BIOSCIENCES BIOTECHNOLOGY RESEARCH ASIA, August 2014. Vol. **11**(2), 875-878

The Use of Laryngeal Mask Airway in Pilonidal Cyst Excision after Muscle Relaxant (Atracurium) Injection in Prone Position

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doi: http://dx.doi.org/10.13005/bbra/1351

(Received: 15 June 2014; accepted: 30 July 2014)

During general anesthesia a large number of surgeries such as pilonidal sinus excision are conducted in prone position. The main purpose of this research is the application of laryngeal mask airway in prone position in pilonidal cyst excision after Atracurium injection. A double-blind descriptive experiment was performed on 85 patients (ASA I–II), such that they reclined on the operating table in prone position. After preoxygenation, general anesthesia was induced by Midazolam, Fentanyl, Propofol, and Atracurium. At the same position, the laryngeal mask airway was placed. Heart rate, systolic and diastolic blood pressure was reduced significantly after anesthesia. Laryngeal mask airway insertion was successful in 78 patients on first try. Induction/incision time was reduced. Laryngospasm and pulmonary aspiration was not observed and rate of sore throat was 16/85 patients. Based on our data, it seems that for minor surgeries in prone position, laryngeal mask airway is applicable after the administration of muscle relaxant, although further studies are required.

Key words: General Anesthesia, Pilonidal Cyst, Laryngeal Mask Airway, Muscle Relaxant, Prone Position.

During general anesthesia a large number of surgeries such as pilonidal sinus excision are conducted in prone position[1]. This position is not an ideal position for anesthesia, on account of problems such as impairment in endotracheal intubation or difficult mask ventilation or pulmonary compliance reduction[2]. The usual technique in anesthetizing in prone position is conducted as follows: anesthesia induction and tracheal intubation on a trolley in supine position, then turning over to prone position on the operating table (1). This process has many complications such as hemodynamic and respiratory problems, central and peripheral nervous system injuries, pressure injuries and ophthalmological complications[3]. On the other hand, the duration of anesthesia and the number of needed personnel increases[4]. An alternative approach is to lay the patient on the operating table in prone and comfortable position and induce

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anesthesia. The benefits of this technique include: reduction of pressure injuries on the patient, time saving and decreasing the number of personnel[5]. The problems associated with prone position such as Pulmonary Hypoventilation or Aspiration dissuades the anesthesiologist to make use of LMA in prone position[6]. Application of laryngeal mask airway in prone position with spontaneous breathing has been reported by some studies[5, 7]. In one study, after proper placement of the mask and muscle relaxant injection (Atracurium), mechanical ventilation was performed[4]. Therefore, the main purpose of the research was the application of laryngeal mask airway for pilonidal cyst excision after muscle relaxant (Atracurium) injection in prone position.

MATERIAL AND METHODS

A double-blind descriptive study was performed on 85 patients (ASA I–II) who undertook the pilonidal cyst excision after obtaining ethics committee approval and patient's consent. Severe skeletal disease, airway difficulties, dental problems, lack of cooperation and history of gastroesophageal regurgitation were considered as exclusion criteria.

Before induction of anesthesia, the patients were asked to recline on the operating table in prone position and hands above the head. Pillows were placed under the breast and pelvis to facilitate abdominal breathing[4]. After preoxygenation, general anesthesia was induced by Midazolam (0.05 mg/Kg) Fentanyl (1 µg/kg), Propofol (2-4 mg/kg) and Atracurium (0.5 mg/kg). Then while the patient's head was tilted to one side, the lungs were ventilated by face mask for two to three minutes. At the same position, according to patient weight and manufacturer's instruction, the laryngeal mask airway was placed on patients(4). Isoflurane 1% with mixture of Nitrous oxide and oxygen (1:2) was used for maintenance of anesthesia. Combination of neostigmine (0.04 mg/Kg) and atropine (0.02 mg/Kg) were used to reverse the muscle relaxation in prone position. The following variables were recorded: heart rate, systolic, and diastolic blood pressure (before and after induction), oxygen saturation, end tidal co_2, LMA malpositioning, sore throat, laryngospasm, pulmonary aspiration, induction/incision time, additional required personnel, and nose or mouth bleeding.

Descriptive statistics and Paired Samples t Test were used in statistical analysis by SPSS software program (SPSS Inc, Chicago, IL). Data are presented as mean ± SD. A $p<0.05$ was determined as significant.

Table 1. Characteristics of patients

Variable	Mean ± SD	Minimum	Maximum
Age (year)	88/12 ± 20/39	15	68
Weight (Kg)	09/15 ± 22/68	49	96
Height (cm)	66/31 ± 47/173	163	187
Body Mass index (Kg . m^{-2})	15/9 ± 71/23	12/23	87/26

RESULTS

This study was done on 85 patients (47 men, 38 women) under general anesthesia with LMA. Characteristics of the patients are shown on table 1.After induction of anesthesia, heart rate (92.45±7.93 vs. 80.95±3.34 pulse/min), systolic (127.53±6.48 vs. 109.94±5.64 mmHg), and diastolic blood pressure (86.94±4.64 vs. 79.06±3.23 mmHg) were reduced (table 2). LMA insertion was successful in 78 patients on first try. Induction/incision time was 2.18±1.22 min. Spo2 was > 94% and ETco2 was between 30 - 35 mmHg. Laryngospasm, pulmonary aspiration and nose or

Table 2. Hemodynamic data before and after induction of anesthesia

Variables		Minimum	Maximum	Mean±SD	p value
Heart rate (pulse/min)	Before induction	83	122	92.45±7.93	0.000
	After induction	79	103	80.95±3.34	
Systolic blood pressure (mmHg)	Before induction	115	135	127.53±6.48	0.000
	After induction	100	115	109.94±5.64	
Diastolic blood pressure (mmHg)	Before induction	80	90	86.94±4.64	0.000
	After induction	65	80	79.06±3.23	

Table 3. Data related to airway management

Laryngospasm	Not seen
Pulmonary aspiration	Not seen
Sore throat (%)	18.8
Spo2 (%)	>94%
ETco2 (mm Hg)	Between 30 - 40
LMA placement	All of the patients
LMA placement with first trial (%)	91.8
Additional required personnel	0
Induction/incision time (min)	2.18±1.22
Bleeding from nose or mouth	0

mouth bleeding was not observed and sore throat rate was 16/85 patients. Additional personnel were not required (table 3).

DISCUSSION

According to the results of our research, LMA insertion:

Was successful in all patients and provided suitable ventilation,

Did not increase heart rate and blood pressure,

Did not cause laryngospasm and pulmonary aspiration,

Decreased induction/incision time and the number of required persons.

The reasons for successful and easy LMA insertion include: move to forward of tongue and jaw and away from the posterior pharyngeal wall under the influence of gravity(8) and use of muscle relaxant before LMA insertion(9). The use of pillows under abdomen and pelvis caused abdominal movement without restriction and suitable ventilation(4) which was confirmed by spo2>94% and normal range of ETco2.

The use of LMA raised blood pressure, although hemodynamic changes after LMA insertion are smaller than endotracheal tube intubation (10, 11). Our data showed that heart rate, systolic, and diastolic blood pressure were reduced after LMA insertion. The reduction related to anesthetic agents was not induced by LMA insertion (12,13).

Direct trauma induced by LMA and reduction of blood flow to the throat induced by LMA cuff pressure causes sore throat(14). Previous studies have reported between 8.1 % and 34 % of sore throats (15-18).

Based on our data, it seems that for minor surgeries in prone position, LMA is applicable after the administration of muscle relaxant, although further studies are required.

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