Propofol for Neonates Undergoing Surgical Procedures

QUESTION
Should propofol be given to neonates undergoing surgical procedures for sedation?

CONTEXT	Sedation for neonates undergoing elective and semi-elective procedures
Sedative, analgesic, and anxiolytic agents are often used in the neonate intensive care unit (NICU). Propofol is a lipophilic anesthetic agent that has been widely used in adult and most paediatric intensive care units for short-term sedation and anaesthesia due to its rapid onset of action and rapid termination of effects when discontinued. Adverse events profile in neonates may differ from that of adults due to differences in its pharmacokinetics and can cause neonatal respiratory depression and lengthen the period of recovery.	

INTERVENTION	Propofol for anesthesia in neonates
Succesful intubation at first attempt: There were no statistically significant differences between propofol and morphine-atropine-suxamethonium regarding the number of neonates with a successful intubation at first attempt. *Low Quality of Evidence.*	
Number of intubation attempts: There were no statistically significant differences between propofol and morphine-atropine-suxamethonium regarding the number of intubation attempts. *Low Quality of Evidence.*	
Time to complete all intubations combined: Neonates sedated with propofol required a shorter time to complete all intubations combined than those sedated with morphine-atropine-suxamethonium. *Low Quality of Evidence.*	
Intraprocedural oxygen saturation: Neonates sedated with propofol showed higher intraprocedural oxygen saturation compared to those sedated with morphine-atropine-suxamethonium. *Low Quality of Evidence.*	
Incidence of metabolic acidosis: There were no statistically significant differences between propofol and morphine-atropine-suxamethonium regarding the incidence of metabolic acidosis. *Low Quality of Evidence.*	

Summary of the Evidence	
Benefits	A Cochrane systematic review[1] (date of search: 2010) identified one randomized controlled trial, which compared sedation with propofol to sedation using morphine, atropine and suxamethonium in a population of 63 neonates requiring tracheal intubation. It found no statistically significant differences regarding number of neonates with a successful intubation at first attempt (1 RCT, 33 events, RR 1.40, 95%CI 0.85-2.29), and also median number of intubation attempts did not differ between groups. There were statistically significant differences favoring propofol regarding median time to complete all intubations combined.
Risks	There was higher intraprocedural oxygen saturation in neonates receiving propofol compared to those receiving morphine-atropine-suxamethonium. There were no differences between groups in the incidence of metabolic acidosis (1 RCT, 53 events, RR 1.19, 95%CI 0.95-1.48). Although numerical data is not available from the study, it reports that there were no differences in blood pressure, hypotension episodes, heart rate or number of episodes of bradycardia.
Applicability	Any estimate on the efficacy and safety of propofol use in neonates that require sedation is very uncertain. Other alternatives exist, like other opioid derivatives or midazolam. More information is needed to issue a recommendation of use of propofol for sedative purposes in neonates.
Commentaries	Further studies on pharmacokinetics, dosage, efficacy and safety of propofol in neonates should be carried on. .

Costs	Sedation using propofol and other agents is more cost-saving than general anesthesia[2]. Propofol has been found to be cost-effective compared to midazolam and other sedating agents, although more so during short periods of sedation[3,4].

1. Shah PS, Shah VS. Propofol for procedural sedation/anaesthesia in neonates. Cochrane Database of Systematic Reviews 2011, Issue 3. Art. No.: CD007248. DOI: 10.1002/14651858.CD007248.pub2.
2. Sedation in Children and Young People Costing Report. Implementing NICE Guidance. National Institute for Health and Clinical Excellence. NICE Clinical Guidance 112, December 2010.
3. Barrientos-Vega R, Sanchez-Soria M M, Morales-Garcia C, Cuena-Boy R, Castellano-Hernandez M. Pharmacoeconomic assessment of propofol 2% used for prolonged sedation. Critical Care Medicine 2001 29(2):317-322
4. Elliott RA, Payne K, Moore JK, Davies LM, Harper NJN, St. Leger AS, et al. Which anaesthetic agents are cost-effective in day surgery? Literature review, national survey of practice and randomised controlled trial. Health Technol Assess 2002;6(30).

TABLE	GRADE Evaluation of Clinical Outcomes								
Number of Studies (N)	**Outcome**	**Comparison**	**Type of Evidence**	**Quality**	**Consistency**	**Direct Evidence**	**Size of Effect**	**GRADE**	**Comments**
1 (63)	Successful intubations at first attempt	Propofol vs. Morphine-atropine suxamethonium	4	0	0 (single study)	0	-2	Low	Very low number of events and/or participants.
1 (63)	Number of intubation attempts	Propofol vs. Morphine-atropine suxamethonium	4	0	0 (single study)	0	-2	Low	Very low number of events and/or participants
1 (63)	Time to complete all intubations combined	Propofol vs. Morphine-atropine suxamethonium	4	0	0 (single study)	0	-2	Low	Very low number of events and/or participants
1 (63)	Intraprocedural oxygen saturation	Propofol vs. Morphine-atropine suxamethonium	4	0	0 (single study)	0	-2	Low	Very low number of events and/or participants
1 (63)	Incidence of metabolic acidosis	Propofol vs. Morphine-atropine suxamethonium	4	0	0 (single study)	0	-2	Low	Very low number of events and/or participants
Type of evidence: 4 = RCT; 2 = Observational; 1 = Non-analytic studies / Expert opinion									