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STUDY ON EFFICACY OF ULTRASOUND AND FOB IN CONFIRMING THE PLACEMENT OF LARYNGEAL MASK AIRWAY

Anaesthesiology

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ABSTRACT

Ultrasound is a safe and non invasive technique for assessing the airway . In this observational study, 60 patients belonging to ASA Classes I and II scheduled for elective general surgery without any airway abnormality were included. Squared wave of capnogramTransverse neck ultrasound was performed using linear probe (8- 13Hz) started from hyoid bone (hyperechoic superficial inverted Ushaped linear structure)probe moved caudally with slight cephalad angle visualization of vocal cord & arytenoids. The Ultrasound arytenoid grade had a significant correlation with LMA rotation grade.The incidence of LMA Malposition by ultrasound was found to be 80% .With regard to the test performance ,US was found to have a sensitivity of 92%,with a positive predictive value of 94% to detect the LMA rotation of any number of degrees. The specificity was 62% with a negative predictive value of 55%. FOB Examination is the gold standard tool for confirmation of the correct placement of LMA. ,we evaluated USG as a tool to confirm the placement comparing with the FOB examinationThe FOB examination is invasive & interrupts the ventilation during procedure. It cannot be done frequently intra-operatively compromising ventilation. These problems can be overcome by using ultrasound.USG detects the rotation of LMA even if it is positioned at optimal depth thereby predicting the chance of dislodgement during the course of surgery.

KEYWORDS

airway, laryngeal mask airway, FOB examination, ultrasound

1. INTRODUCTION:

Ultrasound (US) is an emerging technology for airway assessment. Although the laryngeal cartilage is poorly calcified in children, the arytenoid and thyroid cartilages are easily recognizable as hypoechoic structures surrounded by a hyperechoic border on ultrasound The LMA cuff forms a seal with the periglottic area to provide a continuity of the airway. Three-dimensional radiologic reconstruction of the airway with the LMA showed that within the hypopharynx, the tip of the LMA is placed at the esophageal inlet just below the glottis, and the inflated cuff may elevate the arytenoid and thyroid cartilages to some extent Although US was unable to identify the air-filled cuff of the LMA, it could detect the anatomical change of the cartilage section before and after LMA insertion. We hypothesized that US would detect a malpositioned LMA within the hypopharynx through the positional change of the arytenoid cartilage.. An appropriately placed LMA is usually confirmed by several clinical tests, such as: (1) meeting resistance on insertion of the LMA; (2) ventral movement of LMA upon cuff inflation; (3) effective ventilation as evidenced by chest movement, $P_{ET}CO_2$, expired gas volume, and volume changes of the reservoir bag; and (4) positive airway pressure. In adults, the ability to effectively ventilate, and the airway pressure generated from ventilation, showed a good correlation with correct LMA positioning. However, several studies have demonstrated that the frequency of suboptimal LMA positioning was 12.8% to 49% in children despite clinically successful ventilation. A suboptimally positioned LMA can maintain an airway to some extent, but the LMA may be at increased risk for further displacement during the course of the operation.

2. AIMS :

To compare the efficacy of ultrasound and FOB in diagnosing the malposition of LMA

3. METHODS & MATERIALS :

In this observational study, 60 patients belonging to ASA Classes I and II scheduled for elective general surgery without any airway abnormality were included.

Inclusion criteria

- Asa i&ii
- 18-70 years
- Both sex

Exclusion criteria

- Bmi > 30
- Head and neck abnormalities
- Pregnant female
- Neck extension < 30

SAMPLE SIZE

- Assuming a 5% 2 tailed significance level (α=0.05) & power of 80%.
- Sample size was based on the study by kim J et al an observational study of U/S evaluation of LMA position in Pediatric patients.
- The sample size came to be around 60.

Methodology :

- Ultrasound evaluation of glottis is done prior to LMA insertion
- After institution of general anesthesia , appropriate sized LMA was inserted by classic technique.
- Successful insertion of LMA was judged by clinical tests
  - chest and bag movement with mechanical ventilation
  - No audible leak(20 cm of H_2O : Airway pressure)
  - Squared wave of capnogram
- Transverse neck ultrasound was performed using linear probe (8-13Hz) started from hyoid bone (hyperechoic superficial inverted Ushaped linear structure)probe moved caudally with slight cephalad angle visualization of vocal cord & arytenoids
- Data expressed in percentages.
- Sensitivity, Specificity, Positive predictive value & Negative predictive value was calculated.
- Co-relation between US arytenoid grade and FOB LMA were analysed using Spearman Co-relation Coefficient.
- Statistical analysis were performed using SPSS 16.

4. RESULTS :

FIGURE NO 1 : ultrasound grade and FOB grade

ULTRA SOUND ARYTENOID GRADE	FOB GRADE			
	GRADE 0	GRADE 1	GRADE 2	GRADE 3
GRADE 0	39	0	0	0
GRADE 1	2	4	2	0
GRADE 2	2	2	3	3
GRADE 3	0	0	1	2

The Ultrasound arytenoid grade had a significant correlation with LMA rotation grade.The incidence of LMA Malposition by ultrasound was found to be 80% .With regard to the test performance ,US was found to have a sensitivity of 92%,with a positive predictive value of 94% to detect the LMA rotation of any number of degrees. The specificity was 62% with a negative predictive value of 55%.

5. CONCLUSION & DISCUSSION

- FOB Examination is the gold standard tool for confirmation of the correct placement of LMA.
- In my study ,we evaluated USG as a tool to confirm the placement comparing with the FOB examination
- The FOB examination is invasive & interrupts the ventilation

during procedure. It cannot be done frequently intra-operatively compromising ventilation. These problems can be overcome by using ultrasound.

- USG detects the rotation of LMA even if it is positioned at optimal depth thereby predicting the chance of dislodgement during the course of surgery.

FOB LMA grade was considered as the "gold standard" of LMA malposition that results in ventilator difficulty. Actually, US arytenoid grade that shows LMA rotation may not predict a truly malpositioned LMA. However, a rotated LMA is also a malpositioned LMA, and it may cause ventilator difficulty. Most studies in the field of the FOB in LMAs have only focused on the degree of exposure. In other words, the depth of the LMA was the main concern for optimal position of an LMA by FOB. However, far too little attention has been paid to rotation or deviation of the inserted LMA. This study examined the emerging role of US in the context of bedside real-time airway evaluation of the LMA. US could detect the rotated or deviated LMA easily in pediatric patients despite inadequate evaluation of the depth of the device.Ultrasound confirmation of lma is a non-invasive, easier technique than fiberoptic confirmation without producing any deterimental effect to the patient, so it can be used as an better tool.

6. REFERENCES :

1. An Ultrasound Evaluation of Laryngeal Mask Airway Position in Pediatric Patients: An Observational Study (Anesth Analg 2015; 120:427–32) Jeongmin Kim, MD, Ji Young Kim, MD, PhD, Won Oak Kim, MD,* and Hae Keum Kil, MD
2. Ultrasound Confirmation Of Laryngeal Mask Airway Placement Correlates With Fiberoptic Laryngoscope Finding Middle East J Anesthesiol.2011.Deepak Gupta, Arvind Srirajakalidindi, Nader Habli, And Halim Haber