218–24. [RCT] (See also editorial 199–201.)

Chaudhary R, Chonat S, Gowra H, *et al.* Use of premedication for intubation in tertiary neonatal units in the United Kingdom. *Pediatr Anesth* 2009;**19**:653–8.

Kelleher J, Mallya A, Wyllie J. Premedication before intubation in IUK neonatal units: a decade of change? *Arch Dis Child* 2009;**94**:F332–5.

Welzing L, Kribs A, Huenseler C, *et al.* Remifentanyl for INSURE in preterm infants: a pilot study for evaluation of efficacy and safety, *Acta Paediatr* 2009;**98**:1426–20.

Comment posted October 2007

Updated August 2009