A Novel Nasal PAP Mask Assembly Provided Continuous Active Oxygenation in a Pediatric Patient with a Brain Abscess during Endotracheal Intubation by a Medical Student

Primary Author: Christine H Fratzola MD
Rutgers Robert Wood Johnson Medical School

Co-Authors: James Tse, PhD, MD; Mikaela Kislevitz, BSN, RN, MSIII; Preet Patel, MD; Supreet Grewal, MD;

Introduction: Routine teaching new residents or medical students to perform endotracheal intubation (ETI) often take extra time and may cause oxygen desaturation and stress to the patients. A simple nasal PAP mask assembly has been shown to maintain oxygenation by delivering nasal CPAP, BiPAP or PPV in patients with OSA during sedation, GA or awake/asleep ETI (1-4). However, it has seldom been used in pediatric patients (5-6). We used it in a pediatric patient with brain abscess for teaching intubation to a medical student.

Case Description: A 15-year-old child with 3-week history of right frontal headache and a right anterior frontal epidural empyema (3.5 cm) secondary to right sided sinusitis presented for a blurry hole craniotomy. The patient had a BMI of 21 kg/m2 (180 cm, 68 kg), an ASA III and a Class II airway. A modified pediatric face mask (size #2) with fully-inflated air cushion was shown to him and his mother (Photo 1). A medical student also introduced herself to them. The patient was fitted with the mask over his nose and breathed through it comfortably. His mother gave her consent for taking photographs for teaching purpose and case presentation.

The patient received no sedation and was transported to the OR in a calm manner. The infant mask was secured over his nose with head-straps. It was connected to the anesthesia machine via a long breathing circuit. He was pre-oxygenated with 4 L O2/min. The APL valve was adjusted to deliver 3-5 cm H2O CPAP. General anesthesia was induced with 100 mg of fentanyl, 100 mg of lidocaine and 200 mg of propofol (150 mg + 50 mg). His mouth was closed and a good nasal mask seal was obtained with two hands by the medical student. He received 30 mg of rocuronium following easy nasal ventilation with pressure-control (PC) mode (PIP 13 cm H2O, PEEP 5 cm H2O, RR 20/min) (Photo 2).

With the nasal mask delivering PC ventilation/oxygenation, video-laryngoscopic ETI was accomplished by the medical student with assistance (Photo 3). Additional two 50 mg boluses of propofol were given to maintain deep anesthesia during intubation attempt. The patient maintained 100% SpO2 and stable hemodynamics throughout intubation. He tolerated the procedure well and was extubated awake without problem. He received oxygen via a nasal cannula with a simple face tent (1) during a long transport from the 1st floor OR to the 7th floor pediatric PACU without incident. The patient did not experience any post operative complications.

Discussion: This simple nasal PAP mask assembly was used to provide continuous active oxygenation in a pediatric patient with a brain abscess during GA induction and ETI. Besides CPAP
pre-oxygenation, it provided continuous pressure-controlled nasal ventilation and oxygenation during VL ETI by a medical student. It maintained 100% SpO2 and thus allowed calm, stress-free teaching of smooth ETI. This simple technique may provide less stress on the patient and improve patient safety at a low cost.