

Best Practice to Cuff Pressure Monitoring of Laryngeal Mask Airways Using a Manometer and a Reference Guide

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Introduction

- 150 million Laryngeal Mask Airways (LMAs) utilized globally each year
 - LMAs substituted ETT in > 40% of General Anesthesia cases → Increased versatility (can be used in short laparoscopic procedures)
 - More favorable hemodynamic, respiratory, and cardiac stability
 - Less anesthetics required → Eliminates the need for muscle relaxants and reversals
 - Faster insertion → Laryngoscope not needed
 - Faster recovery process
 - Incidence of death or brain damage approximately 5 million each year
 - Cause of **death from aspiration in 50%** of the cases
 - Insertion is a blind technique
 - Accurate sizing, proper insertion technique, and ideal positioning essential to prevent complications, i.e. gastric inflation, nerve damage, and aspiration
 - Small LMA → **hypo-inflated** cuff and ventilatory failure
 - Large LMA → **hyper-inflated** cuff and increase malposition
- ** Cuff inflation essential to maintain proper seal and positioning ****

Background & Significance

- 50-80% of LMAs inserted are improperly situated in the hypopharynx and misaligned with the tracheal opening
 - Initial introduction to LMA cuff insertion techniques and maintenance:
 - Academic course
 - Simulation labs
 - Airway workshops
 - BLS/ACLS training
 - Clinical introduction via multiple anesthesiologists → development of personal routine
- ***No Standardized Teaching Methodology*****

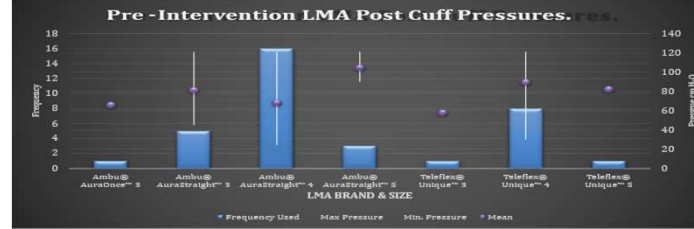
Methodology

- Design:** Qualitative, Non-Experimental Study
- Population:** CRNAs & Anesthesiologists
- Sample Size:** n = 100 LMA insertions (preferably from various providers)

Information Collected	
Provider	<ul style="list-style-type: none"> Type of Provider Years in Current Position
Patient	<ul style="list-style-type: none"> Age Height Weight } BMI
LMA	<ul style="list-style-type: none"> Type Size Volume of Air & Pressure of Cuff

- Instrument:** Manometer
- Intervention:** 10-15 minute PowerPoint review of data and current guidelines & Reference Guide

Phase I Results

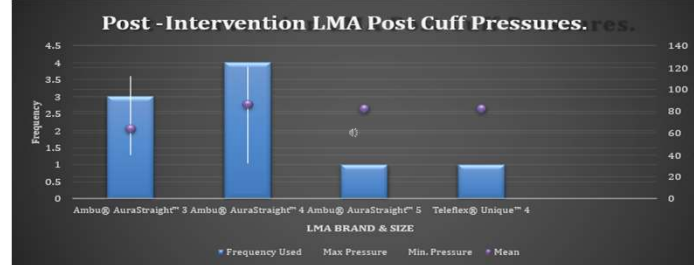


- Mann-Whitney U comparison between phase I and II groups based on Age and BMI showed no significance.
 - Mean age – 50 Years old
 - Mean BMI – 26.6

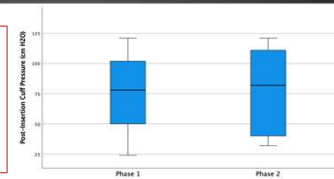
Data collected over 5 weeks

All except the Teleflex Unique size 3 had mean pressures that exceeded manufactures recommendation

Phase II Results



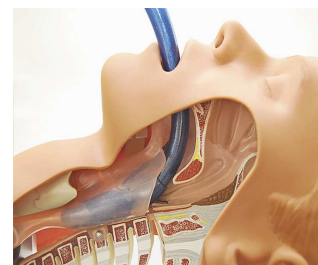
- No statistical difference between Phase I ($\mu=77.29$) and Phase II ($\mu=77.38$)
 - Limitations of this study could have resulted in a lack in reduction of mean pressures.
 - Based on 3 weeks (8 LMAs)



Discussions

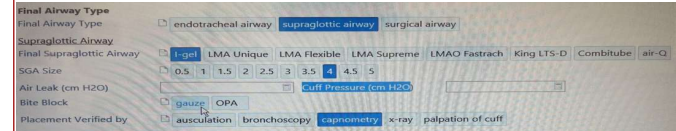


- Limitations**
 - Large Academic – Single Center
 - Weekly meeting remote and limited to 60 min.
 - Meetings focused on Epic training
 - Physician preference
 - Patient co-morbidities limited inclusion
 - Habitual practice
 - Time frame (November – December)
 - Implementation during the holiday period & Covid-19 resurgence.



Discussions & Implications in Practice

- Clinical Practice:**
 - Anesthesia Provider responsible for maintaining patient safety and comfort
 - Manometer and reference guide can guide clinical decision and minimize complications → faster recovery + better patient experience
- Healthcare Policy & Economic Implications:**
 - ↑ Patient satisfaction = ↑ CMS reimbursement + ↑ HCAHPS/Press Ganey scores
 - EMR, such as Epic, contain a field dedicated to assessment of airway devices, including cuff pressures → ↑ Provider accountability



- Education, Quality, & Safety:**
 - No standardized method of educating new providers on current recommendations → Clinical knowledge passed on from experienced provider (information gained from years of handling the device including provider preference)
 - PowerPoint presentation during study could be utilized in yearly competencies or education of students and residents

Conclusion

- No significant difference between Phase I and Phase II data due to limitations of the study:
 - Phase I (5 weeks) → n = 38
 - Phase II (3 weeks) → n = 9
 } Lack of procedures due to Holiday and Covid-19
- Current practice not in alignment with manufacturer's recommendations.
- Manufacturer's recommendations:
 - Size selection based on patient weight
 - Cuff must be fully deflated and lubricated with water-based jelly prior to insertion
 - Cuff pressure < 60 cm H2O
 - Use of manometer recommended



Patient Weight (Kg)	LMA Size #	MAXIMUM Cuff Inflation Volume (mL)
30-50	3	20
50-70	4	30
70-100	5	40
> 100	6	50

MAXIMUM Intra-Cuff Pressure: 60 cm H₂O

References & Contact information



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Phase I	Phase II
<ul style="list-style-type: none"> Pre-Intervention Weeks 1-3 Determine current clinical practice: <ul style="list-style-type: none"> Was air removed or added prior to insertion? What was the post-insertion cuff pressure? Did you remove or add air after insertion? 	<ul style="list-style-type: none"> Post-Intervention Weeks 4-6 Determine whether there were any practice changes: <ul style="list-style-type: none"> Was the manometer and POC reference cards utilized? Did providers alter their insertion techniques? Did providers alter the amount of air in the cuff post-insertion?