Original Research Article

Assessment of haemodynamic response to the insertion of laryngeal mask airway

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Abstract

Background: The major post operative complications associated with Endotracheal intubation such as sorethroat and Laryngitis, pharyngitis, laryngotracheal Most frequent cause of difficulty or danger in the administration of Anaesthesia is obstruction of airway. trauma and vocal cord dysfunction can be avoided with the judicial use of Laryngeal mask airway. So the purpose of the study was to assess haemo dynamic response to the insertion of laryngeal mask airway. **Material and Methods:** Total 50 patients of ASA- Grade I and Grade II undergoing elective surgical procedures were studied. A thorough pre-operative examination and detailed history was completed according to the proforma. Proper placement of Laryngeal mask airway was confirmed by equal chest inflation. To observe the haemodynamic changes, heart rate, blood pressure, systolic and diastolic blood pressure, Mean arterial pressure (MAP), Rate pressure product (RPP) and Cardiac dysarthymia during insertion of the Laryngeal Mask Airway were recorded. Statistical analysis was done using appropriate statistical tests. **Observation and Results:** The actual rise of basal pulse was 9.54 per minute, in systolic blood pressure was 22.32 mm of Hg, in the diastolic blood pressure was 9.8 mm of Hg. The mean value of the Mean arterial pressure was 101.82 mm of Hg. The mean basal value of RPP was 8174.12. **Conclusion:** Thus present study showed that laryngeal mask airway is a well-designed and effective device with a unique role in airway management.

Key Word: laryngeal mask airway.

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INTRODUCTION

Most frequent cause of difficulty or danger in the administration of Anaesthesia is obstruction of airway. Introduction of Endotracheal intubation since 18th century was the biggest technical advance since the discovery of general Anaesthesia itself. Endotracheal Anaesthesia procures an absolute freedom of the patients airway which is mechanically assured. No Anaesthesia is safe or satisfactory unless diligent efforts are made towards maintenance of a functioning airway. [1]Thus a free airway can be defined as one through which inspired air passes without obstruction from outside the body into arterial blood and through which waste gases can pass without obstruction from venous blood to the external atmosphere. [2] The airway includes the nasopharynx and oropharynx, the larynx, the trachea, the bronchi and all subdivisions and alveoli. It is evident that opportunities for interference with patency of the airway are numerous and that awareness of the possibilities for obstruction is essential to complete appreciation of problems involved in control of the airway.[3] Designed specifically for dental, head and neck surgery. Kink proof, but may be occluded by external pressures from patient biting. Bhatt et al claim that Laryngeal mask airway offers less resistance to breathing during constant gas flow than a tracheal tube. Reinforced Laryngeal mask airway have similar internal diameters than corresponding size (Regular), Laryngeal mask airway increases resistance to air flow in smaller

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diameter airways.[4] Intravenous sedation and topical anaesthetic facilitates introduction of Laryngeal mask airway. A gum elastic bougie can be inserted down the Laryngeal mask airway into the trachea. Laryngeal mask airway is removed leaving gum elastic bougie in the trachea.[5] The major post-operative complications associated with Endotracheal intubation such as sorethroat and Laryngitis, pharyngitis, laryngotrachealtrauma and vocal cord dysfunction can be avoided with the judicial use of Laryngeal mask airway.

MATERIAL AND METHODS

This study was conducted in the Department of Anaesthesia after the approval from Ethical Committee of Government Medical College, Miraj. Total 50 patients of ASA- Grade I and Grade II undergoing elective surgical procedures were studied. Duration of the procedures being 30 and 90 minutes, patients of both sexes, ranging in age from 20 to 45 years were included. Patients with uncontrolled Hypertension or Diabetes Mellitus. Raised Intracranial Tension, Coronary Artery Disease, Obstructive Airway Disease were excluded from the study. Informed consent was obtained from each patient and the procedure explained to the patient. No patient with significant Cardiovascular, Respiratory, Neurological or endocrine disease were included in the study. Any patient with upper respiratory tract pathology was excluded from the study and also patients with increased risk of gastric aspiration were excluded from the study. A thorough pre-operative examination and detailed history was completed according to the proforma. 50 patients between the age groups of 20-40 years were selected. All the patients were kept nil by mouth over night and informed written consent was confirmed prior to operative procedure. The patients were allocated according to age, sex, weight, ASA physical status.

All the patients were pre medicated with injection Glycopyrolate 0.04 mg/kg Intramuscular 1 hr before the surgery on arrival in the operation theatre. The patients were laid supine on the table and Intravenous access was secured on the dorsum of the hand using 20 G cannula. A Sphygmomanometer cuff was tied around on the left upper arm and all the patients were put on Electrocardiogram long lead II which was being displayed continuously. Injection diazepam 0.1 mg/kg and Injection Pentazocine 0.3 mg/kg were given Intravenously 15 minutes before induction. Patients were preoxygenated with 100% oxygen for 3 minutes. Basal and Preinduction, pulse rate, systolic and diastolic blood pressure were recorded using the Sphygmomanometer cuff. All the patients were induced with Injection Penthotal Sodium to loss of eyelash reflex 4 - 6 mg/kg and Injection Succinyl Choline 1.5 - 2 mg/kg was given intravenously to facilitate airway placement. Patient's lungs were ventilated with 100% Oxygen for 45 seconds. Proper size laryngeal mask Airway was inserted blind according to the technique described by Brain. Patients were excluded from the study if the insertion of mask took more than two attempts. Proper placement of Laryngeal mask Airway was confirmed by equal chest inflation - bilateral air entry on auscultation and movement of the reservoir bag. Anaesthesia was maintained using controlled ventilation of lungs to maintain normocapnia using closed circuit, using 66% Nitrous Oxide and Oxygen, .5 to 1% Halothane and using Neuromuscular block was provided using Injection Vecuronium 0.1 mg/kg. To observe the haemodynamic changes, heart rate, blood pressure, systolic and diastolic blood pressure, Mean arterial pressure (MAP), Rate pressure product (RPP) and Cardiac dysarthymia during insertion of the Laryngeal Mask Airway recorded The haemodynamic data was obtained at Basal, Preinduction,postinduction,0 minute,1 minute,3 minute and 5 minutes after the Laryngeal Mask Airway insertion and Anaesthesia was continued as appropriate. In addition the maximum systolic and Diastolic pressure were recorded for each patient. Intraoperative ECG was monitored for evidence of any cardiac arrhythmia. At the end of the procedure Extubating conditions and any difficulties encountered during removal of the Laryngeal Mask Airway were noted Development of coughing, vomiting and straining were recorded. Pulse rate, systolic and Diastolic blood pressure, Respiration and Electrocardiogram were monitored throughout. There was no evidence of any cardiac arrhythmia intraoperatively. The patients were followed up immediately after the procedure and later in the recovery room and ward. No patients showed evidence of pharyngitis, Laryngitis or Trauma. History of throat pain, cough and change of voice was not present. Amongst 50 patients 2 patients showed evidence of sore throat on removal of laryngeal Mask Airway. Statistical analysis was done using appropriate statistical tests.

OBSERVATION AND RESULTS

Our study showed that the maximum number of cases were females which shows the preponderance for the gynaecological procedures. Maximum no. Of cases studied were between 20 - 30 years. of age. Data presented as mean standard deviation. Mean±S.D. 29.56±4.97. The maximum no. Of cases were between 46 -55 kg body weight. The data presented as mean standard deviation. Mean±S.D. 46.14±9.66 kg.

Table 1: rise in pulse rate after laryngeal mask airway insertion

Mean Basal Pulse rate	81.76
Mean pulse rate after LMA insertion	91.30
The rise in Pulse Rate from basal	9.54

Table no.1 showedThe mean value of the basal rate was minimum i.e. 81.76 as compared to the mean value of the pulse rate at 0 minute which is maximum 91.3 Per minute. The actual rise was 9.54 per minute.

Table 2: Rise in Systolic Blood Pressure at laryngeal maskairway insertion

Mean Basal Systolic Blood pressure	117.36
Meanmax.Systolic Blood pressure	139.68
The rise in Systolic Blood pressure from basal.	22.32

The table showed the mean basal value of systolic blood pressure was117.36 mm of Hg. The actual rise in systolic blood pressure was 22.32 mm of Hg

Table 3: Rise in diastolic blood pressure at laryngeal mask airway insertion

Mean Basal Systolic Blood pressure	73.16
Meanmax.Systolic Blood pressure	82.96
The rise in Systolic Blood pressure from basal.	9.8

Table showed the mean basal value of diastolic blood pressure was 73.16 mm of Hg. Actual rise in the diastolic blood pressure was 9.8 mm of Hg.

Table 4: Rise in Mean Arterial Pressure (MAP) after laryngeal mask airway

Mean Basal MAP	97.36
Meanmax.MAP after LMA insertion	111.32
The rise in MAP from basal.	13.96

Table showed The mean basal value of Mean arterial pressure was 97.36 mm of Hg. At pre induction the mean value of the Mean arterial pressure was 98.64 mm of Hg .At post induction the mean value of the Mean arterial pressure was 101.82 mm of Hg

Table 5: Rise in Rate Pressure Product RPP

Mean Basal RPP	8174.12
Meanmax. RPP after LMA insertion	19954.44
The rise in RPP from basal.	11780.32

Table showed the mean basal value of RPP was 8174.12. At pre induction the mean RPP was 8105.88. At post induction the mean RPP was 8220.84.

DISCUSSION

The Laryngeal Mask Airway has proved to be a popular addition to the range of equipment available for airway management. One possible advantage of its use is that insertion of the Laryngeal Mask Airway is associated with a lesser Haemodynamic response compared with conventional Laryngoscopy and Tracheal intubation. Laryngeal Mask Airway has been used successfully for short surgical procedures usually lasting from 30 to 90 minutes, because of its ease of insertion & efficacy in handling.[6,7] It is mostly used in gynaecological procedures such as medical termination of pregnancy, Dilatation and curettage, Dilatation and evacuation, cervical biopsy, diagnostic laproscopy, ostighting,[8] cervical encirclage. hysteroscopy, cervical polypectomy and tubal sterlization. It can also be used for emergency cesarean section with failed intubation as reported by Chadwick and Vohra [9] It can be used for cleft palate repair as reported by one study. Our study correlates with that of I .G .Wilson, D. Fell[10] who studied the cardiovascular response produced by the Laryngeal Mask Airway insertion. Anaesthesia was induced with Thiopentone and maintained with Nitrous oxide in oxygen. Vecuronium was used for muscle relaxation. Arterial pressure both systolic and diastolic pressure after Laryngeal Mask Airway insertion was noted it was found that the increase in the heart rate was maximum at 0 minute and the response attenuated within 3 minutes of insertion. [11] The heart rate increased significantly after mask insertion (13.1% maximum mean increase) which is comparable with our study which is 9.54%. The significant increase in systolic blood pressure after 1 minute insertion (17.1 % maximum mean increase) which is comparable with our study which is (22.32 % maximum mean increase). The Diastolic blood pressure (maximum mean increase 13.3 %) which is similar with our study (9.8 % maximum mean increase). One study[12] observed the hemodynamic response to the insertion of Laryngeal Mask Airway in patients anaesthetised with Thiopentone, Nitrous oxide and En ere and paralysed with Atracurium. They showed the Significant increase in systolic pressure using a Dinamap , 1 minute after the insertion of the Laryngeal Mask Airway, The Diastolic blood pressure also showed a maximum increase after 1 minute of insertion but the response is insertion but the response is attenuated after the Laryngeal Mask Air way insertion. This study of Haemodynamic response to Laryngeal Mask Airway insertion is comparable with our study, which shows a increase in the blood pressure at 1 minute and the response is attenuated within 3 minutes of the Laryngeal Mask Airway insertion. [13] Thus the findings of our study correlate with the studies in the past. The insertion of the Laryngeal Mask Airway produces a small but insignificant rise in heart rate and the arterial blood pressure. Hence it can be assumed that the Laryngeal Mask Airway is the useful addition to the anaesthesiologists armamentarium in situations where pressor response to intubation needs to be prevented. Thus present study showed that laryngeal mask airway is a well designed and effective device with a unique role in airway management. It is easy and atraumatic to insert with minimal somatic and autonomic responses. Remains to be seen if this remarkably practical invention can

evolve into an ultimate Laryngeal mask airway offering the advantages of a clear noninvasive airway and airway protection from gastric aspiration.

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