

Propofol for outpatient M.R.I. in infants: Anesthesiologists vs. specially trained non-anesthesiologist-pediatricians

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Introduction: Propofol's (2,6 di-isopropylphenol) rapid onset, short action, and rapid recovery profile, make it a popular agent for procedural sedation in settings remote from the operating rooms. Its use is particularly attractive for magnetic resonance imaging (M.R.I.), when children and infants are frequently unable to remain motionless to successfully complete an M.R.I. At Childrens Hospital Los Angeles (CHLA), critical care and ED physicians have been specially trained to administer propofol anesthesia. This training included didactic lectures, self-study, examination and directly mentored provision of propofol anesthesia. Cases were pre-selected by Anesthesiology, which was responsible for the supervision of the anesthetics. This service has filled an important role providing propofol anesthesia to prescreened children undergoing outpatient radiologic procedures, and enabled improved coverage for these patients. Our study objective was to compare the outcomes of propofol anesthesia provided by pediatric anesthesiologists and these specially trained non-anesthesiologist-pediatricians (NAPs) in infants undergoing outpatient M.R.I.

Methods: CHLA IRB approval was obtained. We reviewed records of 133 unintubated infants, who received propofol for outpatient M.R.I. between November 2001 and October 2002. Patients were triaged between anesthesiologists and NAPs during the pre-operative evaluation. Infants with ASA PS scores of 3 or 4, difficult airways, or a history of or suspicion for difficult anesthetics were pre-selected for anesthesiologists. Thus, patients were not randomized, rather the more challenging infants were triaged to anesthesiologist provided anesthesia. Data collected included: demographics, propofol dose, procedure duration, vital signs during infusion, length of recovery, discharge disposition and complications. Results were compared by unpaired, two-tailed Student's t-test, Fisher's Exact test, and Mann-Whitney test and expressed as mean \pm SD, where appropriate. Statistical significance was considered to be a p value < 0.05 .

Results: 138 anesthetics were provided for 133 infants (73 male), 72 by anesthesiologists and 66 by NAPs. The infants were younger (5.6 ± 3.0 vs. 8.0 ± 3.0 months; $p < 0.01$), smaller (7.1 ± 1.9 vs. 8.3 ± 1.8 kg; $p < 0.01$), had a higher ASA PS (2.0 ± 0.7 vs. 1.4 ± 0.6 ; $p < 0.01$), received more propofol (17 ± 6 vs. 14 ± 6 mg/kg; $p < 0.01$), and received propofol longer (60 ± 18 vs. 53 ± 21 minutes; $p = 0.03$) in the anesthesiologist group. The number of complications requiring intervention was 13 (9.4%). These included insertion of a nasal trumpet for upper airway obstruction (3), fluids for hypotension (8), atropine and for bradycardia and hypotension (1), and bag-mask ventilation and atropine for desaturation and bradycardia (1). The incidence of complications requiring interventions (12.5% vs. 6.1%; $p = 0.25$) and length of recovery (37 ± 15 vs. 35 ± 25 minutes; $p = 0.55$) between anesthesiologists and NAPs groups were not different. In the NAPs group, there were no documented desaturations $< 94\%$ and 2 in the anesthesiologist group. The initial recovery score was higher for the infants treated by NAPs (8.2 ± 1.5 vs. 7.6 ± 1.4 ; $p = 0.02$). All infants completed the M.R.I. in the anesthesiologist group and one infant did not complete the M.R.I. in the NAPs group. For this infant there was concern about airway patency, but no intervention was required. There were no deaths, intubations, or hospitalizations in either group.

Discussion: The Department of Anesthesiology Critical Care Medicine at CHLA has established a program to train pediatric critical care and ED physicians to administer propofol anesthesia. These non-anesthesiologist-physicians have proven to be a valuable resource for providing propofol anesthesia to healthy children requiring outpatient M.R.I. procedures. In an environment where Anesthesiology resources are limited, this anesthesiology-supervised service has increased the available anesthesia resources and continues to provide care for a larger number of children in a safe and efficacious manner for prescreened infants less than one year of age.