ORIGINAL RESEARCH PAPER

Anaesthesiology

A CLINICAL EVALUATION OF PAEDIATRIC AIR-Q INTUBATING LARYNGEAL AIRWAY

KEY WORDS: ILA, ETT, Leak airway pressure.

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ABSTRACT

Background: The management of the airway is one of the anaesthesiologist's core competencies. The key anatomical, physiological, and pathological characteristics of the airway as well as the numerous airway equipment's and methods that have been created for airway maintenance must be thoroughly understood by the anaesthesiologist in order to successfully manage the airway. The Air Q Intubating Laryngeal Airway is one such tool. **Objective:** To measure the Time taken, number of attempts, ease of insertion of ILA ,Leak airway pressure, Time taken and number of attempts of insertion of ETT through ILA and Time taken for removal of ILA **Methods:** This study was carried out in 60 children, between 2-10 years of age of ASA 1 & 2 posted for elective surgery under general anaesthesia. Children were premedicated with oral Midazolam 0.5 mg/kg 30 minutes prior to the surgery. Upon shifting children to the operating room, Standard ASA monitors were connected, baseline parameters were recorded. Children were induced with Sevoflurane + Oxygen + Nitrous Oxide and intravenous line was secured. Inj. Glycopyrrolate + Inj. Fentanyl and muscle relaxant Succinylcholine was administered. Airway secured with an appropriate size ILA and the cuff was inflated and the time taken for insertion of ILA was recorded. The ease of insertion was assessed using a subjective scale of 1-4 (1= no rsistance, 2= mild resistance, 3= moderate insertion, 4= inability to place the device). The appropriate size ETT was inserted through the ILA and the time taken for insertion of ETT through ILA was recorded. The time taken for the removal of the ILA was recorded from disconnection of the breathing circuit, removal of the ILA and recording of EtCo2 tracing. The number of attempts at ILA placement and ETT placement through ILA was recorded. Any necessary adjustments to the Air-Q ILA, problems with ventilation were documented during the surgical procedure. At the end of the surgery, all children were reversed and extubated smoothly after adequate respiratory attempts and were shifted to the post anaesthetic care unit (PACU). **Results:** The insertion of air-Q ILA was easier with less number of attempts. There were high leak airway pressures but no significant difference in hemodynamic parameters. **Conclusion:** Paediatric Air-Q ILA is easy to insert with minimal attempts, forms a satisfactory primary airway with respect to ventilatory parameters by providing adequate leak airway pressures in paediatric patients.

INTRODUCTION:

Airway management continues to remain one of the most challenging task for anaesthesia and critical care providers. Intubation of the trachea has remained the gold standard for airway management during anaesthesia. Supraglottic airway devices (SAD) are an integral part of airway management in infants and children.

The laryngeal mask airway (LMA) is widely used in paediatric population both as an airway and as a conduit to facilitate fiberoptic bronchoscopy. The Air-Q intubating laryngeal airway (Air-Q ILA) is a newer supraglottic airway engineered for use as both primary or rescue airway in the event of a difficult airway. It is disposable version of the reusable intubating laryngeal airway (ILA).

These devices maybe ideal in a paediatric population with difficult airway because it provides a conduit for tracheal intubation and permits oxygenation and ventilation prior to and during intubation attempts. The purpose of this study is to evaluate the feasibility of the Air-Q ILA in paediatric patients.

OBJECTIVES

- Time taken for insertion of the intubating laryngeal airway
- Number of attempts of insertion of intubating laryngeal airway
- Ease of insertion of intubating laryngeal airway
- Leak airway pressure
- Time taken for insertion of ETT
- Number of attempts of insertion of ETT through ILA
- Time taken for removal of ILA
- ETCO2
- SPO2.

METHODOLOGY

Source of data:
This cross sectional study, "A CLINICAL EVALUATION OF PAEDIATRIC

AIR-Q INTUBATING LARYNGEAL AIRWAY" was conducted on 60 children aged between 2-10 years of ASA 1 and 2 posted for elective surgery under genal anaesthesia at Bapuji child Health Institute, Chigateri General Hospital and Bapuji Hospital attached to J.J.M. Medical College, Davangere.

Type of study: Cross sectional study
Study period: February 2021 to January 2023
Sample size: 60

Method of data collection:
Inclusion criteria:

- Children between 2-10 years
- Both sex
- ASA 1 & 2
- Posted for elective surgery under general anaesthesia

Exclusion criteria:

- Active respiratory illness
- Full stomach
- Congenital anomalies/syndromes involving airway
- Congenital heart disease
- Neurological disorders

Procedure:
After obtaining Institutional ethical committee clearance, verbal and written consent of parent/guardian was taken.

Pre Anaesthetic Evaluation:
A proper preanaesthetic evaluation was done for all children on previous day of surgery.

Children were premedicated with oral Midazolam 0.5 mg/kg 30 minutes prior to the surgery in preoperative room.

Upon shifting children to the operating room, Standard ASA monitors (pulse oximetry, non-invasive blood pressure, electrocardiogram, precordial stethoscope) were connected. Baseline parameters (Heart rate, Blood pressure, oxygen saturation) were recorded.

Children were induced with Sevoflurane + Oxygen + Nitrous Oxide and intravenous line was secured.

Inj. Glycopyrrolate 0.01 mg/kg + Inj. Fentanyl 2mcg/kg and a muscle relaxant Inj. Scoline 2 mg/kg was administered iv.

Airway was secured with an appropriate size ILA, the cuff was inflated, the breathing circuit was connected, and the child's ventilation was assessed with bilateral equal chest rise, a normal capnogram waveform, and bilateral equal breath sounds on auscultation. The time taken and number of attempts of ILA insertion was noted.

If the insertion of ILA was not successful after three attempts, the ILA was removed and ETT was inserted after conventional laryngoscopy.

In those children where ILA was successfully placed, an appropriate size ETT, well-lubricated with 2% lignocaine gel was passed blindly through the ILA in a clockwise rotation with an external laryngeal manipulation and jaw thrust given by an assistant. After placement of the ETT, the jaw thrust and external laryngeal manipulation were released. Every attempt for insertion of ETT was made for a duration of 30 seconds. If the ETT was passed successfully, the breathing circuit was connected and checked for ventilation. If adequate chest rise was seen, bilateral equal breath sounds were heard on auscultation, normal capnography waveform was noted, the ETT was considered to be successfully placed in the trachea. If any of the above parameters were found to be abnormal then the ETT insertion was considered unsuccessful. The ETT was removed and the child was ventilated through the ILA. Two more similar attempts of ETT insertion was done with a duration of 40 and 50 seconds respectively.

No child was left apnoeic for more than 60 seconds. Failed insertion was considered when it required more than three attempts and more than 30 seconds of time, when there was absent chest rise, absent capnography waveform and decreasing SpO2 values from baseline. If we were not able to pass the ETT on third attempt, ETT insertion was abandoned. The child was ventilated with the ILA in situ for the rest of the surgery.

Time taken and number of attempts for ETT insertion through ILA was recorded.

The time taken for ILA removal was considered from disconnecting the breathing circuit and removal of the ILA.

Any necessary adjustments to the Air-Q ILA, problems with ventilation, or adverse airway events (coughing, laryngospasm, bronchospasm, desaturation, gastric insufflation) were documented during the surgical procedure.

All children were maintained on oxygen, nitrous oxide, volatile agents (Isoflurane), non depolarizing muscle relaxants (inj. Atracurium 0.5mg/kg) and IPPV. At the end of the surgery, all children were reversed and extubated after adequate respiratory attempts and were shifted to the post anaesthetic care unit (PACU)

Sample Size Estimation

RESULTS

Intubating Laryngeal Airway:

Table 1: Number of attempts for ILA insertion

No. of attempts	No. of cases	Percentage
One	55	91.7
Two	5	8.3
Total	60	100

In 91.7% cases (55/60) ILA was placed in first attempt, in 8.3% cases (5/60) ILA was placed in second attempt.

Table 2: Ease of ILA insertion

Ease of insertion	No. of cases	Percentage
1	58	96.7
2	1	1.7
3	1	1.7
4	0	0.0
Total	60	100

ILA in 96.7% cases (58/60) were inserted in first attempt, in 1.7% cases (1/60) were inserted in second attempt, in 1.7% cases (1/60) were inserted in third attempt, and none in fourth attempt.

Table 3: Leak airway pressure

Leak airway pressure (cmH2O)	No. of cases	Percentage
20-25	56	93.3
25-30	4	6.7
Total	60	100.0

The leak airway pressure was 20-25 cmH2O for 93.3% cases (56/60) and 25-30 cmH2O for 6.7% cases (4/60).

Table 4: Time taken for ETT insertion through ILA

Insertion time (sec)	No. of cases	Percentage
< 30	8	67.0
30-60	4	33.0
Total	12	100.0

Total 12 cases were intubated successfully through ILA out of 60 cases and the time taken for ETT insertion through ILA in 67% cases (8/12) was < 30 seconds, in 33% cases (4/12) it was 30-60 seconds.

Table 5: Number of attempts for ETT insertion through IL

No. of attempts	No. of cases	Percentage
1	0	0
2	0	0
3	11	92
4	1	8
Total	12	100.0

Of 60 cases only in 12 cases the ETT was successfully inserted through ILA in 92% cases (11/12) it was placed in third attempt, in 8% cases (1/12) it was at fourth attempt respectively.

Table 6: Time taken for removal of ILA after ETT insertion

Removal of ILA (sec)	No. of cases (n=51)	Percentage
25-30	7	58
30-35	5	42
Total	12	100.0

Time taken for removal of ILA after ETT tube insertion in 12 cases was 25-30 seconds in 58% cases (7/12), and in 42% cases (5/12) it was 30-35 seconds.

CONCLUSION

Paediatric Air-Q ILA is easy to insert with minimal attempts, forms a satisfactory primary airway with respect to ventilatory parameters by providing adequate leak airway pressures in paediatric patients.

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