

Second Gen. Laryngeal Mask Airway (LMA): Is It Time For You to Upgrade?

by Richard Levitan, MD on April 24, 2012

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The laryngeal mask airway has revolutionized routine anesthesia and has become the default rescue airway for difficult intubation and difficult mask ventilation. The King LT and Combitube have advantages for prehospital and tactical use, but they are not effective conduits for tracheal intubation. The LMA works in 95% of cases of difficult or impossible mask ventilation, and can be a “mucous free highway to the larynx” for fiberoptic intubation. Since anesthesia is using it for at least half of their elective cases, it makes sense that their rescue device is something that is used routinely.

The original LMA (manufactured by LMA North America) comes in both reusable and single patient use versions (Classic and Unique). In my informal surveys of physicians at my cadaver courses, the LMA Unique is the most commonly stocked rescue ventilation device in EDs. The LMA Unique is very forgiving for rescue ventilation; even if improperly placed, it can still effectively ventilate in more than 99% of cases. An ideal placement has the tip of the wedge-shaped bowl in the upper esophagus, and the mask of the device sits squarely over the laryngeal inlet. In this position the epiglottis tilts down into the bowl.



For infrequent users of the LMA (all of us ED physicians) it's worth noting that the LMA works best with an under-inflated mask. A size 4 works well for most normal sized adults; a size 3 would be for very small adults, and a size 5 for very large men. The recommended volume of air in the cuff for a size 4 is 30cc; I suggest putting in 15cc of air prior to insertion and leaving the cuff at this volume. The traditional insertion method is with the mask fully deflated [and lubricate the posterior mask], pressing the mask against the hard palate, posterior and down, into the upper esophagus. I think insertion with the bowl half-inflated is simpler, less likely to cause back-flipping of the tip, and works well as long as the operator avoid excessive atlanto-occipital extension. Atlanto-occipital extension causes the tip

of the mask to go into the larynx, not down into the upper esophagus, where it should be.

The LMA Unique has a flat, wedge-shaped, bowl design and aperture bars over the mask to keep the epiglottis from obstructing the ventilation lumen. These bars, the relatively long length of the ventilation tube, and the fact that the 15mm connector cannot be removed, make intubation through the LMA difficult. Although clinicians have tried to pass a bougie through the LMA blindly into the trachea, this is a hit or miss proposition, depending on the exact positioning of the bowl relative to the larynx and the



location of the epiglottis.

A very effective way to intubate through the LMA Unique is with the use of an Aintree Catheter, made by Cook Critical Care. This is a hollow sheathed introducer that is placed over a 60 centimeter intubating fiberoptic scope. The intubating scope is advanced down the LMA,

through the cords and down to the carina. The Aintree, preloaded on the scope (and positioned above the articulating tip), is slid off the scope and down the trachea. After removal of the fiberoptic scope a tracheal tube can be railroaded over the Aintree (similar to how a tube is advanced over a bougie).



It's important to remember how a left-facing bevel may catch at the gap between the 5.5 mm OD Aintree and the larger ID tracheal tube (7-8.0 mm ID). Accordingly, left-beveled tracheal tubes should be turned counter clockwise off the Aintree at 14-16 centimeters to prevent catching of the bevel on the laryngeal inlet. The LMA Unique, Aintree, and a fiberoptic scope make a great combination, but what if you don't have them all, and wouldn't it be nice if you could decompress the stomach with your LMA?

A myriad of new LMA-type devices – what I call second generation LMAs – now offer easier ways to intubate and also have the benefit of stomach decompression. These devices have a number of shared features. They have broader, flatter bowls that direct them midline, and more

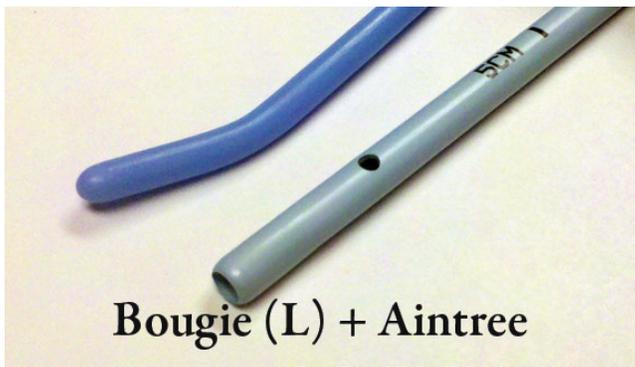
effectively wedge into the upper esophagus with less lateral instability. If you flip over an LMA Unique it has one single pivot point and no lateral stability; this allows it to be easily rotated into a suboptimal position, which may not affect ventilation, but is very detrimental when trying to intubate. Another



feature which is very useful for emergency care is the ability to decompress the stomach.

Second generation LMAs that are designed for intubation and have decompression lumens include the Cook AirQ (sold through Mercury Medical) and Intersurgical I-Gel. The LMA Supreme has a complex bowl design with a broad flat back, "fins" that prevent epiglottis infolding into the bowl, and has a decompression lumen. The bowl does not permit intubation or even fiberoptic scope placement, however. The AMBU Aura has no decompression lumen, but like the AirQ and the I-Gel has a short ventilation tube that can accommodate relatively large tubes, making it ideal for fiberoptic intubation.

The choice of LMA should depend on your resources and back-up systems. If your department has anesthesia back-up and they are likely to be fiberoptically rescuing a failed intubation in your department, the choice of LMA should be coordinated so everyone is familiar with the devices available. In situations of no back-up, and likely aero-medical or ground transfer out to another center, I would advocate an LMA that can



Bougie (L) + Aintree

allow for decompression of the stomach. Without stomach decompression and careful attention to ventilation volumes, it is easy to over-inflate the stomach. Regurgitation with an LMA can lead to catastrophic aspiration since the bowl of the LMA does not fully isolate the trachea from the esophagus. If you have the fiberoptic skills and equipment, I would either obtain an Aintree to assist with intubation over an LMA Unique, or switch to a device better designed for intubation.

All devices are single use. Air-Q, I-gel, and Aura-i all intended for fiberoptic intubation. The LMA Unique and the Supreme cannot be directly used to intubate through, but an Aintree catheter can be passed with a fiberscope through the LMA and into the trachea. LMA Supreme and I-gel allow for decompression of the stomach. The air-Q has an easily removable connector, and the I-gel connector/bite block can be removed with water placed where the bite block inserts. Removing the connector makes for easier fiberoptic intubation and tube insertion. All of the devices except the LMA Unique can be considered second generation LMAs because they have broad flat backs, lateral stability, and more sophisticated bowl designs.

Device	Stomach Decompression	Intubation without Aintree	Short tube length for fiberoptics	Maximum tracheal tube size	Removable 15 mm connector	Sizing for adult patients
LMA Unique	No	No	No	N.A.	NO	3,4,5 most #4
LMA Supreme	Yes	No	N.A.	N.A.	No	3,4,5 most #4
AirQ	No	Yes	Yes	7.5-8.0	Yes	3.5 4.5
I-Gel	Yes	Yes	Yes	6-8.0	Yes with water	3,4,5 most #4
Ambu Aura-i	No	Yes	Yes	6.5-8.0	No	3-6 most #4

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