BRAIN LARYNGEAL MASK - STUDY IN 50 SPONTANEOUSLY BREATHING PATIENTS

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ABSTRACT

Brain laryngeal mask (BLM) was used to assess its suitability in 50 spontaneously breathing patients by one lecturer and 4 Medical Officers. Insertion of the laryngeal mask was successful at the first attempt in 42 patients, second attempt in 7 and third attempt in one. The incidence of airway obstruction secondary to downfolding of the epiglottis, which was corrected by reinsertion, was 16%. Post-operative complications included clenching of teeth in 5 patients, vomiting in 2 and excessive salivation in 3. The incidence of sore throat was 10%.

Keywords: Laryngeal mask,airway complications,anaesthesia

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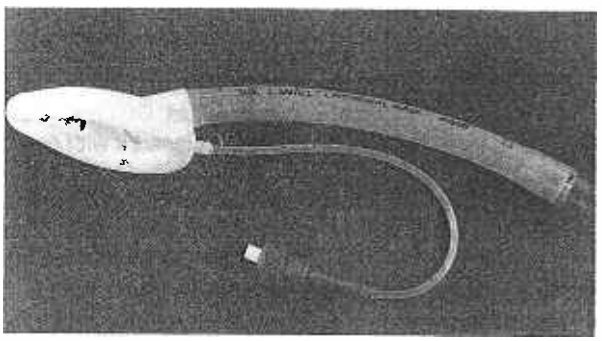
INTRODUCTION

The use of Brain Laryngeal Mask (BLM),also known as Laryngeal mask airway (Colgate Medical Ltd, available in four sizes:1, 2, 3 and 4), was first reported by its inventor in 1983 [1]. The BLM consists of a silicone tracheal tube with an elliptical inflatable cuff at its distal end which, when inflated,forms a uniform airtight seal around the perimeter of the laryngeal inlet (Fig 1). It is designed for blind introduction without the aid of a laryngoscope and administration of a muscle relaxant. Since it is not introduced into the trachea, the diameter of the latter is not compromised.

Fig 1
Brain Laryngeal Mask



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The purpose of the present study is to assess its ease of insertion and the maintenance of an unobstructed airway.

MATERIAL AND METHOD

The study was carried out using sizes 3 and 4 BLM in 50 spontaneously breathing patients who were scheduled for elective surgery. Insertion of the BLM was carried out by one lecturer (Anaesthetic Specialist with more than 5 years' experience) and 4 Medical Officers (more than 2 years in the Department).

Patients weighing less than 50 kg were premedicated with 7.5 mg of midazolam. For patients weighing more than 50 kg, 15 mg of midazolam were administered. For anaesthesia,1 mcg/kg of fentanyl followed by propofol (diprivan) 1.3 to 2.0 mg/kg were administered intravenously. The patients were ventilated briefly with a mixture of 66% nitrous oxide, 33% oxygen and 1% enflurane.

The BLM was inserted as per the recommendations of its inventor [2]. Before insertion, the BLM was deflated and the cuff, directed anteriorly, was well-lubricated on both sides with 4% lidocaine jelly. The position of the patient's head and neck was the same as for intubation. While the doctor steadied the patient's head with his left hand, he introduced the BLM, with the concavity of the mask facing anteriorly, behind the latter's tongue with his right hand. Once the tube was in midway, the right hand gripped the tip of the tube and, with one swift move, pushed the tube in until resistance was met. This usually coincided with an anterior displacement of the larynx.

The cuff was then inflated with 20 ml of air. This resulted in a bulging of the larynx,which indicates that the BLM had been correctly placed. After that, the BLM was connected to the bain system and gently ventilated. If there was an audible air leak around the larynx, the larynx was gently rocked for proper placement of the mask or the head of the patient was turned to one side

and the cuff further inflated with air. If the above measures failed, a diagnosis of partial airway obstruction secondary to downfolding of epiglittis was made.In such cases, the tube was deflated, partly withdrawn and the entire procedure was repeated.

The Medical Officers were allowed to perform the insertion only after witnessing the technique twice. During insertion, the following information was obtained: ease of insertion, number of attempts, volume of air for inflation of the cuff in excess of 20 ml and whatever problems were encountered (Table I).

Table I

Insertion of laryngeal mask and problems

		No.	%
Size of Tube	3	43	86
	4	7	14
Ease of Insertion	Easy	47	94
	Difficult	3	6
	Impossible	0	
Number of attempts	One	42	84
	Two	7	14
	Three	3	6
Failure	Lecturer	3	6
	Medical Officer	5	10
Air way obstruction		8	16
Coughing		2	4
Volume of air in excess of 20ml		8	
	Range	5 - 7	

In all cases, anaesthesia was maintained with nitrous oxide, oxygen and enflurane. Additional doses of fentanyl were used as and when required. Heart rate and blood pressure were recorded prior to induction, immediately after the insertion, and every 5 minutes thereafter. At the end of surgery, the BLM was left in place until the patient had regained protective reflexes and was able to respond to the commands to open his eyes and mouth. Then it removed in the Operation Room (OR) or in the Recovery Room (RR).Particular attention was paid to the clenching of teeth, difficulty in removal, vomiting, laryngospasm and excessive salivation.

Post-operatively, after 24 hours, the patients were asked if they had a sore throat which was graded as mild (slight itchiness or a bit sore), moderate and severe (unbearable, needs treatment).

RESULTS

Out of the 50 patients studied, 27 were done by one lecturer and 23 by 4 Medical Officers. There were 30 males and 20 females. The mean age was 39 years (range 19-82) and the mean body weight was 57.37 kg (range 40-91). Six patients had active medical problems (ischaemic heart disease in 1, diabetes in 2, chronic renal failure in 2, hypertension in 1.) Difficulty in maintaining the airway was anticipated in one case.In all the 50 cases, the BLM was successfully inserted with satisfactory airway. The BLM was successfully inserted in the first attempt in 42 cases, second attempt in 7 and third attempt in one. Two patients, in whom anaesthesia was found to be light, coughed after insertion.In these patients, the cuff was deflated, the tube was partly withdrawn, anaesthesia was deepened and the tube reinserted and reinflated (Table I).

The rate of failure to insert the BLM at the first attempt was low: 3 with the lecturer and 5 with the Medical Officers. The mean duration of surgery was 51.63 minutes (range 20-120 minutes).In 38 cases, the BLM was removed in the OR and 12 in the RR. Excessive salivation was seen in 3 patients and 4 patients clenched their teeth during removal. Two patients vomited in the RR immediately after removal of the mask (Table II). Post-operatively, after 24 hours, five patients complained of sore throat which was described as mild.

Table II

Post operative problems

	No.	%
Salivation	3	6
Clenching	5	10
Vomiting	2	4
Sore throat (mild)	5	10

DISCUSSION

General anaesthesia in a spontaneously breathing patient can be carried out by using a face mask or introducing an endotracheal tube. Holding the mask means that the hand of the anaesthetist is no longer free and, if prolonged, is tiring. The use of an endotracheal tube needs experience in intubation.It may be difficult or impossible and, in certain cases, it is not without risk. But with the laryngeal mask, we have achieved a high success rate of insertion (84%) at the first attempt with a clinically satisfactory airway and an uninterrupted breathing pattern; Brodrick et al [3] had reported a success rate of 80%.

Some of the outstanding advantages of the BLM which were noted included:

1 The ease of insertion: The Medical Officers, after witnessing the procedure, were able to insert it with ease. The technique of insertion can be easily learnt if the instructions are correctly followed. During insertion, the change of hand and swift movement prevent trauma to the posterior pharynx and minimise the risk of downfolding of the epiglottis. The duration taken to insert the BLM was less than that of laryngoscopy and intubation in all cases.

2 Recognition of partial airway obstruction: In all the 8 cases which needed reinsertion of the BLM, downfolding of the epiglottis was the most probable cause and this was rectified by repeating the procedure. This problem can be recognised clinically when the patient is unable to ventilate his lungs and there is an audible leak around the larynx.

Inadequate bag movement, tracheal tug, intercostal recession and the use of accessory muscles of respiration are all indications of possible obstruction due to incorrect positioning of the BLM or downfolding of the epiglottis [2, 3].

3 Satisfactory airway with change of posture.

4 Patient tolerance: Patients were able to tolerate the tube better with less analgesia.

5 Transfer from OR to RR: There was no need to hold the patient's jaw to maintain a patent airway.

6 Post-operative oxygen: The BLM could easily be hooked on to a venturi mask to provide a higher percentage of oxygen.

The BLM has been advocated in cases of difficult intubations [2, 4 - 7]. In our series, we anticipated difficulty in one case and there was no difficulty in maintaining a patent airway by this method.

It has been suggested that the use of an introducer may overcome the problem of airway obstruction secondary to downfolding of the epiglottis [3]. On the contrary,we were able to overcome the problem under deep anaesthesia with propofol [8].

Two of our patients vomited in the RR. Suctioning of the oral cavity with head down tilt was all that was needed.One should remove the mask then the patient has regained his protective reflex. But the laryngeal mask does not provide any protection against aspiration [5].

The incidence of sore throat was 10% compared to 3.9% reported by Brain [2] and 12% by Brodrick [3]. Loser [9] reported an incidence as high as 90% in patients with uncuffed endotracheal tubes lubricated with 4% lidocaine jelly and in 15% in patients with mask anaesthesia. He attributed the high incidence of sore throat to the jelly or the preservative. All our patients had the oro-pharyngeal airway in place throughout the surgery and hence it might be argued that the contribution of irritation of the posterior pharynx by the oral airway may contribute to the higher incidence of post-operative sore throat. Browne et al [10], in their study on 88 patients with and without airway, concluded that the use of an airway did not significantly contribute to the incidence of post-operative sore throat.

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