452867 - REMIFENTANIL FOR TRACHEAL INTUBATION IN INFANTS AND CHILDREN

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Introduction: Remifentanil (R) may be the ideal opioid to facilitate intubation without neuromuscular blockade due to its rapid onset, high potency and unique metabolism. Satisfactory intubating conditions have been reported using doses of 1-3 mcg/kg of R delivered as a rapid infusion[1] or as a 1-4 mcg/kg bolus given prior to induction.[2,3] A wide variation in the predicted optimal dose of R to facilitate intubation has been reported in children of different ages.[1,4] This study aimed to determine the age-specific optimal bolus dose of R (ED95) to facilitate tracheal intubation, in a typical clinical setting, using an up-and-down sequential allocation design.
Methods: With REB approval and parental consent, ASA 1-2 subjects undergoing surgery requiring tracheal intubation were recruited into three age-stratified groups of 0-4 months (group I), 4-12 months (group II), and 1-3 years (group III). A sequential up-and-down design determined allocation of the R bolus dose,[5] starting at 3 mcg/kg, with 1 mcg/kg increments (range 1-6 mcg/kg). A sample size of at least 20 subjects per group was estimated to provide six response crossovers. After IV glycopyrrolate 10 mcg/kg, propofol (5 mg/kg) was followed 15 seconds later by the bolus dose of R over 5 seconds. Tracheal intubation was performed 60 seconds after R administration by a study investigator, blinded to the dose of R, who also graded intubating conditions using the Good Clinical Practice Scoring system.[6] The time to tracheal intubation, duration of apnea, SpO2, HR and NIBP data were recorded. Logistic regression was used to predict the ED50 and ED95 dose of R for satisfactory intubating conditions.
Results: Tracheal intubation was successful in all subjects. There were no significant differences between pre-induction and post-induction cardiovascular parameters either within groups or between groups.
Discussion: The ED95 to facilitate tracheal intubation was higher in all age groups than previously reported,[3,7] possibly due to the sequence and timing of drug administration. Infants aged 4-12 months showed a marked variability in dose response, however the mean dose was not significantly different between age groups. Older children had a longer duration of respiratory depression. This study showed that R in higher doses of 4-6 mcg/kg was effective and without adverse effects. Further investigation of the variability in dose response in infants and assessment of the safety profile of higher doses of R is warranted.
References: 1. Anesth Analg 2005;100(6):1599-604 2. Ped Anes 1998;8(6):467-71 3. Can J Anaesth 2000;47(9):854-9 4. Anaesthesia 2007;62(5):446-50 5. J Am Stat Assoc. 1965;60:967-78 6. Acta Anaesthesiol Scand 1996;40(1):59-74 7. Anaesthesia

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Group	I	II	III
Number (count)	20	24	20
Age	14 weeks [2-17]	10 months [6-12]	2.4 years [1-4]
Weight (kg)	5.9 ± 1	8.5 ± 1.7	13.9 ± 2.7
Intubation attempts: (%) 1 2	 90 10	 92 8	 100 0
Satisfactory intubating conditions (%)	85	63	75
Time to tracheal intubation (s)	10.3 [2-51]	8.9 [1-40]	7.4 [1-35]
Time to return of SV (s)	180 ± 71*	233 ± 87*	331 ± 75
EtCO2 at return of SV (mmHg)	40 ± 9*	40 ± 14*	49 ± 10
Remifentanil ED50 mcg/kg (95% CI)	3.1 (2.5-3.8)	3.7 (2.0-5.4)	3.0 (2.1-3.9)
Remifentanil ED95 mcg/kg (95% CI)	5.0 (3.0-7.0)	9.4 (1.5-17.4)	5.6 (2.9-8.4)

Median [range] or Mean ± SD, SV=Spontaneous Ventilation. *$p < 0.05$