Use of the ProSeal™ Laryngeal Mask Airway in an Infant with a Repaired H-type Tracheoesophageal Fistula and Tracheomalacia

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Introduction: The ProSeal™ laryngeal mask airway (PLMA) is a new airway device with two lumens – an airway tube which is an extension of the tracheo-bronchial tree and a drain tube (DT), which is in continuity with the esophagus. The new design features make the PLMA attractive for positive pressure ventilation (PPV). Also, routine endotracheal intubation may be associated with significant changes and potential injury to the trachea and larynx. We present a case in which the ProSeal™ laryngeal mask airway (PLMA) was an effective alternative to tracheal intubation in an infant with a recently repaired TEF.

Case Report: An 11-week-old, 5.4 kg infant presented for a limited right neck exploration following repair of a recurrent H-type TEF five days prior. He had developed an esophago-cutaneous fistula following removal of the neck drain. Of significance was that he had moderately severe tracheomalacia, reactive airways disease (RAD) and difficulty with intravenous access. The surgeon requested avoidance of intubation if possible because of concern that multiple intubations might have contributed to the recurrence after the initial repair. Following placement of standard monitors, an inhalational induction of anesthesia was performed using an \( O_2/N_2O/sevoflurane \) mixture and a 24G intravenous catheter was placed. A size 1½ ProSeal™ LMA was inserted using the finger insertion technique and the cuff inflated to a pressure of 60cm H\(_2\)O. The depth of insertion was at 50% and the suprasternal notch (SSN) test was positive, suggesting correct placement. The oropharyngeal leak pressure was at 30cm H\(_2\)O with no leak from the DT. The maximum minute ventilation (MMV) was 3.4L and the calculated resting minute ventilation (RMV) was 1.6L, yielding an MMV/RMV ratio of 2. Anesthesia was maintained with an \( O_2/N_2O/sevoflurane \) mixture and fentanyl. Positive pressure ventilation (PPV) with a tidal volume of 60ml, a rate of 15 breaths per minute and a peak inspiratory pressure (PIP) of 17cm H\(_2\)O was used for the 11-minute procedure. The surgical site was infiltrated with local anesthetic and the LMA was removed awake. Recovery was uneventful.

Discussion: The ProSeal™ is a new LMA device with a modified cuff and an esophageal vent (drain tube) that is designed to improve the seal, facilitate PPV and protect the airway from regurgitated material. Adult sizes (sizes 3 to 5) were introduced in 2000 and pediatric sizes (1½ to 2½) in 2004. Even though the pediatric sizes of the PLMA lack the additional dorsal cuff, the size 2 has been found to be as effective as the smallest adult size. We decided to use the PLMA for this case because the surgeon’s request was considered to be reasonable and also because of our prior experience with the use of the PLMA in infants and children. In this particular case, the PLMA facilitated PPV in the presence of significant tracheomalacia and also effectively separated the respiratory tract from the alimentary tract. Avoidance of intubation also decreased the likelihood of potential airway swelling and trauma and effectively eliminated intubation as a possible cause should another recurrence occur.

References