

## Extubation and Reintubation Guided by the Laryngeal Mask Airway in a Child with the Pierre-Robin Syndrome

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Since its introduction in 1983<sup>1</sup> the laryngeal mask airway (LMA) has increased in popularity and clinical application. We report a case in which the LMA was instrumental in managing the airway of a child with Pierre-Robin syndrome and in facilitating tracheal intubation.

### CASE REPORT

A 3-month-old 4.2-kg boy presented with a history of difficulty in feeding, choking, and apnea leading to cyanosis. Soon after birth, a diagnosis of Pierre Robin syndrome was made on the evidence of micrognathia with glossoptosis causing upper airway obstruction. For the first 16 days he was cared for while prone using oxygen *via* facemask and an oral airway. By 2 months of age it was apparent that he was unable to breathe and nurse simultaneously.

On admission to hospital, he maintained an adequate airway except when feeding. Esophageal pH studies revealed significant reflux and a chest x-ray suggested chronic aspiration. Fiberoptic laryngoscopy revealed a normal epiglottis, posteriorly swollen arytenoids, and a normal glottis. Neurologic examination was within normal limits except for mild hypotonia.

The patient presented to the operating room for fundoplication and gastrostomy to control his gastric reflux. Routine monitoring was established followed by an uneventful inhalational induction with halothane in oxygen. A nasopharyngeal airway was required to maintain adequate ventilation. Tracheal intubation with a 3.5-mm-ID tube was successful after numerous attempts even though the vocal cords were never visualized. At completion of surgery, and with his trachea still intubated, the patient was transferred to the intensive care unit for elective ventilation.

Two days later the patient returned to the operating room for evaluation of the airway and for tracheal extubation under controlled conditions. His parents were insistent that tracheostomy be avoided if possible. Inhalational induction with halothane in oxygen was commenced *via* the endotracheal tube. At a suitable depth of anesthesia, laryngoscopy showed that the glottis could not be visualized.

Fiberoptic examination (Olympus PF-27S) of the supraglottic structures was performed revealing normal vocal cords with swollen arytenoids that did not impinge on the glottis. A Bard (size 8-Fr) woven nylon urethral catheter with coude tip directed anteriorly was placed through the endotracheal tube as a guide and the tube withdrawn. An LMA (size 1) was inserted over the catheter guide, which remained within the circuit (fig. 1). After minor adjustments to position the LMA, positive pressure ventilation was performed with ease around the catheter guide. After removal of the guide, spontaneous respiration *via* the LMA was established. No evidence of respiratory obstruction was detected. The LMA was removed when the child was fully awake.

Shortly after removal of the LMA, the child began to exhibit upper airway obstruction with a decreasing hemoglobin oxygen saturation. This was temporarily relieved by insertion of an oral airway and ventilatory assistance by mask. It was decided to proceed to tracheostomy. Anesthesia was reestablished by inhalation of halothane in oxygen *via* facemask and oral airway. The LMA was again inserted, and positive pressure ventilation was easily maintained. The guide was passed through the LMA and felt to advance easily into the trachea—a distance of 2.5 cm measured by markings on the guide (fig. 2). Capnography *via* the lumen of the guide revealed presence of carbon dioxide, which suggested endotracheal placement. The LMA was removed, and a 3.5-mm-ID endotracheal tube inserted over the guide. The position of the endotracheal tube was confirmed by auscultation and capnography. The tracheostomy was successfully performed followed by an uneventful recovery.

### DISCUSSION

The approach to a pediatric patient with a difficult airway involves preparing all of the available options to minimize the risk of a catastrophic loss of airway control. We were faced with the problem of assessing the airway after tracheal extubation in a patient in whom intubation was known to be difficult, while retaining the ability to ventilate the patient. This was further compounded by the potential need to reanesthetize the patient and reintubate the trachea if control of the airway was lost.

Our objective in this case was to provide a route for maintaining the airway should any of the planned steps fail. By placing the catheter guide through the endotracheal tube, our ability to reintubate was preserved until ventilation *via* the LMA was demonstrated to be satisfactory. The sequence was readily reversed when tracheostomy became necessary.

The use of the laryngeal mask to aid blind placement of a catheter to guide an endotracheal tube has been described in adult patients.<sup>2,3</sup> Airway management in infants with Pierre Robin syndrome using the LMA has also been

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described,<sup>4,5</sup> and has included an unsuccessful attempt at passing a guide through the LMA.<sup>4</sup> In our case the catheter guide could be passed through the LMA, facilitating intubation without the trauma of multiple and possibly unsuccessful laryngoscopies.

We selected a guide that had sufficient flexibility, small diameter, long length and a sampling port enabling capnography. When initially placed through the endotracheal tube and when the whole system was connected to the breathing circuit, positive pressure ventilation was easily performed. Before placing the guide down the LMA at the time of reintubation, we ensured that the catheter was sufficiently curved to follow the natural contours of the LMA. We predicted tracheal passage of the guide by tracheal "clicks"—the sensation of the tip of the catheter against the tracheal rings—by the length of advancement of the guide, and by resistance when it reached the carina. In addition, we confirmed this by end-tidal carbon dioxide concentration measurement via the lumen of the guide.

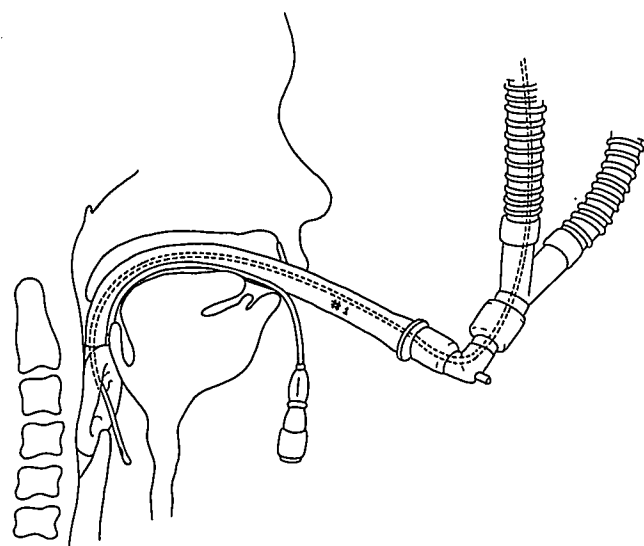


FIG. 1. The laryngeal mask with catheter guide positioned in patient and connected to the breathing circuit.

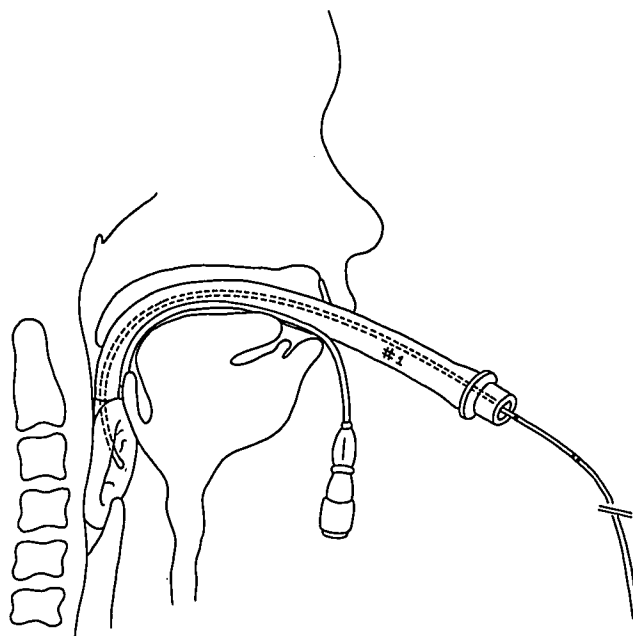


FIG. 2. The laryngeal mask with catheter guide *in situ* (note markings).

In this case the LMA proved to be a valuable addition to the management of a difficult pediatric airway and an adjunct to blind tracheal intubation. As with all new techniques, we caution that proficiency should be gained in its routine use prior to application in the potentially difficult case.

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