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LARYNGEAL MASK AIRWAY INSERTION IN SPONTANEOUSLY BREATHING CHILDREN WITH INDUCTION OF ANAESTHESIA USING PROPOFOL, PROPOFOL-KETAMINE OR PROPOFOL-SEVOFLURANE

Thesis submitted to Department of Anaesthesia and Surgical Intensive Care
Faculty of Medicine- Alexandria University
In partial fulfillment of the requirements for the degree of

Master

In

Anaesthesia and Surgical Intensive Care

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MBBCh, 2009

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[2015]

SUMMARY

Management of the airway has come a long way since the development of endotracheal intubation by Mac Ewan in 1880 to present day use of modern and sophisticated devices.

Although the classical endotracheal tube is the most reliable and safe method to maintain the airway, other several alternatives have been introduced aiming to facilitate airway management or to avoid the stress response provoked by the process of intubation that can cause disturbances in the hemodynamic stability with a resultant increase in the heart rate and in the arterial blood pressure, or disturbances in the intracranial pressure, or even in the intraocular pressure.

From these alternatives, the supraglottic airway devices which become increasingly popular for spontaneously breathing patients undergoing minor surgical procedures. Supraglottic airway devices (SAD) ventilate patients by delivering anaesthetic gases/oxygen above the level of the vocal cords and are designed to overcome the disadvantages of endotracheal intubation such as: soft tissue injury, tooth, vocal cords, laryngeal and tracheal damage, exaggerated haemodynamic response, and barotrauma.

The Laryngeal Mask Airway is considered the most popular of these supraglottic airway devices, invented by Dr. Brain in 1985.

Smooth insertion and correct positioning of an LMA requires adequate mouth opening and sufficient depth of anaesthesia to prevent complications.

Propofol is currently the induction agent of choice for LMA insertion and to reduce its adverse cardiorespiratory depressant effects, a number of other coinduction drugs were introduced among such as Fentanyl, Ketamine and Sevoflurane.

This study was carried out in Alexandria University Hospitals on 60 children of ASA grade I and II, aged 2 to 10 years, and scheduled to undergo elective infra-umbilical surgery under general anaesthesia with spontaneous breathing using LMA. They were randomly classified into three equal groups; twenty children per each group using the closed opaque envelope method according to the drugs used for induction of anesthesia. Group I for Propofol and called group P, group II for Propofol and Ketamine and called group PK and group III for Propofol and Sevoflurane and called group PS.

All the patients were thoroughly assessed pre-operatively. On arrival to the operating room, patients were connected to the standard monitoring.

They were all subjected to the same anaesthetic protocol; EMLA cream was applied to the back of both hands 1 hour prior to surgery, Children were pre-medicated with Chloral hydrate 25-50 mg kg-1 orally 30 min before induction of anaesthesia.

After pre-oxygenation with 100% oxygen for 3 minutes, patients were given their assigned drugs as follows:

- Group P received Propofol 3 mg kg^{-1} intravenously over 15 seconds.
- Group PK received Ketamine 0.5 mg kg^{-1} intravenously over 10 seconds followed immediately by Propofol 2 mg kg^{-1} intravenously over 15 seconds.
- Group PS received induction with Sevoflurane 8% dial concentration in 100% oxygen and fresh gas flow of 6 liters/min till loss of eye lash reflex which occurs usually in less than 10 breaths, along with Propofol 1 mg kg^{-1} intravenously over 15 seconds.

When there was no loss of consciousness and no loss of eye lash reflex within 30 seconds after Propofol injection, the patient was given further increments of Propofol 0.5 mg kg^{-1} till loss of consciousness and loss of eye lash reflex.

Laryngeal mask airway was inserted 60 seconds after injection of Propofol according to the 180° rotational (reverse) technique of insertion.

In cases with failure of the first attempt of LMA insertion, patients were given subsequent bolus dose of Propofol 0.5 mg kg^{-1} and were ventilated with a face mask. LMA insertion was attempted up to three times. However, insertion conditions assessment have been done only for the first attempt. If LMA insertion was unsuccessful after three attempts, the patient was scheduled to be intubated using a muscle relaxant.

Complications like (apnea, hypotension, laryngeal spasm...etc), were managed accordingly.

Anaesthesia was maintained with 2-2.5% Sevoflurane in 100 % oxygen.

Demographic data (age, sex and weight), haemodynamic measurements (heart rate, mean arterial blood pressure and oxygen saturation), insertion measurements (including resistance to mouth opening, resistance to LMA insertion, swallowing, coughing/gagging, limb/head movements, laryngospasm), number of attempts of LMA insertion, number of patients requiring additional boluses of propofol, total dose of propofol needed, incidence of apnea and its duration and incidence of laryngospasm or hypotension were recorded and statistically analyzed.

There was no statistically significant difference between the three groups as regards age, gender, body weight.

Haemodynamic parameters in the form of HR and MABP were most significantly decreased in the propofol group relative to the other two groups. Ketamine-propofol group was the most stable regarding haemodynamics.

Slight oxygen desaturation was observed in the propofol group after insertion of LMA due to the increased incidence of apnea in such group.

Regarding the insertion measurements, the present study showed that a combination of sevoflurane with propofol 1 mg kg^{-1} achieved satisfactory conditions for LMA insertion, significantly better than with a combination of ketamine of 0.5mg kg^{-1} with propofol 2 mg kg^{-1} and also better than propofol 3 mg kg^{-1} alone.

LMA insertion was successfully accomplished from the first trial in all cases of the three groups except only one patient in the PK group where a second attempt was required. Also, only four patients; two from the propofol group and another two from the PK group, required additional propofol boluses, but this rendered no statistically significant differences.

Generally, complications were infrequent in the three groups, but apnea was more encountered in the propofol group with about five cases with statistically significant difference on comparison to the other groups. Laryngospasm occurred once in the PK and PS groups. Only four cases in group P and another four in group PS suffered hypotension.