International Journal of Health Sciences, Qassim University, Vol. 8, No. 4 (Oct-Dec 2014)

Rapid Communication

Novel Configuration of Laryngeal Mask Airway

John T. Denny, MD
Department of Anesthesia, Rutgers/Robert Wood Johnson Medical School,
3100 CAB, 125 Paterson Street, New Brunswick, NJ 08901.
dennyjt@rwjms.rutgers.edu,
732 235 6268

Julia E. Denny, BSN, CCRN, SRNA
Rutgers Graduate School of Nursing, 65 Bergen Street, Newark, NJ 07107

Abstract:

Objectives:

Hospital airway emergency teams are often responsible for responding to codes, emergency intubations etc. The individual provider may have to respond quickly to widely separated areas of large medical centers on a moment's notice. Further, in addition to the urgency, the distance of different sites makes it important that the airway team not have to lug a large medical gear bag with airway supplies and emergency drugs.

While the importance of the LMA in emergency airway management has been well established, it is sold as a fairly bulky device that requires a disproportionate space in an airway pack. We sought to examine whether modifying the LMA packaging might reduce the amount of space taken up by the need to carry three different sizes in an airway pack.

Methods:

A commonly used Laryngeal Mask Size Number 3 manufactured by Ambu Company was studied. The volume displacement of the package, and then just the LMA was measured using volumetric techniques.

Results:

Removing the large packaging yielded a much smaller footprint in cubic ml that was only 18% of the original packaging: 43 versus 240 cubic milliliters.

Conclusions:

This configuration of LMA transport allows for transporting more airway equipment in less space. These results have important implications for emergency airway response teams. Removing the original packaging and using this folded-over configuration allows to use 82% less volume in cubic milliliters per LMA in the airway pack. This allows emergency teams to carry more equipment in much less space.

Introduction:

The Laryngeal Mask Airway (LMA) is an above the glottis (supra-glottic) airway device invented by Dr. Archie Brain. It introduced as "an alternative to either the endotracheal tube or the face-mask with either spontaneous or positive pressure ventilation." [(1)] It was first used clinically in 1988 in the United Kingdom (UK), and has been used over 150 million times worldwide since then. Although it was rapidly embraced by anesthetists in the U.K., it was not until 1991 that the U.S. Food and Drug Administration allowed the release of the LMA in the U.S.

Dr. Brain first conceived of his device while providing dental anesthesia using the Goldman Dental Nose Piece, which fit over the nose, leaving the mouth free for dental access. Dr. Brain modified the Goldman mask to fit around the larynx, and glued a 10mm cut endotracheal tube to the mask. He subsequently constructed many prototypes with modifications. These were used in over 7000 patients. [(2)]

Early on, the LMA was described as successfully managing a difficult airway. [(3, 4)] Brain et al in 1985 described the LMA as having "proven value in some cases of difficult intubation indicates that it may contribute to the safety of general anesthesia."[(5)]

Hospital airway emergency teams are often responsible for responding to codes, emergency intubations etc. The individual provider may have to respond quickly to widely separated areas of large medical centers on a moment's notice. This is analogous to paramedics bringing their own, often cumbersome, gear bags of medical supplies with them to an accident scene. In many medical centers, the airway emergency team must bring their own equipment and drugs. Further, in addition to the urgency, the distance of different sites makes it important that the airway team not have to lug a large medical gear bag with airway supplies and emergency drugs.

While the importance of the LMA in emergency airway management has been well established, it is sold as a fairly bulky device that requires a disproportionate space in an airway pack. It is much more bulky than standard endotracheal tubes. There are three standard sizes of LMA's used in adult patients: LMA 3, 4, and 5, whereas only two sizes of endotracheal tubes typically are commonly used in adults, the 7-0 and 8-0.

We sought to examine whether modifying the LMA packaging might reduce the amount of space taken up by the need to carry three different sizes in an airway pack.

Methods:

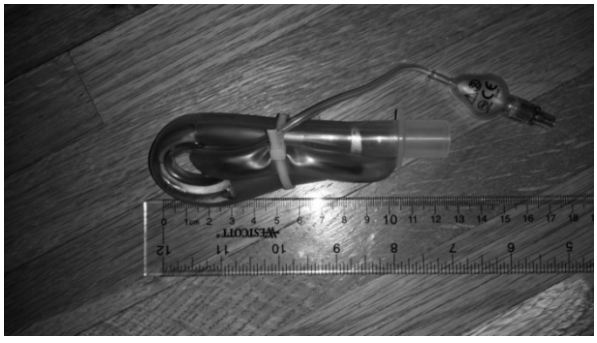
We studied a commonly used Laryngeal Mask Number 3 manufactured by Ambu Company.

The volume displacement of the package was measured using volumetric techniques.

Picture 1 depicts native package of LMA #3:

The LMA was then removed from the packaging and folded over onto itself, and secured with an eight inch plastic cable tie, manufactured by Commercial Electric, Atlanta, Georgia. The volume displacement of this configuration was then measured.

Picture 2 depicts folded over configuration of LMA #3:



Results:

Configuration of LMA	Length	Width	Cubic ml.
Native packaging	24.5 cm	11.5 cm	240
Folded over	12 cm	4 cm	43

Discussion:

The LMA when removed from its original bulky packaging had approximately one-half of the length and about one-third the width of the native packaging. Removing the large packaging yielded a much smaller footprint in cubic ml that was only 18% of the original packaging: 43 versus 240 cubic milliliters.

It is important to note that the original packaging contains a sterile LMA. Removing it and folding it over obviously negates the sterile packaging. It would thus be advisable to place the folded over LMA into a sterile bag for transport within the emergency pack.

Conclusions:

This configuration of LMA transport allows for transporting more airway equipment in less space.

These results have important implications for emergency airway response teams. Removing the original packaging and using this folded-over configuration allows to use 82% less volume in cubic milliliters per LMA in the airway pack. This allows emergency teams to carry more equipment in much less space.

References:

1. Brain AI. The laryngeal mask--a new concept in airway management. Br J Anaesth. 1983;55(8):801-5.
2. Brain AI. The development of the Laryngeal Mask--a brief history of the invention, early clinical studies and experimental work from which the Laryngeal Mask evolved. European journal of anaesthesiology Supplement. 1991; 4:5-17.
3. Brain AI. The laryngeal mask airway--a possible new solution to airway problems in the emergency situation. Archives of emergency medicine. 1984;1(4):229-32.
4. Brain AI. Three cases of difficult intubation overcome by the laryngeal mask airway. Anaesthesia. 1985;40(4):353-5.
5. Brain AI, McGhee TD, McAteer EJ, Thomas A, Abu-Saad MA, Bushman JA. The laryngeal mask airway. Development and preliminary trials of a new type of airway. Anaesthesia. 1985;40(4):356-61.