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بالرسالة صفحات
لم ترد بالأصل

UPPER AIRWAY COMPLICATIONS AND INTRAOCULAR PRESSURE CHANGES FOLLOWING GENERAL ANAESTHESIA FOR CATARACT SURGERY WITH LARYNGEAL MASK AIRWAY: COMPARISON OF REMOVAL IN DEEPLY ANAESTHETISED VERSUS AWAKE PATIENTS

Thesis

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CONTENTS

INTRODUCTION

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Historical review:

The Brain laryngeal mask airway (LMA) has become an important alternative to tracheal tube.[1] It was designed by **Dr .A. Brain** as a new concept in airway management.[2] The beauty of laryngeal mask airway is that it forms an airtight seal by enclosing the Larynx and avoids airway obstruction in the oropharynx.[2]

One advantage of the laryngeal mask is that the patients are more heamo-dynamically stable than those whose tracheas are intubated.[1] It avoids most of the stress response to intubation reflected by an increase in heart rate, mean arterial blood pressure and increased intra-ocular pressure.[1,3] The LMA also reduces the incidence of immediate postoperative upper airway complications following general anaesthesia.[4]

The laryngeal mask may be removed while the patients are deeply anaesthetised in the operating room. However many anaesthetists prefer to leave the LMA in situ until the patient is awake, as this helps to maintain a clear airway until protective reflexes return.[5]

History and development:[5]

The LMA was designed by Archie Brain, a British anaesthetist. working at Royal London Hospital U.K. as part of specific search for an airway that was more practical than the face mask and less invasive than a tracheal tube. The inventor applied the principle of bioengineering to the functional anatomy of the pharynx both in terms of anatomical fit and methods of placement. In considering possible options, he was struck by the similarity between the contour of the elliptical path around the nose against which the Goldman nasal mask fitted and the contour around the glottis. The intention was that the cuff portion would site in the pharyngeal sack where it would form a circumferential low-pressure seal around the glottis.

The first prototype was constructing from the cuff of Goldman nasal mask for dental anaesthesia stretched over a diagonally cut size 10 mm tracheal tube and fixed into position by acrylic glue and was first used in human patient undergoing a routine hernia repair at the William Harvey Hospital in 1981. As a result of this experience three more prototypes were assembled and easily used in 1983.[6,7]

The Dunlop Rubber Company provided Brain with a silicon elliptical tours surrounding a flat silicon membrane by piercing this membrane with slots and deforming the flat surface into a shallow bowel, the inventor was able to construct a prototype with a significant advantages over it's predecessors but was too small for use in adults.

In July 1986, Brain purchased a supply of liquid latex and began to make plaster of Paris casts to test a wide range of design ideas searching for optimal characteristics for LMA, which must include a high-pressure seal.

By September 1986, extensive testing of latex and silicon variant took place and by December 1987 the first all factory made LMA and was ready for trial and the initial results exceed expectations since the new silicon cuff was softer than the Dunlop cuff making a more extensive contact with the laryngeal perimeter and was a compromise between the ease of insertion and the quality of the seal around the glottis.

By autumn 1990, all UK hospital had purchased it and the LMA was approved for use in USA in August 1991.

Device details:

The standard laryngeal mask airway: (Fig I)

The currently available LMA is composed of medical grade silicon rubber. It consists of a curved tube open distally into the lumen of a small elliptical mask that has a reinflatable outer rim. Two vertical elastic bars, mask aperture bars, are present a cross the opening to prevent obstruction of the tube by the epiglottis. Proximally the tube is joined to a standard polysulfon connector. The tube is attached to the back of the mask at an angle of 30 degrees which was found to be the optimal angle for tracheal intubation via the LMA.[8] A black line runs longitudinally along the posterior curvature of the shaft to aid in orienting the tube in situ. A pilot

tube and a self-sealing pilot balloon are attached to the surface of inflatable rim. The valve is made from polypropylene and has a metallic spring, (except in magnetic resonance imaging version).[2]

Size selection: (table I)

Originally there was a choice of four sizes [9] and recently sizes 1.5, 2.5 and 5 have been added to the range.[5] Judging the correct size of the LMA can be difficult. In lieu of an accurate predictive test the current choice of LMA is based on weight.

Voyagis et al 1996 [10] compared the standard formula based on weight with another based on gender. The formula was to use size 5 for all males, size 4 for all females and to fall back to a smaller size whenever insertion failed. The mean peak inspiratory pressure at which oropharyngeal leak occurred was significantly greater using the sex related formula.

The flexible laryngeal mask airway (FLMA):

The FLMA was specifically designed for use in ear, nose and throat (ENT), head and neck, dental surgery and was first described by Alexander in 1990.[11] It consists of a normal LMA connected to a floppy, flexometalic tube which has a narrower bore and relatively crush proof.[11] It provides better surgical access than the standard LMA during head and neck surgery. It become commercially available in 1992 in all sizes except size 1and 1,5.[5]

Table (I) :Description of different sizes of laryngeal mask airway devices

SIZE	Patient weight (kg)	ID/OD (mm)	length (cm)**	FLM ID (mm)	FLMA length (cm)**	Cuff volume (ml)	Largest TT ID (mm)	FOB size LMA (mm)	FOB size FLMA (mm)
1	< 5	5.25/ 8.2	8			< 4	3.5	2.7	
1.5	5-10	6.1/ 9.6	10			< 7	4	3	
2	10-20	7/11	11	5.1	13	< 10	4.5	3.5	2.2
2.5	20- 30	8.4/ 13	12.5	6.1	16.5	< 14	5	4	3.5
3	30- 50	10/15	16	7.6	21	< 20	6	5	4
4	50- 70	10/15	16	7.5	21	< 30	6	5	4
5	>70	11.5/ 16.5	18	8.7	24	< 40	7	7.3	5

ID : internal diameter.

OD : Outer diameter.

FLMA : Flexible laryngeal mask airway.

Largest TT ID: Largest tracheal tube internal diameter

FOB : Fibreoptic bronchoscope.