

Does the Modality of Pain Relief Affect Early Postoperative Hypoxemia during Transport to and Recovery in the PACU?

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Introduction: There is controversy in the literature about the etiology of early postoperative hypoxemia in children. Intubation, use of muscle relaxants, intravenous induction, and duration of anesthesia of greater than one hour have all been associated with an increased incidence of hypoxemia. Tomkins et al. reported no significant correlation with age, weight, procedure, time to awakening, or use of opiates. (1) Another study demonstrated that age, type of anesthetic, the use or avoidance of narcotics, and the use of controlled or spontaneous respiration had no significant relation to the incidence of desaturation. (2) However, a recent study showed a significant correlation between early hypoxemia and children's ages and fentanyl doses, and the infant's recovery score. (3) We hypothesize that in healthy children administration of a combined presurgical caudal analgesia and light general anesthesia may decrease the incidence of early postoperative hypoxemia and the need for oxygen during transport to and in the PACU.

Methods: After obtaining institutional and written parental consents, 19 healthy outpatient children, ASA 1 or 2, 1-6 years old scheduled for elective orchidopexy, were included. Obese children, those with a history of prematurity, recent colds, respiratory, cardiac, hematological or neurological disease were excluded. Baseline SaO₂ was recorded. Children were premedicated with midazolam 0.5 mg/kg P.O. In the OR, after placing routine monitors, anesthesia was induced via mask using sevoflurane and nitrous oxide, 60 %, in oxygen. For pain relief, children were randomized into two groups. Those in group 1 received presurgical caudal analgesia, using ropivacaine 0.2 %, 1.25 ml/kg. Children in group 2 received fentanyl 2 ug/kg i.v. before surgical incision. During surgery, fentanyl 1 ug/kg i.v. was administered if needed. Anesthesia was maintained using isoflurane and nitrous oxide, 60 %, in oxygen. The airway was maintained via laryngeal mask and children breathed spontaneously. All operations were performed by the same surgeon and in the same operating room. At the end of anesthesia children were transferred to the PACU while lying on their side and breathing room air. An independent observer, blinded to the modality of pain relief, recorded SaO₂ during transport and in the PACU. If SaO₂ decreased below 95 % oxygen was administered via mask. Duration of transport, PACU, DSU, and hospital discharge time (from anesthesia end till DSU discharge time) was noted.

Results: Demographic data of the two groups did not differ, and there was no difference in transport times. None of the nine children in group 1 desaturated during transport; one child required oxygen in the PACU for 15 minutes. Of the 10 children in group 2, four desaturated during transport and five required O₂ in the PACU. The present study suggests that presurgical caudal analgesia is associated with shorter DSU duration and earlier hospital discharge.

Group	N	Use of O ₂ during Transport	Use of O ₂ during PACU	O ₂ Duration* (min)	PACU Duration (min)	DSU Duration* (min)	Hospital Duration* (min)
1 (caudal)	9	0 (0%)	1 (11%)	2±5	60±24	64±42	144±42
2 (fentanyl)	10	4 (40%)	5 (50%)	17±21	60±24	123±55	195±58

*Significant difference between two groups using a two-sample t test (P<0.05)

Discussion: Our data suggests that presurgical caudal analgesia for intra- and postoperative pain relief may decrease early postoperative desaturation and the need for oxygen during transport to and in the PACU. Children who received presurgical caudal analgesia required light general anesthesia and they did not receive narcotics. This may have contributed to less respiratory depression and to the significantly shorter DSU duration and hospital stay.

References:

1. Tomkins D.P. et al., *Anaesth Intensive Care* 1988
2. Pullerits J. et al., *Can J Anaesth*, 1987
3. Xue F.S. et al., *Paediatr Anaesth*, 1996