Original Research Paper

Volume - 14 | Issue - 07 | July - 2024 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Anaesthesiology

A COMPARATIVE STUDY OF CLINICAL PERFORMANCE OF TWO SUPRAGLOTTIC AIRWAY DEVICES I-GEL VS COBRA PLA FOR MINOR SURGICAL PROCEDURES.

Dr. Shashank krishnakumar*	Senior Resident Department Of Anaesthesiology, Sree Balaji medical college and hospital. *Corresponding Author
Dr. Pranjali Kurekhar	Professor, Department Of Anaesthesiology, Sree Balaji Medical College And Hospital.
Dr. Bhagyavardhan Botta	Assistant professor, Sree Balaji medical college and hospital.
Dr. Roshni Iyer	Junior Resident, Sree Balaji Medical College And Hospital.

ABSTRACT Supraglottic airway devices are considered an alternative option in patients undergoing short surgery whose duration is anticipated less than 30mins , in these patients conventional airway management with endotracheal intubation can be avoided , there are several supraglottic airway devices available for use , Cobra-PLA and I-gel are such devices which can be employed for airway management , out study compares these two airway devices in terms of the ease of insertion , time of insertion , hemodynamic changes which occur upon its insertion , adequacy of ventilation and oxygenation and incidence of post-operative complications. Cobra-PLA a cuffed peri pharyngeal sealer which is a first-generation SGA , resembling the hood of a cobra has been compared with other second generation SGA. The I-gel LMA which is a newly introduced cuffless second generation LMA has been compared with other first generation SGA , however there are few studies which compare the Cobra-PLA with the I-gel LMA.

KEYWORDS : Supraglottic airway device , short surgical procedures , I-Gel , Cobra-PLA , Airway

INTRODUCTION

Intubation using the endotracheal tube is the major method that is thought to be significant for managing the patient's airway while they are under anesthesia. The laryngeal mask airway (LMA) and the supraglottic gel device are two options that can be used instead of an endotracheal tube in certain situations (I-Gel). The form of airway care that is most commonly used and advised for patients who will only be undergoing relatively brief surgical operations. Patients who are undergoing short surgical operations (those that last less than 30 minutes) and patients for whom endotracheal intubation is not an option may be candidates for the laryngeal mask airway, which is an alternative to face mask ventilation in the operating room. Patients who are candidates for the laryngeal mask airway include: patients who are undergoing short surgical operations (those that last less than 30 minutes); patients for whom endotracheal intubation is not an option may be candidates for the laryngeal mask airway, which is an alternative to face mask ventilation in the operating room.

The laryngeal mask airway is a type of supraglottic airway device that is utilised in the hospital setting for the purpose of securing the airway of patients undergoing anaesthesia and for the management of emergency airway situations.

The basic first generation of LMAs have evolved to overcome the drawbacks to newer second generation LMA devices. The head of the Cobra PLA is designed to sit over the glottis and close off the hypopharynx when it is in the appropriate position. This component prevents soft tissue collapse and permits positive pressure ventilation. In contrast to other supraglottic airway devices, the Cobra PLA does not come equipped with an esophageal sealing cuff. Because its distal part looks like the hood of a cobra, it was given the name "cobra" to reflect this similarity. It has a 15mm adapter and an expanded distal end with a smooth posterior surface , its anterior surface has a 'frond-like' anterior griller which encloses the airway.

There have been numerus studies which compare the Cobra PLA device to first other first generation LMA , however there are few studies which compare the Cobra PLA with other second generation LMAs , In a study conducted in children between the correlation of intraocular pressure and hemodynamic response in children comparing four supraglottic airway devices , Cobra PLA and I-Gel LMA and that there was difference between the insertion characteristics among the two supraglottic airway devices [45]

However in a study conducted between the evaluation of successful insertion between the Cobra-PLA and supreme LMA by novice anaesthesiologists it was found that ease of insertion was found to be easier with Cobra-PLA than the Supreme-LMA.[46]

The I-Gel is a more advanced second-generation LMA constructed of thermoelastic elastomer, which creates a non-inflatable cuff that seals off the laryngeal and perilaryngeal tissues anatomically. With its wide range of sizes, its form, as well as the softness resulting from its composition, closes the airway, giving surgical patients a safe, non-traumatic airway. No studies have compared the Cobra-PLA device and the I-Gel LMA.

Aim

To observe the clinical performance of two supraglottic airway devices I-GEL and Cobra LMA for patients undergoing minor surgical procedure.

Objectives:

Primary outcome: comparison of ease of insertion of Cobra-PLA and I-Gel.

Secondary outcome: comparison between Cobra-PLA and I-Gel in terms of

1. No. of Insertion attempts
2. Time taken for insertion
3. Hemodynamic response
4. Incidence of complications such as sore throat, stridor , laryngospasm, blood staining on the device and occurrence of aspiration.

Review Of Literature

Airway Management:

During the whole course of the procedure, it is the primary responsibility of the anesthesiologist to ensure that the patient is able to maintain regular breathing. When a fiberoptic scope is not available, it is normal practise to resort to unconventional or alternative measures in order to successfully seal the airway. This is done in order to prevent the patient from experiencing any complications. In order for any of these treatments to be successful, the airway must at all times be kept free of obstructions, and a suitable dose of anaesthetic must be maintained throughout the process of manipulating the airway. [4]

Evaluation Of The Airway:

Indices obtained from a physical examination, indices obtained from radiological imaging, and advanced indices are the three types of indices that can be utilised to provide an accurate prognosis of an airway obstruction. It is probable that a history of snoring, apnoea, daytime somnolence, and stridor are all indications of a blockage in the airway. This restriction in the airway may become more obvious following induction. During the course of the physical examination, it is important to evaluate the patient's size and form of the head, as well as their gross facial characteristics, the size and symmetry of the mandible, the size of the tongue, the prominence of the upper incisors, and the range of motion in the jaw, head, and neck.[5]

General Anaesthesia:

The use of medications that cause anaesthesia results in a loss of reflexes that protect the body, which is known as general anaesthesia. During this state, the patient is unconscious and cannot defend themselves. It is possible to obtain amnesia, analgesia, skeletal muscular relaxation, and an absence of reflexes in the autonomic nervous system by taking one of several medicines that can be given. When in this state, the patient does not react to any stimuli, even those that are verbal, physical, or unpleasant. Upper airway blockage often necessitates the insertion of an endotracheal tube or a laryngeal mask airway in order to keep an individual's airway patency while they are under the influence of general anaesthesia. As a result of the patient's limited capacity for spontaneous respiration, the patient frequently requires either partial or complete mechanical support using positive pressure ventilation. Additionally, there is a possibility that the patient's cardiovascular condition would worsen.[7,8]

In the past, when a physical examination was the only sign of a patient's level of anaesthesia, it was typical for inexperienced anaesthetists to provide an excessive amount of anaesthesia to their patients.[9] Not until the 20th century did the community of anesthesiologists develop a monitoring method that could be considered truly systematic. [10] Dr. Arthur Guedel is credited with developing one of the earliest safety measures in the field of anesthesiology in 1937. [11] His chart provided a description of the stages of anaesthesia, numbered 1 through 4, with progressively more specific information as each stage was reached. Despite advances in anaesthetic medicines and delivery systems that have sped up the onset of general anaesthesia as well as recovery time, Guedel's classification is still used today (and in some cases completely avoided certain stages).[12]

Guedel's Classification - Anaesthesia Stages:

Stage 1. Analgesia or Disorientation: The patient is administered medication and may begin to feel the effects of the medication, but he or she has not yet become asleep. This stage can begin in a preoperative anaesthesiology holding room if the patient is already sedated. This period is typically referred regarded as the "induction stage," but there are a few exceptions. Patients are unconscious but awake enough to talk. The breathing is consistent and at a steady rate. At this moment, the patient transitions from having analgesia but no amnesia to having analgesia while also experiencing forgetfulness simultaneously. The onset of loss of consciousness denotes the arrival at the end of this period.

Stage 2: Disinhibition, delirium, erratic behaviour, absence of the eyelid reflex, hypertension, and tachycardia are some of the characteristics of this stage, which can also be referred to as the excitement or delirium stage. Reflexes of the airway are still functional and frequently receptive to stimulation throughout this stage of development. During this stage of anaesthesia, it is important to refrain from performing any procedures that involve inserting or removing endotracheal tubes or performing extensive suctioning. At this point, laryngospasm, which is the involuntary and tonic closure of the vocal cords, is more likely to occur, and any manipulation of the airway has the potential to make it worse. Because of this, the patient's airway could become blocked as a consequence of their spastic movements, vomiting, and rapid, erratic breathing. Rapid-acting medications facilitate advancement to stage 3 by reducing the amount of time spent in stage 2 to the greatest extent possible.[13]

Stage 3. This stage is distinguished by decreased respiratory function as well as a cessation of ocular motility. At this point, the modification of the airway is risk-free. In this stage, we will talk about four different "planes." During plane 1, the subject continues to exhibit regular, spontaneous respiration, constricted pupils, and a gaze that is centred. Reflexes of the conjunctiva, the swallow, and the eyelids, on the other hand, often disappear at this plane. During plane 2, you will experience a loss of corneal and laryngeal reflexes, along with periodic cessations of respiration. There is also a possibility of a decrease in ocular motility as well as an increase in lacrimation. When the body is in plane 3, the intercostal and abdominal muscles completely relax, and the pupillary light reflex is no longer present. This plane is referred to as "true surgical anaesthesia" because to the fact that it is effective for the majority of surgical procedures. Plane 4 is characterised by erratic breathing, paradoxical rib cage movement, and full diaphragm paralysis that leads to apnea. This is not the least of its characteristics.[14]

Stage 4. An overdose occurs when an already severe depression in the brain or the medullary region is made even worse by the administration of an excessive amount of the anaesthetic drug in relation to the level of surgical stimulation. During this stage, the respiratory system ceases to function, which may also result in death. At this stage, the skeletal muscles have relaxed into a flaccid state, and the pupils have become fixed and dilated. Blood pressure is often significantly lower than normal, with weak and thready pulses as a result of inhibition of the cardiac pump and vasodilation in the peripheral circulation. This is often the case in those who have hypertension. If proper care is not taken for the heart and lungs, this stage is lethal. As a consequence of this, the purpose of the anesthesiologist is to get the patient into stage 3 of anaesthesia as early as possible and then maintain that state for the duration of the surgery.[13]

Induction By The Intravenous Route:

It may be difficult to establish the necessary amount of anaesthesia when utilising intravenous induction medicines because this may compromise the patient's capacity to breathe on their own, which is a prerequisite for the procedure. Patients who are under the influence of propofol wake up more quickly, and the drug also lessens the reactivity of their airways. It is an efficient medicine that makes it possible to determine the patient's laryngoscopic airway grade in a short amount of time. While the patient is under the influence of propofol, the installation of a laryngeal mask airway (also known as an LMA) enables improved control of the airway. The risk for apnea is the most major downside, and because of this, the titration of a suitable dose needs to be carried out with the utmost caution.[15]

Inhalational Induction:

Induction of unconsciousness through inhalation is by far the most successful method to use when working with a patient who has a difficult but "uncompromised airway." In order for inhalation induction to be successful, the airway must remain patent during the whole induction procedure, and the patient must have reached an adequate level of anaesthesia before any manipulation of the airway may take place. [16]

The halothane component is by far the most effective. Sevoflurane is another alternative for producing anaesthesia; however, due to its limited solubility, the level of anaesthesia that the patient experiences during laryngoscopy soon decreases. This is because the patient is unable to dissolve sevoflurane. 7 However, rapid recovery is one of the elements that can be of significant advantage in a patient who develops airway obstruction following induction. This is because rapid recovery allows the patient to return to normal functioning much more quickly. This is due to the fact that a speedy recovery makes it possible for the patient to resume normal functioning sooner. It is possible to maintain the level of anaesthesia that was initially established if the concentration of the agent that is inspired is high enough to make up for the dilutive effects that are caused by the surrounding room air. The use of this approach has the benefit of enabling the preservation of spontaneous breathing even when airway instrumentation is being conducted. This is one of the advantages of utilising this technique. [17]

Awake intubation is frequently the primary type of airway management used in individuals who have difficulty breathing via their airways. In order for this approach to be successful, it is essential that sufficient amounts of local anaesthetics be applied to the airway. When working with patients in this situation, it is absolutely necessary to keep the patient's spontaneous ventilation going. One of the benefits that may be acquired by awake intubation is the maintenance of normal airway tone and respiratory attempts. This is one of the benefits that can be gained. It is possible that the patient will have trouble breathing, that their haemodynamic reactions will increase, and that their intracranial pressure will potentially increase as well. [18]

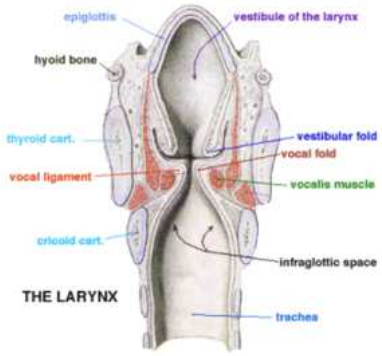


Figure 1. Anatomy of larynx.[19]

Supraglottic Airway Devices

Supraglottic airway devices (SGAs) are well suited for the unique demands of outpatient anaesthesia due to their many advantages over endotracheal intubation. Compared to endotracheal tubes, SGAs have a reduced incidence of airway morbidity and may allow for earlier recovery and discharge from the hospital for its patients. Aspiration of stomach contents is a serious risk that is not well addressed by SGAs, and positive pressure ventilation is not reliably provided by these devices. Many different supplemental airway devices (SGAs), including improved versions of the original laryngeal mask airway (LMA Classic; LMA North America, Inc.), are in development to address these shortcomings. It has not yet been determined whether or whether they are beneficial and safe for usage in specific patient demographics (such as morbidly obese people) and specific surgical procedures (for example, laparoscopic surgery).[20]

The endotracheal tube (ET) allowed modern anesthesiologists to perform extensive, risky surgeries without the patient's airway becoming blocked, gastric contents being aspirated into the lungs, or the patient suffocating. This allowed for the development of current methods of anaesthetic administration. For decades, endotracheal intubation and bag-and-mask breathing were the only two options available for managing airways. The first supraglottic airway device (SGA) to combine aspects of the facemask and the ET was developed in 1983; this was the laryngeal mask airway (LMA). [1] It included advantages from both the facemask and the ET, such as being easy to put on and easy to keep clean, and providing a somewhat safe airway.

Seventy-five percent or more of all surgeries are now conducted in an outpatient setting. [2] As a result, there is a growing need for anaesthetic drugs and practises that boost the efficacy and safety of anaesthesia, with the end goals of attaining faster induction and emergence, fewer and milder side effects, and earlier discharge of the patient from the hospital. One of the numerous benefits that SGAs offer over ET is their suitability for outpatient anaesthesia.

It has been hypothesised that the sympathetic nervous system is less activated by SGA insertion into the trachea than during direct laryngoscopy or the implantation of a semirigid ET. Potentially, this means less trouble for patients with coronary artery disease down the road. The laryngeal mask airway (LMA) is an alternative to the endotracheal tube (ET) that allows for less anaesthetic to be administered, which may result in fewer adverse effects and a shorter hospital stay. A study comparing LMAs and ETs found no differences in the average time to place the two airway devices or the time taken from the end of surgery to remove the airway device. However, the LMA group had a significantly shorter postanesthesia care unit stay and time to begin walking than the ET group, but both groups were "home ready" at the same point in time. 4 An additional study confirmed that LMA induction times were significantly less than endotracheal intubation times, with similar recovery times.[5] It was found that outpatients receiving GA for dentoalveolar surgery had a lower mean procedure time in the LMA group compared to the ET group. The LMA group also improved much more rapidly after therapy. The incidence of postoperative sore throat was significantly reduced in the LMA group (6 patients). [4,7] Another perk is that neuromuscular blockade is rarely necessary when an SGA is used. This means the patient is protected from the medicine's and its antagonists' associated morbidity and side effects.

This surge of SGAs over the past two decades can be directly attributed to the LMA's success. An effective SGA will have the following properties: it will be able to seal the upper airway during both spontaneous and positive pressure ventilation; it will span the oropharyngeal space; it will have a low resistance to the flow of respiratory gas; it will protect the subglottic airway from gastric contents and upper airway secretions; and it will have a low incidence of airway morbidity and adverse events. It will not be considered safe for use in clinical settings until that time has passed. Subglottic airway devices' accept/reject profiles determine their therapeutic utility. This profile reflects the oropharynx's predisposition to accept or reject a newcomer. [8,9] The shape, material, cuff volume, and oropharyngeal location of the device all contribute to its outward appearance.

In addition, SGAs are only appropriate for use in very specialised procedures and on very specific sorts of patients. SGAs are not as effective in preventing aspiration of stomach contents as ETs are. They should not be used by patients who have recently eaten or who have other risk factors for aspiration. For many patients, the airway leak pressure of the SGA is 20-25 cm H 2 O, which limits the provision of positive pressure breathing. [10,11]. Regurgitation and aspiration can occur if the stomach is insufflated due to excessive airway pressure. In the context of reduced lung and chest compliance, it is probable that delivering positive pressure breathing will not be adequate. Because of this, SGAs are not ideal for procedures involving morbidly obese patients, those with restrictive and obstructive lung disease, or those who need laparoscopic surgery, especially when the patient is in a steep Trendelenburg position. In order to overcome these obstacles and encourage wider adoption of supraglottic ventilation, new SGA designs have been developed in recent years.

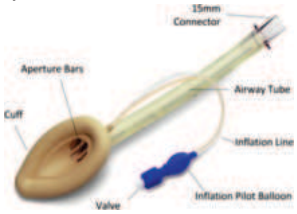
Classification Of Supra-glottic Airway Devices

Esophageal sealing	Pharyngeal sealing	Perilaryngeal sealers
None (1st generation)	VBM Laryngeal tube	LMA classic
	Cobra-PLA	LMA unique
		LMA flexible
		AuraOnce LMA
		Aura-i-LMA
		Air-Q ILA
Gastic Channel (2nd generation)	Combitube	LMA pro-seal
	Rusch easy tube	LMA supreme
	VBM LTS II	Aura-Gain LMA
	King LTS-D	I-gel
Gastric channel + self energizing mechanism of sealing		Baska-Mask

Supraglottic airway devices in clinical use ; 1st Generation Supraglottic airway devices LMA Classic (LMA North America, Inc)

When it comes to airway management, the LMA Classic may be the single most important development to occur in the past quarter of a century. A year after becoming commercially available in Europe, in 1991, the Food and Drug Administration (FDA) in the United States approved this device for use in clinical settings (1988).

The LMA Classic's "bowl-shaped" mask has an inflatable silicone cuff in the shape of an oval that is supposed to create a seal at the laryngeal entrance. As a result of two elastic bands across the bowl opening, the epiglottis is unable to obstruct the gill slits. A curved tube with a wide diameter connects the mask's bowl and aperture, allowing it to be connected to either a self-inflating bag (like an Ambu) or a ventilatory circuit. The LMA Classic is designed to fit the majority of airways, including those of infants and large adults. It comes in sizes ranging from 1 to 6, and may be sterilised in a steam autoclave up to 40 times.



Laryngeal mask airway LMA Classic.

After the LMA has been placed in the oropharynx, a leak is made in the airway by inflating the cuff to a pressure of 20-25 cm H 2 O. If the LMA isn't in the right place, air may leak out of the airway at a low pressure, but simply pumping more air into the cuff could not fix the problem. In fact, doing so might cause pressure ischemia of the pharyngeal mucosa and postoperative sore throat. Low-pressure airway leaks can be fixed by shifting the position of the lower mask airway (LMA) (with gentle pushing or pulling, or with a jaw thrust). Plus, the LMA can be removed and reinserted if necessary.

The LMA Classic was first designed to promote spontaneous breathing during regular general anaesthesia. Similarly, the apparatus can be utilised for positive pressure breathing with peak airway pressures not exceeding 20–25 cm H2O. Both of these ventilation systems are laid out before you. Despite being intended for preemptive airway control, it has shown effective as an airway rescue device in a variety of emergency contexts, including resuscitation. The LMA Classic is now recommended as a primary ventilatory device or as a conduit for the ET in paediatric and adult patients for whom ventilation with a facemask or intubation is difficult or impossible in the ASA Difficult Airway Algorithm [12] and the AHA 2000 Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care [13]. Success rates for blind LMA Classic intubation are low, but those for intubation with a fiberoptic scope are high.[14]

For the time being, however, the LMA Classic remains the most

popular SGA. More than 200 million patients in more than 200 different countries have been helped by LMAs, which are used in an estimated 30–60% of all general anaesthetics. 8 Overall, it has been found to have a very low rate of serious issues and airway morbidity, and there have been no deaths directly attributed to its use. [8,15] The LMA has largely replaced the use of facemasks during general anaesthesia because of the ease with which it allows the airway to be maintained without the use of the hands. Patients with poor lung or chest compliance and higher airway resistance, a blocked glottis or subglottis, anatomic anomalies of the oropharynx, or a significant risk of aspiration are not appropriate candidates for the LMA.

Incredibly effective laparoscopic cholecystectomy and laparoscopic gynecologic surgery have been carried out using the LMA Classic as the principal ventilatory equipment[16,17,18]

Clinical studies assessing the efficacy of the LMA for laparoscopic surgery have excluded patients who are more likely to experience failure or problems from the procedure. Patients in this group generally exhibit many risk factors for cardiovascular disease, such as being overweight or obese (defined as a body mass index (BMI) of 30 kg/m 2 or above), having a poor ASA physical status (grade III or higher), or having a high Mallampati score (grades III and IV).[16,17,18]

LMA Unique (LMA North America, Inc)

When compared to the original, reusable SGAs, the LMA Unique was one of the earliest single-use alternatives. Because of worries that autoclaved airway management equipment could still harbour infectious pathogens, particularly prions, this device was designed to eliminate the risk of contamination. 15,19,20 The LMA Unique is a disposable, sterile alternative to the LMA Classic; it comes in the same five sizes and offers the same clinical applications and performance as its more permanent counterpart.

Laryngeal mask airway LMA Unique.

Courtesy of LMA North America, Inc; with permission.

LMA Classic Excel (LMA North America, Inc)

An epiglottic elevating bar and a detachable connector set the LMA Classic Excel apart from its predecessor, the LMA Classic. These additions facilitate the subsequent insertion of an ET through the LMA. The LMA Classic Excel can be used up to 60 times and is available in three to five different sizes. Guests from other planets up to 7.5 metres in size are welcome.

Laryngeal mask airway LMA Classic Excel.

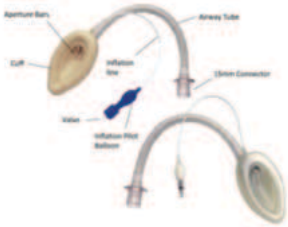
Courtesy of LMA North America, Inc; with permission.

LMA Flexible (LMA North America, Inc)

The LMA Flexible is a modified version of the traditional LMA cuff that features an airway tube that is thinner, longer, and reinforced with wire. Even though intubation is impossible with this tool due to the airway tube's length and narrowness, its increased length and flexibility make it simpler to move it away from the surgical site without the cuff becoming dislodged. Having the surgeon and anesthesiologist in close proximity is especially useful during procedures involving the ear, nose, and throat (ENT), the maxillofacial region, and the dental area. The LMA Flexible comes in a variety of sizes, from 2 to 6, and can be used repeatedly or thrown away after use.

Cobra PLA (Engineered Medical Systems)

The Cobra Perilaryngeal Airway (PLA) is a cuffed, supraglottic airway designed for single-patient use. Cobra PLAs have a breathing tube, a striated and tapering head, a large circumferential pharyngeal cuff, and a broad cuff. It's available in eight different sizes, making it a good fit for everyone from newborns to tall people. A soft "grill" is put on the anterior (laryngeal) side of the skull to stop the epiglottis from covering the ventilatory orifice where the tube meets the head. This protective structure is situated on the side of the head that houses the larynx. It is possible to scale up by one to two sizes in the Cobra collection from an ET size 8. Experiments were performed on both adults and children to determine how well the Cobra worked with both natural and artificial respiration. Patients had a body mass index (BMI) of 30, and those without a history of gastroesophageal reflux disease (GERD) (gastroesophageal reflux disease). Based on their general health and level of activity, each person was classified as either ASA Physical Status Class I or II (GERD). Every study concluded that the Cobra was an effective main ventilator, with a higher airway seal pressure than the LMA Unique. The Cobra PLA project had to be halted when two patients who were undergoing elective surgery under anaesthetic and using the device suffered lung aspiration. This fact ultimately led to the conclusion of the study. Patients (n = 34) who did not participate in the study because of factors such as a history of gastroesophageal reflux disease (GERD), a problematic airway, or extreme obesity.[31-35]



Laryngeal mask airway LMA Flexible. Reusable version (*top*) and single-use version (*bottom*).

Courtesy of LMA North America, Inc; with permission.

Comparison between the Cobra-PLA and LMA supreme in novice anaesthetists concluded that it was easier to insert the Cobra-PLA than the LMA-Supreme[46.]

In a comparative study with four supraglottic airway devices in terms of efficacy, Intraocular pressure and hemodynamic parameters with the I-GEL and Cobra-PLA there was so significant change in Intra-ocular pressure or hemodynamic pressures.

In a Study comparing LMA-supreme to the Cobra-PLA in patients undergoing controlled mechanical ventilation under anaesthesia it was found that both devices functioned effectively as ventilatory device , but the LMA-Supreme was better it terms of ease of insertion and lesser incidence of post-operative complications.

The Cobra-PLA has also been evaluated as an airway conduit for blind intuabtion in a study with 49 participants and it was found that this device provided good use for blind intubations , however this device did cause airway trauma.[47]

Cobra supraglottic airway device.

Courtesy of Focus Medical Hellas S.A., Attiki, Greece; with permission.

EAD	LMA-Classic		LMA-Unique		SoftSeal®	CobraPLA	
Size	Weight (kg)	Max cuff volume (mL)	Weight (kg)	Max cuff volume (mL)	Weight (kg)	Weight (kg)	Max cuff volume (mL)
0.5	N/A	N/A	N/A	N/A	N/A	>2.5	8
1	<5	4	<5	4	<5	>5	10
1.5	5-10	7	5-10	7	5-10	>10	25
2	10-20	10	10-20	10	10-20	>15	40
2.5	20-30	14	20-30	14	20-30	N/A	N/A
3	30-50	20	30-50	20	30-50	>35	65
4	50-70	30	50-70	30	50-70	>70	70
5	70-100	40	70-100	40	70-100	>100	85
6	>100	50	>100	50	>100	>130	85

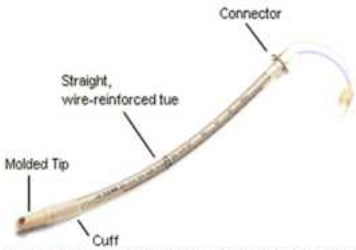
N/A: not available
*No indication of maximum cuff volume on EAD.

Size selection for Cobra-PLA

The cobra PLA device on insertion into the airway, it is a peri pharyngeal sealer

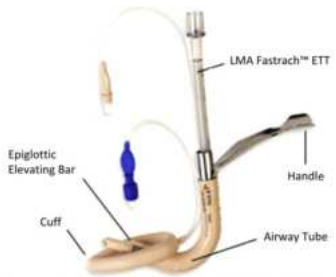
LMA Fastrach (LMA North America, Inc)

While the LMA Fastrach is typically used to intubate a patient, it also has the capability of functioning as a supraglottic airway for the purpose of ventilation. This tool can be used to facilitate the placement of an ET when direct laryngoscopy is either not feasible due to patient factors or is unsuccessful. It's sturdy enough to hold a size 8 ET and has a short enough airway tube so the ET cuff can be placed below the vocal chords. As a plus, the airway tubing is hypoallergenic. The LMA Fastrach can be used with a fiberoptic bronchoscope, illuminated stylets, or the Flexible Airway Scope, despite being intended for use in blind endotracheal intubation. It comes in three to five different sizes and features a multipurpose LMA Fastrach ET that can be reused over and over again without losing its shape or strength.



Endotracheal tube LMA ET Tube, for use with the LMA FasTrach.

***Courtesy of* LMA North America, Inc; with permission.**



Laryngeal mask airway LMA FasTrach. LMA ET Tube is placed in the airway tube. The tip of the ET tube protrudes under the epiglottic elevating bar.

***Courtesy of* LMA North America, Inc; with permission.**

LMA CTrach (LMA North America, Inc)

The LMA CTrach, a variant of the LMA Fastrach, features integrated fiberoptics that allow for real-time visualisation during tracheal intubation. The mask on the LMA CTrach can be used to provide ventilation when intubation is being attempted.

American medical personnel have a wide variety of laryngeal masks from which to choose. The LMA Classic and its descendants inspired its general layout, with slight variations across brands. They are mostly one-time use goods. The Sheridan Laryngeal Mask by Teleflex Medical is one type of laryngeal mask, and the Portex Soft Seal Laryngeal Mask by Smiths Medical is another. There are other similar products available, including the Aura40 Reusable Laryngeal Mask, the AuraStraight Disposable Laryngeal Mask, the AuraFlex Disposable Laryngeal Mask, and the AuraOnce Disposable Laryngeal Mask (AES, Inc).

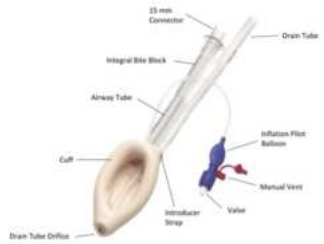
Intubating laryngeal mask airway LMA CTrach.

***Courtesy of* LMA North America, Inc; with permission.**

2nd Generation supraglottic airway devices.

LMA ProSeal (LMA North America, Inc)

The LMA ProSeal is an improved version of the traditional LMA that provides dual access to the body's vital organs. On top of that, it does a great job of sealing off the airway. The mask is more likely to stay in place, the risk of choking on one's own vomit is lessened, and the effectiveness of PAP is enhanced by these design elements. They can also be used to make a stomach vacuum. The LMA ProSeal cuff is designed with an extra chamber that helps establish a better pharyngeal seal when the perilaryngeal cuff is pressed against the laryngeal entry. This allows for a positive pressure ventilation system of 30 cm H2O. The esophageal end of the mask features a drain opening that can fit a gastric tube as large as 14 French. A misaligned LMA (such a reverse fold at the mask's tip) is instantly noticeable because the gastric tube cannot be placed into the oesophagus drain if the distal aperture is obstructed. Finding the cause of the problem will go more quickly now. Reusable and available in diameters ranging from 1.5 to 5 mm, the LMA ProSeal is a great option for sealing small medical devices. The incisor end of the airway tube is connected to an esophageal drain through a silicone bite block. The tube that carries air through the body is reinforced with wire.



Laryngeal mask airway LMA ProSeal.

***Courtesy of* LMA North America, Inc; with permission.**

Correct placement of the LMA ProSeal. Gastric tube placed in the oesophageal lumen enables gastric emptying and assessment of the position of the distal end of the LMA ProSeal at the upper oesophageal sphincter.

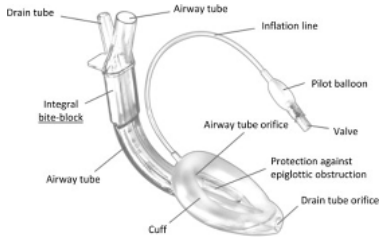
***Courtesy of* LMA North America, Inc; with permission.**

59 randomised controlled trials and 79 additional pieces of clinical research published between January 1998 and March 2005 made up the examined literature in 2005. 21 There was no difference in insertion success rate between the LMA Classic and the LMA ProSeal, however the LMA ProSeal provided a much more secure closure in the airway. Regurgitated stomach contents could be quickly identified, emptied, gastric pressure could be lowered, and they could be expelled through the esophageal port. A properly placed LMA ProSeal has been shown to minimise the risk of aspiration in comparison to an LMA Classic, however these results are inconclusive. When comparing an LMA ProSeal to an ET, there was a significant decrease in coughing and sympathetic activity. In clinical trials, the LMA ProSeal performed better than competing SGAs during positive pressure breathing when

subjected to both baseline and increased (as is the case during laparoscopic surgery) intra-abdominal pressure. Here is where we find the LMA ProSeal trials taking place. [22,23,24] The ProSeal has been shown in a recent trial to reduce the need for analgesic medication in the first six hours after surgery for patients having laparoscopic gynecologic surgery. Definitely a groundbreaking finding. 25 Another study that compared laparoscopic and open breast surgery found similar results. There were fewer cases of postoperative nausea and vomiting, painkiller use, and airway morbidity in the laparoscopic group.[7]

LMA Supreme (LMA North America, Inc)

Airway seal pressure is increased by 50% in comparison to the LMA Classic and LMA Unique thanks to the LMA Supreme's revised cuff, which is also used in the LMA ProSeal. The gastric drain of the LMA Supreme has several purposes, including suctioning the stomach, venting regurgitated stomach contents, and ensuring that the mask's tip is at the upper esophageal sphincter. Together, the distal cuff and reinforced tip prevent the sleeve from folding in on itself. The airway tube is specifically shaped to facilitate insertion and maintain stability once in place. The LMA Supreme, a single-use device that comes in adult sizes ranging from 3 to 5, has clinical value that is on par with that of the LMA ProSeal.

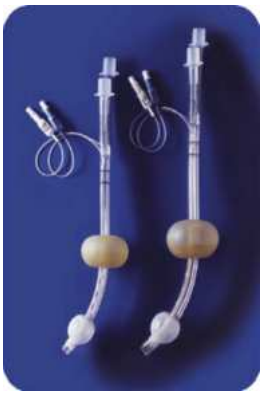


Laryngeal mask airway LMA Supreme.
***Courtesy of* LMA North America, Inc; with permission.**

Other SGA designs

Combitube (Covidien)

The Combitube combines the best features of a standard ET and an esophageal obturator airway in a single device. There should be no more than one user at any given moment. The proximal oropharynx balloon on the Combitube is large, whereas the distal oesophagus (or trachea) balloon is small and designed to work at a lower pressure. Eight air vents and one port are located between the two cuffs. Based on where the tube's distal tip is positioned, the Combitube can provide ventilation either in the trachea or the oesophagus. The oesophagus tends to be the primary site of damage (rare). [26] When the distal cuff is inflated, the device functions like a standard ET. A gastric tube can be inserted into the esophageal lumen once the distal end has been positioned within the oesophagus. So, you won't have to worry about heartburn from acid in your stomach making its way up your oesophagus again.

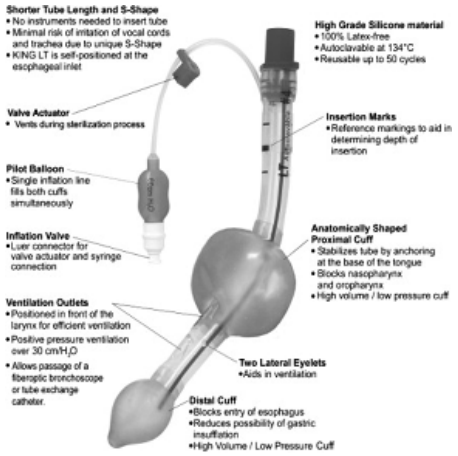


The Combitube is a double-lumen esophageal/tracheal airway available in two sizes. Since its conception in 1987, the Combitube has been frequently utilised as an emergency airway device, notably in prehospital situations. The Combitube is a simple tool to utilise in a "cannot ventilate-cannot intubate" scenario. It's been employed in life-or-death situations, such freeing people trapped in cars who are unable to breathe on their own.

In a study with 90 patients undergoing minor gynecologic operations under general anaesthesia, the Combitube, LMA ProSeal, and Laryngeal Tube S were all used effectively (LTS). The relative performance of each tube relative to the other two was calculated. Patients were all of a healthy weight and classified as ASA physical status class I, II, or III (BMI 35 kg/m 2). When compared to the other ventilation devices, the Combitube produced the highest cuff pressures, caused the most airway morbidity, and overall performed the worst (time to successful placement and breathing, failure rate). 28 It was also discovered in another study that the Combitube actually enhanced the rate of airway morbidity in everyday surgical procedures. Another study revealed the same thing, confirming that the Combitube shouldn't be utilised for airway management in regular general anaesthesia.[28,29]

King LT and King LTS (King Systems/VBM Medizintechnik, GmbH)

The Laryngeal Tube (LT) is a single-lumen, silicone tube with insertion marks, two ventilation ports between the cuffs, and a blind esophageal tip. The oesophageal cuff is smaller and is meant to relieve pressure, while the oropharyngeal cuff is larger. In the beginning, it seems like a scaled-down Combitube. The LT is easy to implant and has the added benefit of perhaps avoiding aspiration. It can be used up to 50 times and is available in sizes 2-5. There is also a disposable option available.



You can put a gastric tube via the LTS's second lumen to drain the stomach. Three- and five-person reusable and disposable versions of the LTS are on the market.

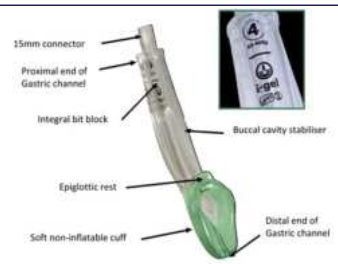
The LT and LTS are useful for individuals who are breathing on their own as well as those who are receiving positive pressure ventilation. Their airtight seal is reminiscent to the LMA ProSeal in its basic structure. Since its introduction to clinical settings in 2002, the LMA ProSeal has been studied extensively in comparison to the LTS. [22,23,28,30]

The LTS airway seal was adequate during positive pressure breathing in three different studies, even with increased intra-abdominal pressure from laparoscopy. Patients having a BMI greater than 35 or an ASA physical status class III, as well as those at risk for aspiration, were not included in the studies. During the laparoscopic procedure, the Trendelenburg angle was kept below 15 degrees, and the intra-abdominal pressure was maintained at or below 18 cm H2O at all times. The LMA ProSeal was found to be superior than the LTS in a fourth research in terms of insertion time, success, airway leak pressure, peak and plateau airway pressure, and the ease with which a stomach tube could be introduced into the body. The LMA ProSeal helped improve swallowing and reduce throat pain for 23 patients. [22,28]

All things considered, our findings point to the LTS being a safe and effective airway device for people requiring pulmonary mechanical ventilation. This conclusion was reached after considering the big picture.[8]

Intersurgical i-gel (Intersurgical Inc)

The i-gel is a relatively new addition to the SGA's arsenal. The i-gel is a disposable medical device with a built-in bite block, a conduit for a gastric tube, and a soft, noninflatable cuff that shapes itself to the anatomy of the hypopharynx after blind insertion. However, a second research of 280 i-gel usage indicated that there were three incidences of regurgitation, with one resulting to a nonfatal aspiration, suggesting that caution should be exercised when using this device during positive pressure breathing. [37-40]



I-gel supraglottic airway device.

Studies

1. In 2010, Amr M. Helmy, et alfrom the Department of Anaesthesiology and Intensive Care at Suez Canal University in Ismailia, Egypt, compared the innovative supraglottic airway device I-gel to the traditional laryngeal mask airway in 80 patients who were anaesthetized and breathing on their own during the trial. They took into account factors including insertion difficulty, leak pressure, and They determined that there were no significant differences in the patients' hemodynamic status between the two groups. Changing to an I-gel from a laryngeal mask airway was significantly faster and less complicated. When compared to the laryngeal mask airway, the I-gel airway exhibited a significantly higher leak pressure, resulting in a much lower rate of stomach insufflation.[41]

2. An observational study was carried out in 2009 by Beylacq L at Hospital des enfants cedex in France on fifty children weighing more than 30 kilogrammes. Due to its high success rate and low complication rate, the Igel was deemed to be a suitable device for paediatric airway management by the study's author.[42]

3. Ashish Kannaujia from S.N.Medical College in Agra, India, conducted a study in 2009 on a total of 120 patients to determine the ease of insertion, the time it took to produce a successful airway, the oropharyngeal seal pressure, and the airway stability on head and neck movement. 11 seconds is the median amount of time for insertion. The pressure at the oropharyngeal seal was 20 cm H20. During the perioperative period, there was not a single patient who experienced a serious adverse event. I-gel is a straightforward supraglottic device that is of high quality and may be used with relative ease. Adult patients who require surgical operations lasting between 30 and 60 minutes while breathing on their own will benefit greatly from using this gadget because it is very effective and useful.[43]

5. In 2008, J.J. Gatward conducted a study on the use of I-gel in elective patients who were under general anaesthesia to evaluate its simplicity of use, airway quality, placement, seal, and complications. The majority of patients experienced only modest problems, and those that did occur were uncommon. I-gel may be injected quickly and painlessly, and it is effective in providing a secure airway in more than 90 percent of cases. It is recommended that further research be conducted to evaluate the device's safety and performance in comparison to existing supraglottic airway devices.[44]

i-gel size	Patient size	Patient weight guidance (kg)
1	Neonate	2-5
1.5	Infant	5-12
2	Small paediatric	10-25
2.5	Large paediatric	25-35
3	Small adult	30-60
4	Medium adult	50-90
5	Large adult+	90+

Size guide for I-GEL LMA.

MATERIALS AND METHODS:

1. I-GEL LMA
2. COBRA PLA
3. 20ml syringe
4. water soluble lubricant jelly
5. 10F suction catheter

Methodology:

After obtaining Institutional ethical committee approval. Patients who are admitted in Sree Balaji medical college for minor surgical procedures defined as surgeries last less than 1 hour in duration, undergo routine physical and blood evaluation and preanesthetic checkup. age, height, weight, BMI are assessed. patients who meet the inclusion criteria, informed and written consent is obtained and patients are randomized into two groups by double blinding with closed envelope technique. Prior to surgery all patients are kept Nil Per oral for minimum period of 6 hours. Once patient is shifted inside the operating room, intravenous line is secured and started on intravenous fluids at rate of 100ml/hour, standard ASA monitors, ECG, pulse oximeter, non-invasive blood pressure monitors are connected and the patients baseline vitals are noted.

Patients are then premedicated with Inj.Glycopyrolate 0.2 mg and Inj.Fentanyl 2mcg/kg/body weight.

Patients are then preoxygenated for a period of 3 mins with a fractional inspired concentration of 100 % Patients are then induced with Inj.Propofol 2mg/kg/body weight and paralyzed with Inj.Atracurium 0.5mg/kg/body weight after checking for ventilation, patients are ventilated for a period of 3 mins and the pre-insertion vitals are noted. Prior to insertion of both devices, they were adequately lubricated with a water-soluble jelly.

Inclusion Criteria:

- All patients undergoing minor surgical procedures whose anticipated duration of surgery was less than 30 mins at Sree Balaji Medical College Hospital
- 1.ASA grade – I, II, III
- 2.Age between 15 & 55yrs

Exclusion Criteria:

- 1.Patient refusal.
- 2. ASA grade – IV
- 3.Patients with complications like severe anemia, hypovolemia, septicemia, shock.
- 4. Bleeding disorders or on anticoagulant therapy
- 5.Local infection in pharynx.
- 6.Patients with Full Stomach
- 7.Patients with upper airway obstruction
- 8.emergency surgeries

Group -c

Patients intubated with Cobra-PLA 3 size was inserted with the neck in extended position with the index finger technique, cuff volume was inflated with 20ml of air to attain a cuff pressure of 60 cm H20 following which the anesthetic circuit is connected and ventilation is resumed. Position of the CPLA was confirmed by Bilateral chest wall movement, capnography tracing and presence of no audible leak.

Group-i

Patients intubated with the I-gel 3 size device was inserted with the neck in extended position with the single index finger technique the position was confirmed by bilateral chest wall movement, capnography tracing and the presence of no audible leak.

Maintainence Of Anaesthesia

Plane of anesthesia was maintained for both groups of patients with N2O , O2 at a ratio of 2:1 with Sevoflurane to attain a MAC of 1 , muscle relaxtion was with Inj.Atracurim 0.1mg/kg /body weight . post insertion the vitals were noted at 1 min , 5 mins and 30 mins . Ryle's Tube were introduced to allow for aspiration of secretions in both group of patients. , suction catheter was inserted via the gastric channel of the I-GEL and around the cuff of the Cobra-PLA. Once adequate plane was achieved the surgical team was allowed to proceed for surgery.

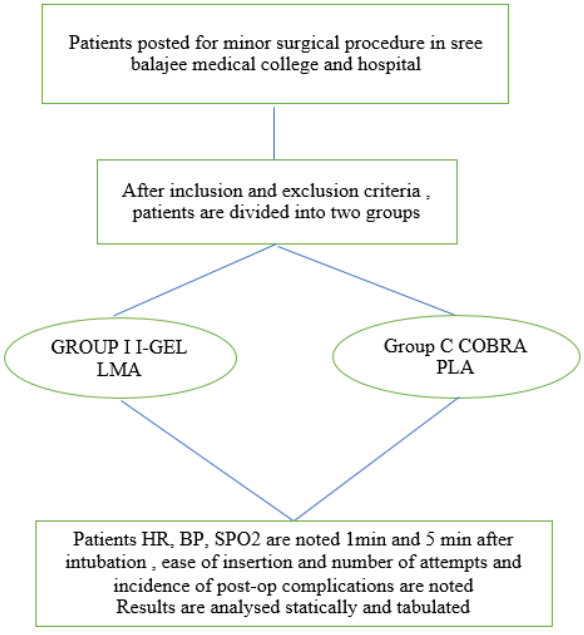
Reversal And Extubation

Upon completion of surgery and recovery for neuromuscular recovery, prior to extubation both groups of patient received Inj.Odensetron 0.1mg/kg/body weight , patients were revered with Inj.Neostigmine 0.05mg/kg/ body weight and Inj.glycopyrolate 0.5mg , after adequate suctioning through the suction catheter and oral suctioning , cuff deflated and patients extubated.

Complications like stridor/ laryngospasm and were noted at the time of recovery from anesthesia .post-removal the device was examined for evidence of blood staining . patients were followed up for 24 hours for sore throat.

Patients were then shifted to the post-operative ward for the next 24 hours were followed up on the occurrence of sore throat.

Methodology In Brief



Study Place
The study was carried out in the department of anesthesia sree balaji medical college and hospital bharath university

Study Setting
The Study was carried out in the operating theater complex in sree balaji medical college and hospital bharath university

Study Design:
Single Blinded Interventional study, randomized by blind envelope technique.

Sampling Methodology
Random sampling

Sample Size
50

Operational Definition
Patients undergoing short surgical procedures are pre-medicated and pre-oxygenated and induced and intubated with Supraglottic airway device like I-Gel or Cobra PLA and the hemodynamic response, ease of insertion and post-operative complications are assessed.

Study Outcome
Easy Of Insertion: No resistance to insertion in the pharynx on a single effort

Difficult Insertion: defined as the one in which there was resistance to insertion or more than one attempt was required.

Number Of Insertion Attempts: A precise procedure was followed when inserting the laryngeal mask; up to three tries were performed, and the total number of attempts needed were documented. A single transit of the laryngeal mask into the oropharynx was considered one try if confirmation of adequate ventilation based on 1) Bilateral chest wall movement, 2) square wave capnography, 3) no audible leak with 7ml.kg of tidal volume. The number of attempts for adequate ventilation was counted as the total number of insertion attempts.

Time Taken For Insertion: it was measured from i-gel or cobra pla taken in hand of the investigator till confirmation of adequate ventilation of the patient.

Hemodynamic Response: the patients pulse rate and blood pressure are recorded just before insertion and one minute and 5 minutes after initiation of insertion attempts

Incidence Of Complications: The patients are asked whether they had sore throat after removal of LMA, the patients are closely monitored whether they have any bronchospasm of laryngospasm. Post removal of the supraglottic airway device it is examined for the presence of blood staining.

Data Entry And Analysis
The data were tabulated using Microsoft excel and anaylsed with SPSS version 23. descriptive statistics were analysed with independent t-test and were expressed as mean +- standard deviation and p-values were obtained a p-value less than 0.05 was considered significant for a two-sided test. categorical variables were analysed with chi-square test and expressed as number and frequency.

RESULTS :
Present study is a randomised controlled trial involving 50 participants with 25 in each group. All the 50 patients completed the study and all 50 were statistically analysed there were no drop outs from the study . Group I-I gel Group C-Cobra pla

Table 1: Age wise distribution of Study Participants

Group	Number	Mean	S.D	P value
Group-I	25	44.28	8.6	0.56
Group-C	25	46.03	9.2	

Table 1 shows the two groups being compared by age , the mean age for group -I is 44.28 and the for group- C it it is 46.03 , the p-value is 0.56 which is not significant.

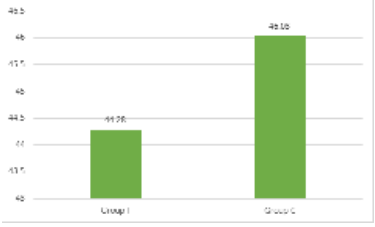


Figure 1: Age wise distribution of Study Participants

Figure 1 shows the graphical representation of the age wise distribution among the two groups

Table 2: Sex Distribution of Study Groups

Group	Male	Female	Total	df	CHI Square	P value
Group-I	14	11	25	1	1.84	0.78
Group-C	16	9	25			
Total	30	20	50			

Group-I had a total of 14 male and 11 female patients , and Group-C had a total of 16 males and 9 females , the CHI-Square test showed a p-value of 0.78 which is not statistically significant.

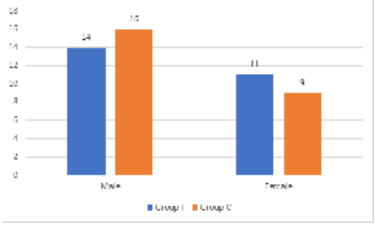


Figure 2: Sex Distribution of Study Groups

The graphical representation of the sex distribution between the two groups, which had no significance, is shown in Figure 2.

Table 3: Body mass index among study groups

Group	Number	Mean	S.D	P value
Group-I	25	24.16	2.21	0.42
Group-C	25	24.75	2.42	

BMI among the two groups the mean in group-I is 24.16 and mean BMI in group-C is 24.75 , the date is statistically not significant as a p-value is 0.42

Table 4: ASA grading among study groups

Group	Grade 1	Grade 2	Total	Chi square	P value
Group-I	13	12	25	0.45	0.710
Group-C	12	13	25		
Total	25	25	50		

The two groups are comparable with respect to ASA grading , data was analysed by chi-square test which showed a p-value of 0.710 which was not statistically significant.

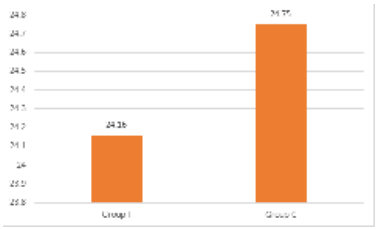


Figure 3: Body mass index among study groups

Figure 3 shows Graphical representation among the BMI of the two study groups.

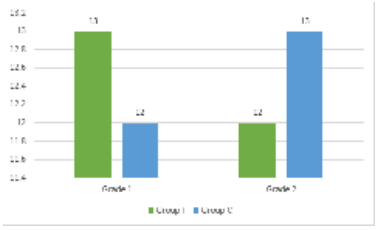


Figure 4: ASA grading among study groups

Figure 4 shows the graphical representation among the two study groups when compared with the ASA grading.

Table 5: Time taken for insertion of device in minutes among study participants

Group	Number	Mean	S.D	P value
Group-I	25	2.12	0.21	0.52
Group-C	25	2.08	0.42	

The two groups are comparable with respect to Time taken for insertion of two devices , the mean for group-I is 2.12 and for group-C is 2.08 , student t test revealed a p-value of 0.52 which was found to statistically not significant.

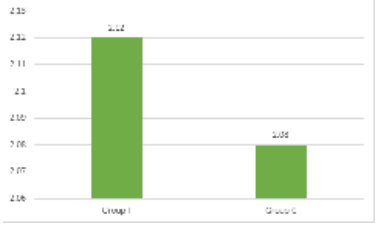


Figure 5: Time taken for insertion of device in minutes among study participants

Table 6:No of attempts of insertion among study participants

Group	1	>1	Total	df	CHI Square	P value
Group-I	20	5	25	1	2.67	0.56
Group-C	18	7	25			
Total	38	12	50			

Table 6 , The two groups are comparable in terms of the number of insertion attempts made by research participants; in group I, there was 5 such attempts, while in group C, there were 7 such attempts. However, the chi-square test indicated a p-value of 0.56, which was not statistically significant.

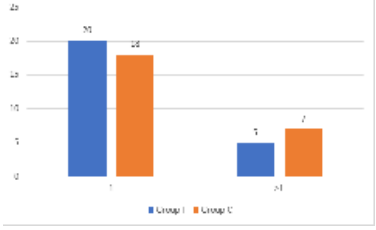


Figure 6: No of attempts of insertion among study participants

Figure 6 shows the graphical representation of the number of attempts between group-I and Group-C.

Table 7:Postoperative complications among study participants

Sore Throat	I-GEL	25	0	25	<0.0001
	COBRA	25	2	23	significant
Broncho/Laryngospasm	I-GEL	25	0	25	p-1
	COBRA	25	0	25	No significant

The two groups are comparable with respect to postoperative complications, the total number of patients that developed postoperative sore throat was 2 patients in group C and no patients in group-I developed a sore throat, and no patients in both groups developed bronchospasm or laryngospasm. Data analysis showed a p-value of less than 0.0001 which was strongly significant.

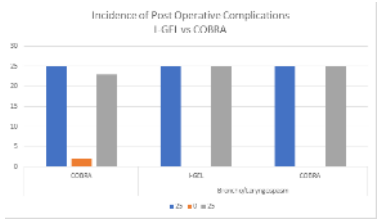


Figure 7: graphical representation of post-operative complications among the two groups.

Table 8: shows the incidence of blood staining after the removal of the device

blood staining on the device				
group	total no	yes	no	p.value
i-gel	25	2	23	<0.0001
cobra	25	5	20	

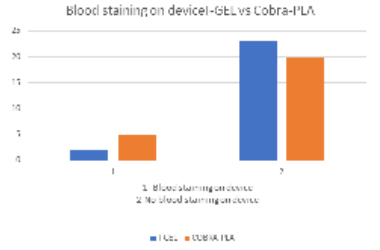


Figure 8: Blood staining on both devices after removal

Figure 8: shows the graphical representation of the incidence of blood staining on both devices after its removal. Group-I had zero amount of staining wherein group-C had 2 cases of blood staining on the device. T-test revealed a p-value less than 0.0001 percent which was statistically significant The two groups are comparable with respect to postoperative complications

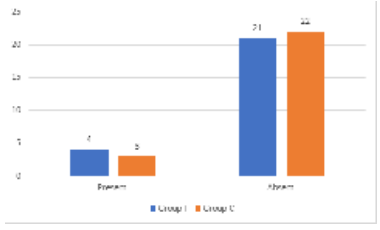


Figure 7: Postoperative complications among study participants

Table 9:Heart rate among study participants

Time of assessment	group	Mean	Std. Deviation	P value
Hr0	Group-I	86.47	6.357	0.15
	Group-C	82.33	8.829	
Hr5 min	Group-I	82.00	6.845	0.28
	Group-C	84.93	8.811	
HR30 min	Group-I	80.00	7.071	0.93
	Group-C	79.80	7.213	
Hr15 1hr	Group-I	76.67	7.355	0.14
	Group-C	78.67	9.186	

Table 9 shows the heart rate on taken during the insertion , 5 mins , 30

mins and 1 hour after insertion , using student t test the p value were analysed and p- values were obtained , there was no statistical difference between both groups in terms of heart rate variability among the two groups. ,p-values more than 0.05.

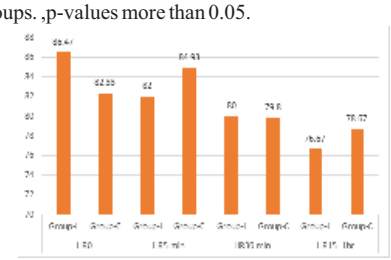


Figure 9 shows the heart rate variability among the two groups, at the time of insertion, 5 min after insertion, 30 min and 1 hour after insertion respectively.

Table 10 :SPO2 among study participants

Time of assessment	Group	Mean	S.D	P value
SPO2 o min	Group-I	99.73	.458	0.60
	Group-C	99.40	.507	
SPO5min	Group-I	98.60	.507	0.75
	Group-C	98.67	.488	
SPO230 min	Group-I	99.73	.458	0.90
	Group-C	99.33	.488	
SPO2 1 hr	Group-I	98.60	.507	0.64
	Group-C	98.73	.458	

Table 10 shows the SPO2 among the two groups at insertion, 5 mins, 30 mins and 1 hour after insertion, data were analysed by t-test and p-values were obtained which did not reveal any significance statistically.

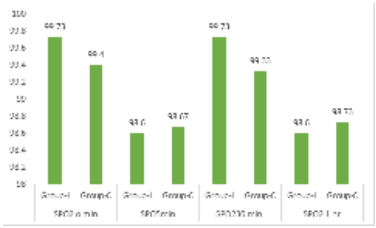


Figure 10:SPO2 among study participants

Figure 10 shows the bar graph representation among the two groups.

Table 11:Respiratory rate among study participants

Time of assessment	Group	Mean	S.D	P value
Rr0	Group-I	17.60	.986	0.69
	Group-C	17.47	.834	
Rr5	Group-I	17.07	1.100	0.84
	Group-C	17.00	.756	
Rr10	Group-I	16.27	.961	0.08
	Group-C	15.27	.961	
Rr15	Group-I	15.73	.961	0.81
	Group-C	15.27	1.033	

The two groups are comparable with respect to respiratory rate , the analysed date showed no significance between the two groups in terms of respiratory rate.

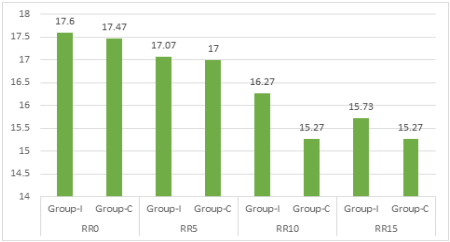


Figure 11: Respiratory rate among study participants

Hemodynamic change	Group	MEAN SBP	MEAN DBP	P-value
Pre-insertion	Group-I Group-C	123.3 124.2	83.48 83.3	SBP-0.30 DBP-0.85 MAP-0.76
1min after insertion	Group-I Group-C	125.7 124.5	83.6 83.1	SBP-0.14 DBP-0.62 MAP-0.43
5 mins after insertion	Group-I Group-C	122.3 123.7	84.4 84.4	SBP-0.29 DBP-0.98 MAP-0.66

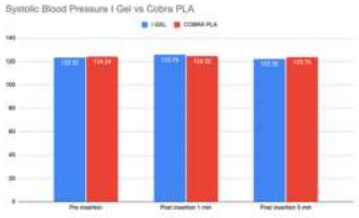


Figure 12: systolic blood pressure among participants

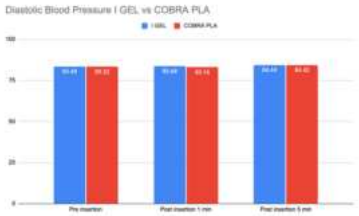


Figure 13: Diastolic Blood pressure among participants

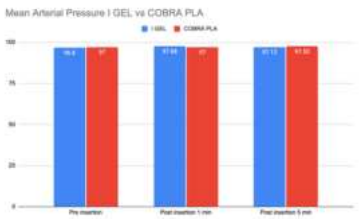


Figure 14: Mean arterial blood pressure among the participants

Table 15: compares the ease of insertion between the two groups

ease of insertion of I-GEL AND Cobra-PLA					
total	easy	difficult	easy as %	diffiult as %	
25	23	2	92	8	p value less than 0.0001
25	19	6	76	24	signifcant

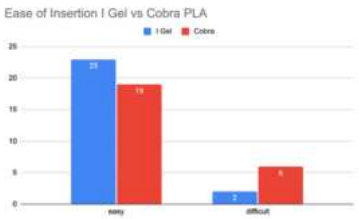


Figure 15: Ease of Insertion among the two groups

Figure 15 compares the ease of insertion between the two groups of participants the total number of difficult insertions in group-I are 2 , whereas in group-C it is 6 , using the student t-test a p-value of 0.0001 was obtained and found to be statistically strongly significant.

DISCUSSION

The I-GEL airway is a brand-new, cutting-edge supraglottic airway management device composed of clear, flexible, gel-like Styrene Ethylene Butadiene Styrene, a medical-grade thermoplastic elastomer. The I-GEL is a true anatomical device intended to prevent compressive injuries that can happen when using inflated supraglottic airway devices by creating a non-inflatable anatomical seal of the pharyngeal, laryngeal, and perilaryngeal tissues..

According to our study, I-GEL was just as effective as Cobra-PLA at keeping anaesthesia patients' ventilation and oxygenation levels stable. In comparison to other devices, I-mean GEL's insertion time for

the supraglottic airway device was much lower. The I-GEL was inserted quickly and easily because it is an uncuffed peri-laryngeal sealer. Additionally, it gave a stable airway.Both IGEL and Cobra-PLA were successfully inserted in all patients. The overall success rate for supraglottic airway device insertion was similar in both the groups. The result obtained with IGEL was comparable with that obtained by Gatward.J.et.al.[45] The device was inserted in first attempt in 40 patients in IGEL and 38 patients in ALMA with significant difference.

Joo & Rose[4] reported 96.7% overall intubation success rate with reverse orientation of conventional PVC tracheal tubes through ILMA in patients with normal airway.[48] Kundra et.al.[47] demonstrated a 96% success rate within two intubation attempts with both Rusch PVC tubes oriented in normal direction and with silicone wire-reinforced tubes. Michalek.et.al.[48]compared the IGEL and ILMA as a conduit for tracheal intubation in manikin and concluded that the success rate for blind tracheal intubation through ILMA was over 80% and IGEL was 63%.

The first-attempt success rate is another important performance indicator for tracheal intubation. Time taken for insertion of device in group I is less compare to group A. The association is statistically significant (P<0.05)

Anitha shetty.et.al[48] had obtained contrast results with ILMA. The IGEL has a wider stem. Danha et.a[49] suggested that wider shaft of the channel and absence of bar make the tube passage 'subjectively easy'. The time required for the supraglottic device removal after intubation was significantly less in the I-GEL group. This uncuffed device was easier to remove with endo-tracheal tube in situ using a stabilizing rod. Sharma et.al.[50] described difficulties in removing the IGEL after intubation, but we have not noted any significant difficulties by using the silicone stabilising rod from the ILMA set.

Insertion of supraglottic airway and tracheal intubation through it may be indicated where conventional laryngoscopy fails. The ILMA was specially designed for this purpose. IGEL, a relatively new device has some benefits: disposable, cheap & its wide bore facilitate direct passage of a standard size tracheal tube. It can be a useful adjunct to tracheal intubation in patients with difficult airway as documented in several case reports.

Kannaujia et.a, conducted a study in 2009 on a total of 120 patients to determine the ease of insertion, the time it took to produce a successful airway, the oropharyngeal seal pressure, and the airway stability on head and neck movement. 11 seconds is the median amount of time for insertion. The pressure at the oropharyngeal seal was 20 cm H20. During the perioperative period, there was not a single patient who experienced a serious adverse event. I-gel is a straightforward supraglottic device that is of high quality and may be used with relative ease. Adult patients who require surgical operations lasting between 30 and 60 minutes while breathing on their own will benefit greatly from using this gadget because it is very effective and useful.[43] , this correlates with our results we also found the I-gel LMA the time taken for insertion to be the same.

Amr M. Helmy, et al., did a comparative study in 80 patients between I-gel, and the classical laryngeal mask airway in anaesthetized spontaneously ventilated patients. They noted parameters such as the ease of insertion, leak pressure, end They came to the conclusion that neither of the groups caused any substantial changes in the hemodynamic condition of the patients. When compared to inserting a laryngeal mask airway, inserting an I-gel was far simpler and took much less time. The I-gel airway had a substantially higher leak pressure than the laryngeal mask airway, and as a result, the incidence of stomach insufflation was significantly lower with the I-gel airway.[41] , when the I-Gel is compared with the Cobra-PLA which is a first generation LMA. The I-gel LMA was easier to insert when compared to the Cobra-PLA.

In 2019 , In study conducted by, Achmet Ali et.al in a comparative study comparing Supreme LMA , Proseal LMA and Cobra PLA , in a study conducted on 150 patients undergoing minor surgical procedures , that the there was highest incidence of post-operative complications in the group intubated with Cobra PLA , in our study also patieents intubated with the Cobra-PLA had higher incidence of post-operative sore throat and more evidence of blood staining on the device was noted with the Cobra-PLA.

the drawbacks of our study include the blinding , single blinded study so the principal investigator knows which device is being inserted and the insertion characteristics , our study did not compare the peak pressure changes after insertion of each device. the ease of insertion is compared under ideal intubating conditions with use of muscle relaxants , further studies to be conducted without the use of muscle relaxants to determine the ease of insertion.

CONCLUSION

After data analysis and evaluation, based on the results of our study, we conclude that the I–GEL has a significantly easier insertion than that of the Cobra-PLA device and the Cobra PLA is associated with more post-operative complications like sore throat and was found to be more blood stained than the I-gel upon removal , the I-GEL is less traumatic to the airway . I-gel and Cobra-PLA are equally effective with respect to ventilation and oxygenation, number of attempts, and hemodynamic changes. But More studies to be conducted to find out the efficacy of one option over other.

REFERENCES

1. Pennant JH, White PF. The laryngeal mask airway. Its uses in anesthesiology. Anesthesiology. 1993 Jul 1;79(1):144-63.
2. Yardy N, Hancox D, Strang T. A comparison of two airway aids for emergency use by unskilled personnelThe Combitube and laryngeal mask. Anaesthesia. 1999 Feb;54(2):181-3.
3. Wharton NM, Gibbison B, Gabbott DA, Haslam GM, Muchatuta N, Cook TM. I.gel insertion by novices in manikins and patients. Anaesthesia. 2008 Sep;63(9):991-5.
4. Finucane BT, Santora AH, Tsui BC. Principles of airway management. New York: Springer; 2003 Mar.
5. Goldberg AN, Schwab RJ. Identifying the patient with sleep apnea: upper airway assessment and physical examination. Otolaryngologic Clinics of North America. 1998 Dec 1;31(6):919-30.
6. Atkinson RS, Boulton TB, Barr A. The history of anesthesia. BLESSED DAYS OF ANAESTHESIA. 1989:207.
7. Brown EN, Lydic R, Schiff ND. General anesthesia, sleep, and coma. New England Journal of Medicine. 2010 Dec 30;363(27):2638-50.
8. Bischoff P, Rundshagen I. Awareness under general anesthesia. Deutsches Ärzteblatt International. 2011 Jan;108(1-2):1.
9. Olsson GL, Hallen B, Hambraeus Jonzon K. Aspiration during anaesthesia: a computer aided study of 185 358 anaesthetics. Acta anaesthesiologica scandinavica. 1986 Jan;30(1):84-92.
10. Urban BW, Bleckwenn M. Concepts and correlations relevant to general anaesthesia. British journal of anaesthesia. 2002 Jul 1;89(1):3-16.
11. Drew BA. Arthur Guedel and the ascendance of anesthesia: A teacher, tinkerer, and transformer. Journal of Anesthesia History. 2019 Jul 1;5(3):85-92.
12. Calverley RK. Arthur E. Guedel (1883–1956). InAnaesthesia 1985 (pp. 49-53). Springer, Berlin, Heidelberg.
13. Guedel AE. Stages of anesthesia and a re-classification of the signs of anesthesia. Anesthesia & Analgesia. 1927 Aug 1;6(4):157-62.
14. GUEDEL AE. Third stage ether anesthesia: a sub-classification regarding the significance of the position and movements of the eyeball. Survey of Anesthesiology. 1966 Oct 1;10(5):515-21.
15. van den Berg AA, Chitty DA, Jones RD, Sohel MS, Shahen A. Intravenous or inhaled induction of anesthesia in adults? An audit of preoperative patient preferences. Anesthesia & Analgesia. 2005 May 1;100(5):1422-4.
16. Dave NM. Premedication and induction of anaesthesia in paediatric patients. Indian Journal of Anaesthesia. 2019 Sep;63(9):713.
17. Thwaites A, Edmends S, Smith I. Inhalation induction with sevoflurane: a double-blind comparison with propofol. British Journal of anaesthesia. 1997 Apr 1;78(4):356-61.
18. Yurino M, Kimura H. Induction of anesthesia with sevoflurane, nitrous oxide, and oxygen: a comparison of spontaneous ventilation and vital capacity rapid inhalation induction (VCRII) techniques. Anesthesia and analgesia. 1993 Mar 1;76(3):598-601.
19. Shafik M.T., Bahlman B.U., Hall J.E., et. al.: A comparison of the Soft Seal disposable and the Classic re-usable laryngeal mask airway. Anaesthesia 2006; 61: pp. 178-181.
20. Miller D.M., Youkhana I., Karunarante W.U., et. al.: Presence of protein deposits on "cleaned" re-usable anaesthetic equipment. Anaesthesia 2001; 56: pp. 1069-1072.
21. Cook T.M., Lee G., Nolan J.P.: The ProSeal laryngeal mask airway: a review of the literature. Can J Anaesth 2005; 52: pp. 739-760.
22. Roth H., Genzwuerker V., Rothhaas A., et. al.: The ProSeal Laryngeal Mask Airway and the Laryngeal Tube Suction™ for ventilation in gynaecological patients undergoing laparoscopic surgery. Eur J Anaesthesiol 2005; 22: pp. 117-122.
23. Cook T.M., Cranshaw J.: Randomized crossover comparison of ProSeal Laryngeal Mask Airway with Laryngeal Tube Sonda during anaesthesia with controlled ventilation. Br J Anaesth 2005; 95: pp. 261-266.
24. Evans N.R., Skowno P.J., Bennett M.F., et. al.: A prospective observational study of the use of the ProSeal™ laryngeal mask airway for postpartum lubal ligation. Int J Obstet Anesth 2005; 14: pp. 90-95.
25. Hohlrieder M., Brimacombe J., Eschertzhuber S., et. al.: A study of airway management using the ProSeal LMA laryngeal mask airway compared with the tracheal tube on postoperative analgesic requirements following gynaecological laparoscopic surgery. Anaesthesia 2007; 62: pp. 913-918.
26. Agro F., Frass M., Benumof J.L., et. al.: Current status of the Combitube: a review of the literature. J Clin Anesth 2002; 14: pp. 307-314.
27. Frass M., Frenzer R., Zdrahal F., et. al.: The esophageal tracheal Combitube: preliminary results with new airway for CPR. Ann Emerg Med 1987; 16: pp. 768-772.
28. Bein B., Carstensen M., Gleim L., et. al.: A comparison of the ProSeal laryngeal mask airway, the laryngeal tube S and the esophageal-tracheal combitube during routine surgical procedures. Eur J Anaesthesiol 2005; 22: pp. 341-346.
29. Oczenski W., Krenn H., Dahaba A.A., et. al.: Complications following the use of the combitube, tracheal tube and laryngeal mask airway. Anaesthesia 1999; 54: pp. 1161-1165.
30. Gaitini L.A., Vaida S.J., Somri M., et. al.: A randomized controlled trial comparing the ProSeal Laryngeal Mask Airway with the laryngeal tube suction in mechanically ventilated patients. Anesthesiology 2004; 101: pp. 316-320.
31. Gaitini L., Carmi N., Yanovski B., et. al.: Comparison of the Cobra PLA (Cobra Perilaryngeal Airway) and the Laryngeal Mask Airway Unique in children under pressure controlled ventilation. Paediatr Anaesth 2008; 18: pp. 313-319.
32. Gaitini L., Yanovski B., Somri M., et. al.: A comparison between the PLA Cobra and the

Laryngeal Mask Airway Unique during spontaneous ventilation: a randomized prospective study. Anesth Analg 2006; 102: pp. 631-636.
33. Hooshangi H., Wong D.T.: Brief review: the Cobra Perilaryngeal Airway (Cobra PLA) and the Streamlined Liner of Pharyngeal Airway (SLIPA) supraglottic airways. Can J Anaesth 2008; 55: pp. 177-185.
34. Cook T.M., Lowe J.M.: An evaluation of the Cobra Perilaryngeal Airway: study halted after two cases of pulmonary aspiration. Anaesthesia 2005; 60: pp. 791-796.
35. Miller D.M., Light D.: Laboratory and clinical comparisons of the Streamlined Liner of the Pharynx Airway (SLIPA) with the laryngeal mask airway. Anaesthesia 2003; 58: pp. 136-142.
36. Hein C., Plummer J., Owen H.: Evaluation of the SLIPA (Streamlined Liner of the Pharynx Airway), a single use supraglottic airway device, in 60 anaesthetized patients undergoing minor surgical procedures. Anaesth Intensive Care 2005; 33: pp. 756-761.
37. Uppal V., Fletcher G., Kinsella J.: Comparison of the i-gel with the cuffed tracheal tube during pressure-controlled ventilation. Br J Anaesth 2009; 102: pp. 264-268.
38. Richez B., Saltel L., Banchereau F., et. al.: A new single use supraglottic airway device with a noninflatable cuff and an esophageal vent: an observational study of the i-gel. Anesth Analg 2008; 106: pp. 1137-1139.
39. Beylacq L., Bordes M., Semjen F., et. al.: The I-gel, a single-use supraglottic airway device with a noninflatable cuff and an esophageal vent: an observational study in children. Acta Anaesthesiol Scand 2009; 53: pp. 376-379.
40. Gibbison B., Cook T.M., Seller C.: Case series: protection from aspiration and failure of protection from aspiration with the i-gel airway. Br J Anaesth 2008; 100: pp. 415-417.
41. Helmy AM, Atef HM, El-Taher EM, Henidak AM. Comparative study between I-gel, a new supraglottic airway device, and classical laryngeal mask airway in anesthetized spontaneously ventilated patients. Saudi J Anaesth. 2010 Sep;4(3):131-6.
42. Beylacq L, Bordes M, Semjen F, Cros AM. The I.gel®, a single use supraglottic airway device with a non.inflatable cuff and an esophageal vent: An observational study in children. Acta Anaesthesiologica Scandinavica. 2009 Mar;53(3):376-9.
43. Kumar A, Srivastava U, Saxena S, Kannaujia AK, Saraswat N, Mishra AR, Sharma S. Single injection paravertebral block for major cancer breast surgery. Journal of Anaesthesiology Clinical Pharmacology. 2009 Jul 1;25(3):281-4.
44. Gatward JJ, Cook TM, Seller C, Handel J, Simpson T, Vanek V, Kelly F. Evaluation of the size 4 i-gel airway in one hundred non-paralysed patients. Anaesthesia. 2008 Oct;63(10):1124-30.
45. Comparison of four supraglottic airway devices in terms of efficacy, intraocular pressure, and hemodynamic parameters in children undergoing ophthalmic surgeries Turk J Anaesthesiol Reanim .2015 Oct;43(5):304-12. doi: 10.5152/TJAR.2015.49091. Epub 2015 Aug 21.
46. Evaluation of successful insertion of cobra-perilaryngeal airway and laryngeal mask airway supreme by novice anaesthesiologists: Experience from a teaching institute, Tushar Mantri, Sumitra G Bakshi, Kailash S Sharma Department of Anesthesiology, Critical Care and Pain, Tata Memorial Hospital, Mumbai, Maharashtra, India
47. Evaluation of the Cobra perilaryngeal airway (CPLA) as an airway conduit November 2007European Journal of Anaesthesiology 24(10):852-5 DOI:10.1017/S026502 1507000877
48. Comparison between poly vinyl chloride (pvc) tube and intubating laryngeal mask airway (ilma) tube for intubation through intubating laryngeal mask airway (ilma / lma - fastrach) in mallampati (mp) 3 and 4 patients october 2014 ·journal of evidence based medicine and healthcare 1(8):955-961 doi:10.18410/ jebmh 2014/ 144
49. Comparison of fibreoptic-guided orotracheal intubation through classic and single-use laryngeal mask airways R F Danha [1], J L Thompson, M T Popat, J J Pandit DOI: 10.1111/j.1365-2044.2004.04045.x
50. The i-gel™ airway for ventilation and rescue intubation Sharma, S.Rogers, R.Popat, M.Author Information