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Reply:

Thank you for referring the letter of Charma *et al.* concerning our report "Prophylactic methylene blue in a patient with congenital methemoglobinemia".¹

Our patient had severe congenital methemoglobinemia as evidenced by a methemoglobin level of 15.9%. The case was scheduled on two previous occasions for turbinectomy, but was cancelled because of the development of severe hypoxemia during induction of anesthesia.^{1,2}

On this occasion, the patient was preoxygenated prior to induction of anesthesia resulting in an increase of the PaO₂ from 81.3 to 543 mmHg, associated with an increase of the functional oxygen saturation (SaO₂) [O₂Hb / O₂Hb + RHb × 100%] from 96.2% to 99.7%. However, as shown in the Table, the fractional oxygen

saturation (SfO₂) [O₂Hb / O₂Hb + RHb + COHb + MetHb × 100%] which reflects the actual oxyhemoglobin saturation, only increased from 80.9% to 84.1%. Thus, preoxygenation alone did not provide an adequate margin of safety against hypoxemia. It was only after the administration of methylene blue that SfO₂ increased up to 94.7%, associated with a significant decrease of the methemoglobin level from 15.9% to 5%.

The increase in SfO₂ and the decrease in methemoglobin levels following prophylactic methylene blue were maintained postoperatively, which increased the safety margin against perioperative hypoxemia not only during induction of anesthesia, but also intraoperatively and during the postoperative period.

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Optimizing insertion of the ProSeal laryngeal mask airway

To the Editor:

O'Connor *et al.* report an incidence of ProSeal laryngeal mask airway (PLMA) glottic insertion of 6%.¹

We should not conclude the PLMA increases the risk of glottic insertion. In the first classic LMA (cLMA) fiberoptic study 4% of cLMA tips entered the glottis.² Unlike the cLMA, the PLMA drain tube enables rapid diagnosis of misplacement.

During 656 elective adult PLMA insertions (age 52 ± 17 yr, weight 76 kg, range 34–140 kg, > 90% unparalyzed) my first time success is 83.2%, overall success 99.8% and median seal pressure 33 cm H₂O.

TABLE Values of oxygen partial pressure (PaO₂), saturation (SaO₂) and fractional saturation (SfO₂) and methemoglobin concentrations on room air, after preoxygenation, and after methylene blue administration

		PaO ₂ (mmHg)	SaO ₂ (%)	SfO ₂ (%)	Methemoglobin (%)
Room air	Room Air	81.3	96.2	80.9	15.9
After preoxygenation	100% O ₂	543	99.7	84.1	15.8
Five minutes after methylene blue	100% O ₂	519	100	94.7	5
Second day	Room air	86	96.9	93.4	2.6

Most re-insertions were in patients who moved during insertion.

Glottic insertion is likely to cause complete airway obstruction. I have needed 12 reinsertions (1.8%) due to high airway pressure (5), stridor (5) or airway obstruction (2). These might be due to glottic insertion or: PLMA cuff infolding, arytenoid shortening, mask fold-over or laryngospasm. Differential diagnosis may be difficult, though an algorithm assists.³ My estimates for glottic insertion therefore range from 1.8% (all cases of partial obstruction or stridor) to 0.3% (all complete obstructions): compared to the 6% reported by O'Connor.

In explaining these differences it is noteworthy that O'Connor uses digital insertion. I routinely use the manufacturer's introducer and anesthesia assistants provide mouth-opening, then jaw-thrust during insertion. The digital technique is used when this fails.

Finally O'Connor's tests of glottic insertion have not been validated.⁴ When the test was 'positive' O'Connor replaced the PLMA, without fiberoptic examination to confirm accuracy of the test. An opportunity for validation has therefore been missed.

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Reply:

Dr. Cook or others may have a different reinsertion rate than we experienced, and these differences may be due to a number of variables: pharmacological paralysis or not, use of the insertion tool or fingertip, presence of assistants providing mouth-opening and jaw thrust or no such assistance, level of experience and familiarity with the ProSeal, technique for deflation and preparation of the

cuff, size selection for the mask, patient age and anatomy. What Dr. Cook does not explain is how he diagnosed his 17% of patients with unsuccessful insertion attempts, or how he established diagnosis of glottic insertion in 1.8% of reinsertions. We fear most ProSeal laryngeal mask airway (PLMA) users simply insert the device, hook up the anesthetic circuit, and hope for the best.

The drain tube permits rapid and reliable diagnosis of malposition without use of any ventilatory trial. Such ventilatory trials cannot diagnose the foldover malposition.^{1,2} When glottic insertion occurs the ventilation is simply ineffective. In both circumstances, these ventilatory trials occur while there is inadequate separation of the gastrointestinal and respiratory tracts and thus endanger the patient. Our first goal using the ProSeal is to ensure that the tip of the mask is inserted into the esophageal inlet. This takes only ten to 15 sec and soap solution on the drain tube port to create a membrane. If we find that the mask is malpositioned, we reinsert it. If the position appears satisfactory, we then proceed to test ventilation.

Once the user has excluded malposition of the PLMA, the anesthesia circuit may be connected with confidence to assess how well the PLMA will function as an airway.³ The user can then make an informed decision about the appropriate use of the device for the intended surgical procedure. The drain tube of the PLMA is much more than a portal to empty the stomach or a conduit for a bougie.

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