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Intubation and Extubation of the Patient with Pierre-Robin Syndrome

To the Editor:—Chadd *et al.*[1] should be congratulated for successfully managing the difficult airway of a 3-month-old patient with Pierre-Robin syndrome. However, even though their airway management techniques were useful, new, and innovative, the techniques ignore two useful and recent developments that might have been additionally helpful.

First, although the initial intubation for fundoplication and gastrostomy with conventional laryngoscopy "was successful after numerous attempts even though the vocal cords were never visualized," it may have been more prudent to accomplish the initial intubation over a fiberoptic instrument. Indeed, fiberoptic laryngoscopy was performed as part of the preoperative evaluation. One of the main lessons from the ASA closed claims studies is that repeated traumatic instrumentation of the upper airway may result in periglottic edema and loss of the ability to ventilate *via* mask.[2] Fiberoptic intubation can be accomplished after induction of anesthesia during continuous positive or negative pressure ventilation either *via* an anesthesia mask that has a dedicated self-sealing fiberoptic port[3] or *via* a laryngeal mask airway.[4] Similarly, the reintubation technique of the patient for tracheostomy involved blindly passing a guide through the laryngeal mask airway into the trachea. What if the guide did not go back into the trachea? Even though "capnography *via* the lumen of the guide" revealed the "presence of carbon dioxide," the reintubation guide could still have been in the pharynx (and perhaps within the rim of the laryngeal mask airway). Carbon dioxide can be retrieved and a normal-looking carbon dioxide waveform obtained from a pharyngeal location. The tracheal reintubation *via* a laryngeal mask airway could also have been visualized fiberoptically.[4]

Second, the guide that was used to facilitate extubation on the 2nd postoperative day could or should have been considered a jet stylet (not just a hollow reintubation stylet).[2,5] Thus, although the laryngeal mask airway was intended to serve as the ventilation backup if spontaneous ventilation around the extubation guide was not adequate, this could have also been accomplished by using the extubation guide as a jet stylet. The laryngeal mask airway would not have been a good choice for backup ventilation if difficulty with ventilation was due to laryngeal edema or laryngospasm. The extubation guide can be used as a jet stylet if it passes out of the ventilation circuit through a self-sealing diaphragm in the elbow connector (see fig. 1 of ref. 6 or fig. 11 of ref. 2),[2,6] whereas the extubation guide cannot be used as a jet stylet if it passes up the ventilatory hosing, as appears in figure 1 of reference 1.

In summary, my main point is that useful techniques do not need to be mutually exclusive of one another. With respect to the initial intubation, fiberoptic equipment could be used in series with conventional equipment; with respect to the final intubation, the intubation guide through a laryngeal mask airway can be a fiberoptic instrument. Finally, the function of an extubation guide can easily be expanded to that of a jet ventilation stylet.

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Position of the Laryngeal Mask Airway

To the Editor:—In the recent article by Chadd *et al.*,[1] we were pleased to read that the laryngeal mask airway (LMA) was used to resolve a problem with airway management in a child with Pierre-Robin syndrome. However, we would like to bring out an important misconception that is shown in figure 1. The drawing shows the proximal end of the cuff of the LMA pressing against the epiglottis. This position was originally thought to be accurate. We have recently completed a study in which a sagittal midline scan was obtained using magnetic

resonance imaging to ascertain cuff position.[2] In our study, the epiglottis was within the cuff of the LMA in 88% of patients. The 12% of patients in whom the epiglottis lay outside the cuff had the LMA malpositioned. Our study and others[2,3] show that the epiglottis is within the confines of the mask in the majority of correctly placed LMAs in children. The epiglottis in children, and in the child with Pierre-Robin syndrome in our series, is actually often not at the adult anatomic position but rather is floating at an angle closer to 90° to the cervical spine.

Another minor point is that in children it is often not as easy to intubate the trachea or pass a bougie *via* the laryngeal mask. As such, we prefer to use a fiberoptic bronchoscope[4,5] to guide the endotracheal tube into the trachea, because frequently one must pass posterior to a free-floating epiglottis. However, in this case we cannot argue with Chadd *et al.*'s success.

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In Reply:—We agree with Benumof's statement "that useful techniques do not need to be mutually exclusive of one another." We also agree that all of the altenatives that he proposes are valid in most circumstances. However, in our experience, some standard approaches do not translate well technically to the neonatal and infant populations.

The use of the laryngeal mask airway (LMA) as an adjunct to fiberoptic intubation has been described.[1] We have found fiberoptic intubation *via* the laryngeal mask in infants to be limited by the short lengths of pediatric endotracheal tubes passing through the entire length of an LMA. The catheter guide was used in this case to allow removal of the LMA and subsequent placement of the endotracheal tube. We recently have described a technique that allows removal of the LMA following direct placement of an endotracheal tube with the fiberscope; this technique has eliminated our previous concerns.[2]

We have evaluated this particular catheter guide as a potential jet ventilation stylet. Because of its very small lumen and relatively long length, the flow resistance is too great to allow satisfactory jet ventilation. We show the guide in the limb of the circuit to illustrate that we did, in fact, successfully ventilate the child's lungs *via* the catheter guide, preserving access to the larynx.

As Benumof and Denman and Goudsouzian have correctly pointed out, the technique described is a blind technique[3] with the element of uncertainty that accompanies any blind approach. We believe, however, that the LMA decreases the uncertainty by effectively limiting the target of the catheter as it emerges from the LMA in the direction of the larynx. The success rate of this technique in infants remains to be systematically evaluated.

Now that we have a method of removing the LMA with an endotracheal tube in place, we also suggest that fiberoptic intubation *via* the LMA is useful in the neonatal and infant populations. We find that the LMA provides a conduit for passage of the fiberscope to the immediate area of the larynx as well as a comfortably secure route for ventilation during the process.

We appreciate the correction of the epiglottis position provided by Denman and Goudsouzian. We agree that clinically the epiglottis is most often seen to be within the LMA during endoscopy.

Our intent in reporting this case was not to advocate a technique to be exclusive of any other. We found the catheter guide to be useful in this particular circumstance. We do advocate, however, approaching the difficult airway with a careful plan that does not expose the patient to unnecessary risks of catastrophic airway loss.

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