



Nasal CPAP in Pediatric Patients Undergoing MRI Study

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ABSTRACT

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Introduction: Moderate to deep sedation, or general anesthesia with paralysis is often required to obtain satisfactory MRI images. With the deepening of sedation, there is a tendency for upper airway obstruction in pediatric patients and airway intervention is often required. A wide variety of techniques are being used for MRI studies, for example, unassisted ventilation, nasal cannula, LMA, and intubation in pediatric patients (2,3). The MRI suite poses significant challenges both in adequate monitoring and in airway intervention (1). We conducted a study in pediatric patients anesthetized for MRI using nasal CPAP as a non-invasive airway management technique.

Methods: 45 pediatric patients, ages 5 m – 7 yrs, underwent MRI study at Shands Hospital at the University of Florida under anesthesia. We used a Nasal Vestibule Airway (NVA), a pressure-sealing nasal cannula, and the SNOR-SCOPE, an anesthesia-circuit stethoscope head (both devices invented, and registered by Dr James Noble). Usage of those devices have been approved by the hospital. Most often the anesthesia was conducted as follows: mask inhalation induction with sevoflurane, an intravenous line was established and continuous propofol infusion started, which ranged between 200-400 mcg/kg/min. An NVA was secured in the patient's nasal vestibule with Tegaderm. A disposable Mapleson circuit with added long corrugated tubing extended the reservoir bag to the foot of the MRI platform about 10 feet from the patient's head; connected with the bag was the pop-off valve that came with the Mapleson circuit, a SNOR-SCOPE and a disposable plastic pressure gauge (Portex). The gas flow into the circuit and the pop-off valve were regulated to keep positive pressure in the circuit with the reservoir bag always distended at less than 20 cm of water but fluctuating with respiration. Monitors included: automated BP, ECG, plastic suprasternal stethoscope, CO₂ sample line at the mouth under a "tent" of tape, SNORE-SCOPE to manual stethoscope, the fluctuations of the distended reservoir bag and the fluctuations of the silicone piston in the Portex pressure gauge. With MRA a short period of apnea was created by bolus of remifentanyl.

Results: The records of 45 pediatric patients been reviewed, there was no mortality or morbidity, or any other complications related to this anesthesia management.

Discussion: Providing anesthesia management for MRI studies in pediatric patients may be quite challenging. The possibility of a difficult airway, significant cardiac, or other comorbidity, in a remote location with limited resources, positioning of small pediatric patient inside of scanner - all of those factors contribute to the risk of higher complications (1). Different airway devices have been suggested and used for MRI study. We are offering a new approach – nasal CPAP with intravenous anesthesia as an alternative to instrumentation of the airway. There is a group of pediatric patients who may benefit from this technique greatly.

The three fundamental devices required for this new airway management system are now officially registered and ready for market: the NVA in SNOR-TAL configuration; the SNOR-SCOPE stethoscope head; and, the SNOR-SCOPE PLUS electronic attachment. Anyone interested should first visit the website: www.anesthesia-air.com.

Ref.: 1. Gooden CK, Curr Opin Anesthesiol, 2004 Aug; 17(4): 339-42.

2. Taghon TA, et al., Int. Anesthesiol. Clin., 2006, v 44(1), pp 65-79.

3. King WK, et al., Acad Emerg Med, 2006 Jun; 13(6):673-6.

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METHODS

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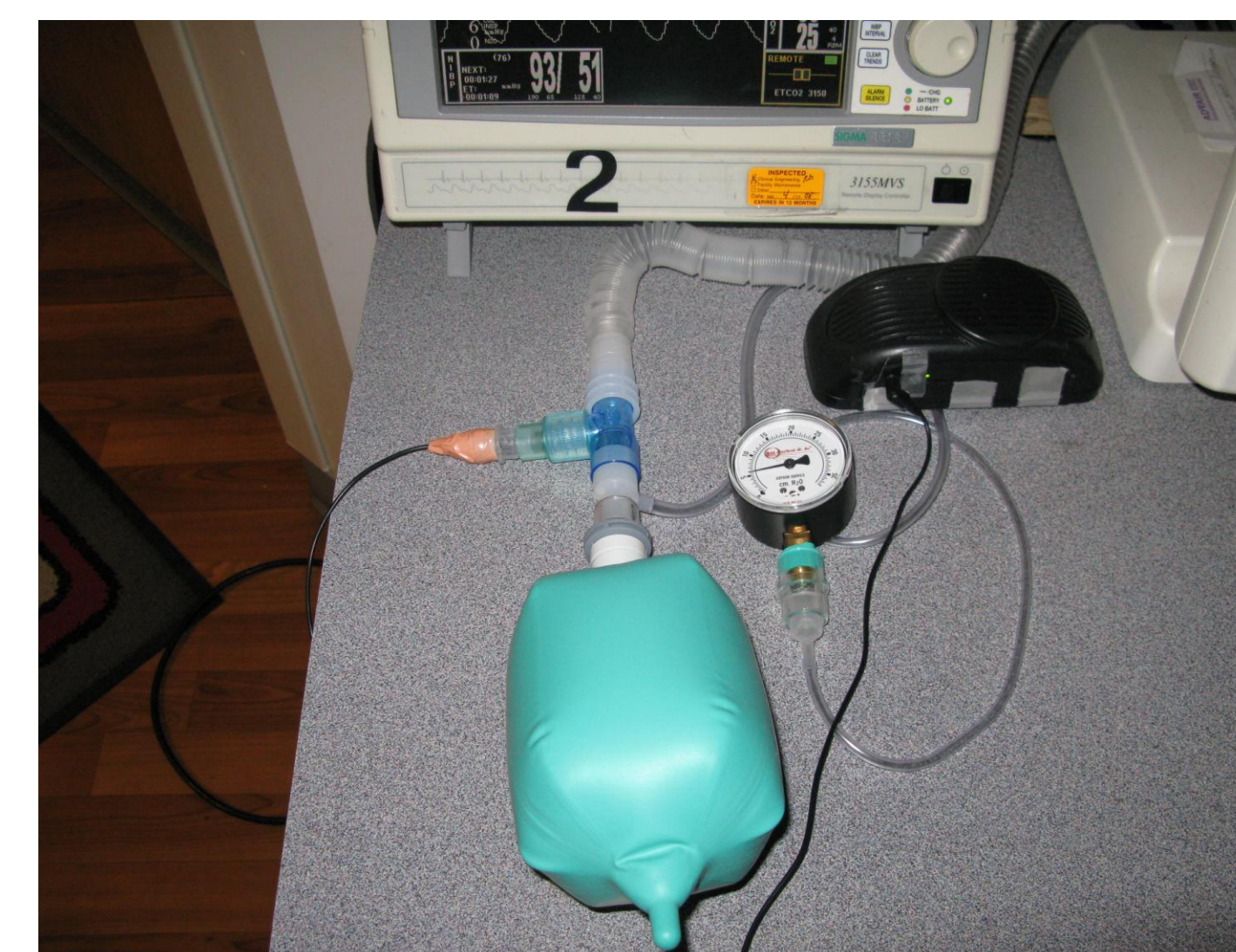
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