Comparison of Classic and Proseal LMA in anaesthetised and paralysed patients coming for gynaecological surgeries.

Dissertation submitted to

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IN

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CHENNAI- 600 003

APRIL 2013

CERTIFICATE

This is to certify that the dissertation entitled **Comparison of Classic and Proseal LMA in anaesthetised and paralysed patients coming for gynaecological surgeries**, Submitted by Dr. Sushma Vijay Pingale in partial fulfilment for the award of the degree of Doctor of Medicine in Anaesthesiology by the Tamilnadu Dr. M.G.R. Medical University, Chennai is a bonafide record of the work done by her in the INSTITUTE OF ANAESTHESIOLOGY & CRITICAL CARE, Madras Medical College, during the academic year 2011-2013.

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DECLARATION

I solemnly declare that this dissertation entitled "COMPARISON OF CLASSIC AND PROSEAL LMA IN ANAESTHETISED AND PARALYSED PATIENTS COMING FOR GYNAECOLOGICAL SURGERIES" has been prepared by me, under the Guidance of Prof.Dr. R. RAJENDRAN, M.D, D.A, Chief Anaesthesiologist, Department of Anaesthesiology, Institute of Obstetrics and Gynaecology, Egmore, Chennai in partial fulfillment of the regulations for award of the degree of M.D. (Anaesthesiology) examination to be held in April 2013. This study was conducted at Institute of Obstetrics and Gynaecology, Egmore, Chennai. I have not submitted this dissertation previously to any university for the award of any degree or diploma.

Date:

Place: Chennai **Dr. SUSHMA VIJAY PINGALE**

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CONTENTS

INTRODUCTION

Adversity makes man look for better options!

It all startedwith the invent of Anaesthesia! Induction of general anaesthesia resulted in loss of upper airway reflexes and reduction in tone of pharyngeal structures which resulted in potential life threatening complications like obstruction of upper airway and accidental aspiration of gastric contents![1]Anaesthesiologists started feeling the need for devices to secure the airway.This lead to the introduction of tracheal intubation for giving general anaesthesia which was first done by William MacEven in the year 1880. But this invention though gold standard is not devoid of certain limitations even today viz., it often requires neuromuscular blockade, stimulates unwanted reflex sympathetic activity and may damage the vocal cords and the tracheal mucosa.[1]An alternative method of using the traditional facemask with or without Guedel's airway was used for anaesthesia in patients who were starved and breathing spontaneously. But even these two devices (facemask, Guedel's airway) had their own limitations. The facial characteristics of individual patients, particularly those with beards or without teeth, do not always conform to the relatively uncompromising shape of traditional facemasks.[1]Whereas the Guedel's airway can prevent the airway obstruction due to tongue fall after induction of anaesthesia but not due to the loss of tone of pharyngeal muscles. It is more difficult to maintain a good seal with the mask for prolonged periods than an endotracheal tube. It not only tires the Anaethesiologist but also keeps his hands unavailable to manage any other emergency during the conduct of anaesthesia.

Astonishingly, more than a century after the introduction of the endotracheal tube anaesthesia, a new invention developed in Great Britain by a determined, single minded anaesthesiologist revolutionised the airway management! The Laryngeal Mask Airway (LMA) was born!

The LMA was conceived and designed by Dr. Archie Brain in UK in 1981 and following prolonged research was released in 1988.[1]Dr. Archie Brain worked on the idea of decreasing the size of the anaesthetic mask so that instead of applying it over the face it could be applied over the laryngeal opening. Seventy prototypes and several thousand patients later the Dunlop Rubber company made some latex and silicone masks to the inventor's specifications.[1] The first independent clinical trial of LMA was carried out at Northwick Park Hospital in 1987 and within one year the design was finalised and four sizes were available.[1] By September 1990 all british hospitals performing operations had LMA on their anaesthesia machines!But this device was also not full proof against complications like aspiration.Hence Dr Brain's penchant for improvisation lead him to the invention of Proseal LMA-the LMA(PLMA) with a drainage tube and an extra cuff dorsally!The PLMA was introduced by Dr.Archie Brain in 2000.[1]It is the most complex and most specialized device and is widely believed to replace all other models of LMA.

But although newer versions are increasingly seen in the Anaesthesiologist's armoury ,the classic LMA has its own place!Hence we decided to compare these two LMAs to find out which LMA sits properly into the laryngopharynx and gives a better seal around the glottis.We also have endeavoured to find out which LMA amongst the

two is better in terms of ease of insertion, time taken for insertion, number of attempts for insertion and the complications.

AIM OF THE STUDY:

To compare Classic LMA andProsealLMA in anesthetised patients coming for Gynaecological surgery in terms of:

1)Fiberoptic view (FOB)

2)Oropharyngeal sealing pressure (OSP)

3)Ease of insertion

4)Time taken for insertion

5)Number of attempts

6)Complications.

HISTORY OFAIRWAY MANAGEMENT & AIRWAY EQUIPMENTS:

1) In 1854, Manuel Garcia (1805-1906), a Spanish vocal pedagogist, was the first man who saw the functioning glottis in a living human. He made a device in which he incorporated two mirrors and used sun as an external light source.

2) In 1858, Eugene Bouchut (1818-1891),a French paediatrician introduced a set of tubes called Bouchut's tubes and deviced a new technique for nonsurgically intubating the trachea via the oral route in order to bypass the laryngeal obstruction caused by diphthericpseudomembrane.

3) In 1878 March, Wichelm Hack from Freiburg described the use of nonsurgical orotracheal intubation for vocal cord polyp removal.

4) In 1880, William MacEwen (1848-1924) , a Scottish Surgeon,was the first person who used orotracheal intubation for giving General Anaesthesia with chloroform.

5) On 23 April 1895, Alfred Kirstein (1863-1922) a German, was the first person to perform direct laryngoscopy using a modified Oesophagoscopeand to visualise the vocal cords directly. He named this device as autoscope.

6) In 1900 Kuhn developed flexometallic tracheal tube.

7) In 1913, Cheavalier Jackson invented a new laryngoscope blade with a light source at the distal tip and reported a high success rate for intubation of trachea using Direct Laryngoscopy.

8) In 1913, Henry .H.Janeway (1873-1921) deviceda laryngoscope which incorporated a distal light source with batteries within the handle.The blade of this laryngoscope had a notch in the centre to keep the tracheal tube in the midline of the oropharynx during intubation and a slight curve to the distal tip of blade to help the passage of the tube through the rima glottis. He thus popularised the widespread use of direct Laryngoscopy and tracheal intubation in the practice of Anaesthesiology.

9) After World War I Sir Ivan Whiteside Magill developed the the Magill forceps and the technique of intubating the trachea in an awake patient blindly via the nasal route.

10) In 1941,Robert Miller introduced the straight laryngoscope blade.

11) In 1943, Sir Robert Reynolds Macintosh (1897-1989) introduced his new curved laryngoscope blade which is the most popular blade currently in use for direct laryngoscopy and intubation.

12) In 1966, Shigeto Ikeda, a Japanese invented the flexible fiberoptic bronchoscope which is illuminated with an external light source.

13) In 1967, Dr. Peter Murphy was the first to use a flexible fiberscope to perform tracheal intubation.

14) In 1980,the use of fiberoptic bronchoscope for endotracheal intubation for giving general anaesthesia was popularised.

15) In 1981,Dr.ArchieBrain invented the Classic Laryngeal Mask Airway.

16) In 1990,the use of LMA and rigid fiberoptic laryngoscopes was popularised .

17) In 2000, Dr.Archie Brain introduced the Proseal LMA.

18) In 2000s the videolaryngoscope like the glidescope was introduced.

LARYNGOSCOPIC ANATOMY[3,4]

The laryngoscopic anatomy or the structures visualised during a laryngoscopy determine the success in securing the airway. But before doing the laryngoscopy it is of utmost importance to bring the oral , pharyngeal and the laryngeal axis in a single line by giving head extension and neck flexion like in sniffing the morning air position.At laryngoscopy, the structure visible first is the base of the tongue and as the scope progresses the valleculae and the anterior surface of the epiglottis become visible. The laryngeal aditus then comes into the view .The inlet of the larynx looks backward and upward into the laryngeal part of the pharynx . The laryngeal aditus is wider in front than behind and is bounded in front by the posterior aspect of the epiglottis, with its prominent epiglottic tubercle. The aryepiglottic folds are seen on either side running posteromedially from the lateral aspects of the epiglottis. The aryepiglottic folds are thin in front but become thicker as they pass backwards where they contain the cuneiform and corniculate cartilages. Within the cavity of larynx , there are two folds of mucous membrane on each side. The upper fold is the vestibular fold and is also called as the false vocal cords whereas the lower fold is the vocal fold also known as the true vocal cords.The vestibular fold is formed by mucous membrane covering the vestibular ligament and is vascular and pink in colour. The vocal cords appear pale in colour and their extension is from the angle of the thyroid cartilage in front to the vocal processes of the arytenoids backwards.[4]The opening in between the vocal cords is triangular and is

called the rimaglottidis. Through the rimaglottidis the upper two or three tracheal rings can be visualised.

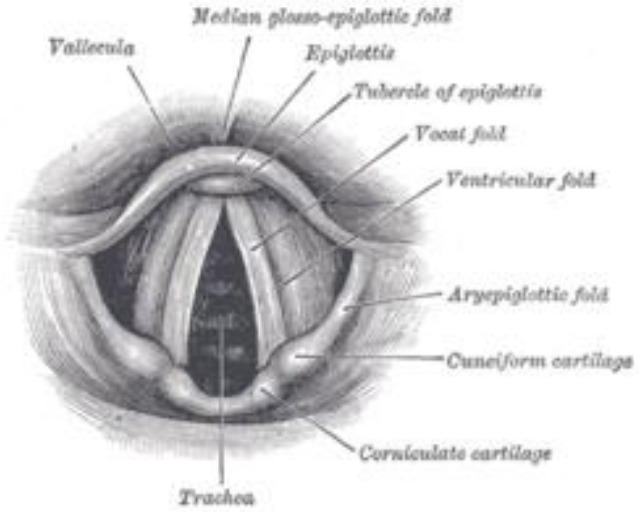


figure-1: anatomy ofglottis

When a Laryngeal Mask Airway sits properly in the larynx , its tip should lie at the upper sphincter of the oesophagus , the margins should lie against the pyriform fossae and the upper end of the LMA should lie behind the base of the tongue. The tip of the epiglottis may rest either within the bowl of the mask or under the proximal cuff.

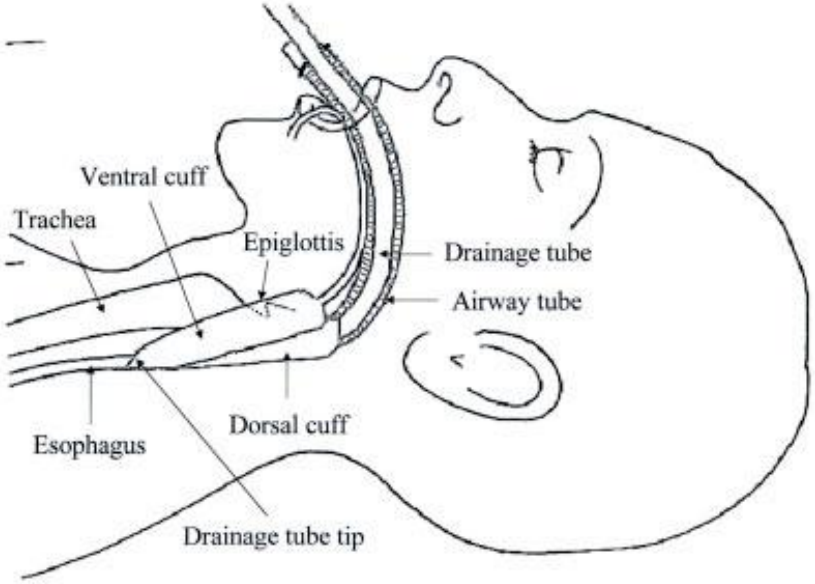


figure-2 : placement of LMA

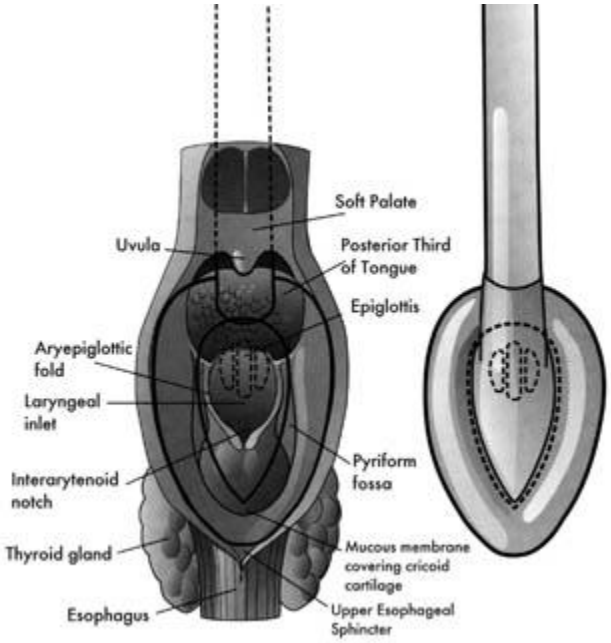


figure-3 : ideal placement of LMA

CLASSIC LMA[5]

The Classic LMA was invented by Dr.Archie Brain in the year 1981 and introduced in the year 1988.

The Classic LMA is made from medical grade silicone . It consists of a curved tube connected to an elliptical spoon shaped mask at a 30 degree angle. There are two flexible vertical bars at the entry of the tube into the mask to prevent obstruction of the tube by the epiglottis. The mask is surrounded by an inflatable cuff. An inflation tube and self-sealing pilot balloon are attached to the proximal wider end of the mask. A black line running longitudinally along the posterior aspect of the tube helps to orient it after placement. At the machine end of the tube it has a standard 15 mm connector.

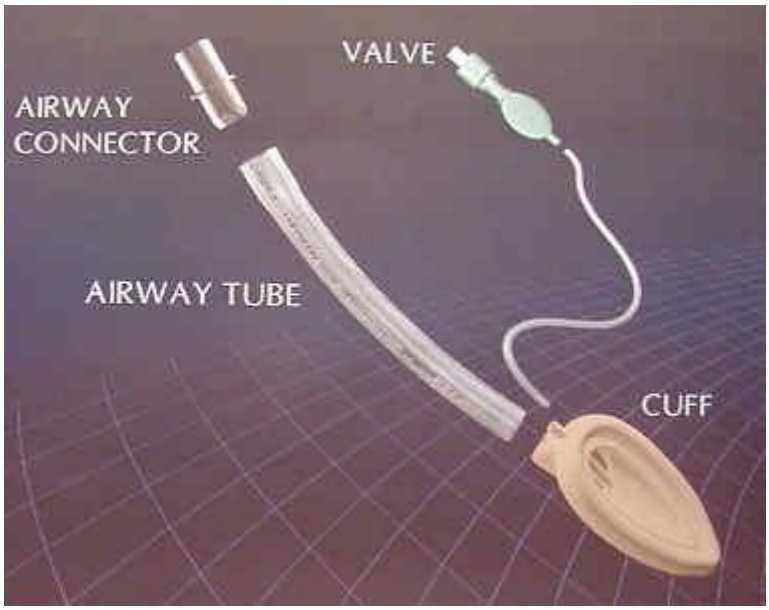


figure-4 : Classic Laryngeal Mask Airway

The Classic LMA is available in 7 sizes and the choice of the correct size is according to the patient's weight. When there is doubt, a larger rather than a smaller size should be chosen for the first attempt.

Indications:

1) As an alternative to mask while giving anaesthesia.
2) As an alternative to endotracheal tube in short procedures where intubation is not necessary.
3) As a rescue device in failed intubation.
4) As an acceptable alternative to endotracheal tube in cardiac arrest patients for airway management.
5) As a tool for airway management in the prehospital setting in patients in whom positioning or prolonged extrication does not allow for endotracheal intubation.
6) As a conduit for intubation for especially when direct laryngoscopy is not successful.

Contraindications: In patients with :

1) restricted mouth opening
2) complete upper airway obstruction
3) increased risk of aspiration.
4) Suspected or known abnormalities of supraglottic anatomy.
5) Need for higher airway pressures(>20 cm of H2O)

INSERTION:

The Classic LMA can be inserted by the following 3 techniques:

1) Standard technique:

This technique involves using a midline or slightly diagonal approach with the cuff fully deflated.The patient should be placed in head extension and neck flexion position. The mouth is opened and holding the LMA like a pen, with the index finger pressing on the point where the tube joins the mask,the tip of the cuff is placed against the inner surface of the upper incisors or gums with the aperture facing anteriorly. The mask is pressed back against the hard palate to keep it flattened as it is advanced into the oral cavity , using the index finger to push upward against the palate. A change of direction can be sensed as the mask tip encounters the posterior pharyngeal wall and follows it downward.By withdrawing the other fingers as the index finger is advanced and slight pronation of the forearm it is often possible to insert the mask fully into position with a single movement.The longitudinal black line on the shaft should lie in the midline facing the upper lip.

2)180 Degree technique:

In this technique the LMA is inserted with the laryngeal aperture pointing cephalad and then rotated it 180 degree as it enters the pharynx.

3)Partial Inflation:

In this technique the LMA cuff is partially inflated before insertion.This has found to increase the success rate of insertion.

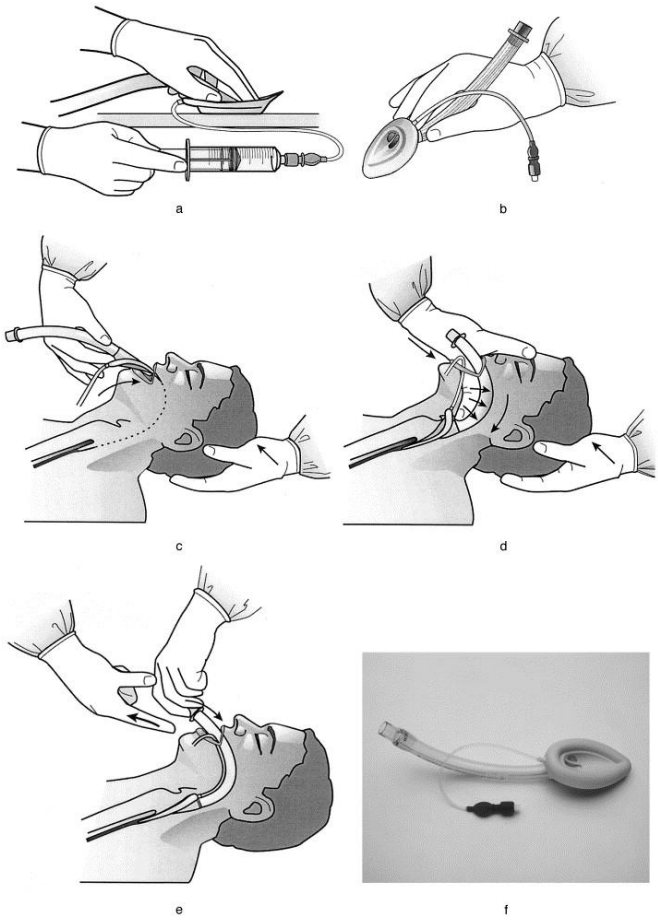


figure-5 : Insertion technique for Classic LMA

PROSEAL LMA[5,6]

The Proseal LMA was introduced by Dr.Archie Brain in the year 2000. It is a modified Classic Laryngeal Mask Airway with an extra cuff dorsally and a drain tube.

It is made from medical grade silicone and can be reused. It has four main parts :a mask, an airway tube, an inflation line and a drain tube.

The mask consists of two cuffs one ventral and another cuff placed dorsally.This dorsal cuff is seen only in larger sizes. The ventral cuff is larger than the cuff of Classic Laryngeal Mask Airway of the same size. The dorsal cuff was added to improve the seal around glottis in such a way that when inflated, it pushes the ventral cuff anteriorly so that the glottis is enveloped within the bowl. The bowl does not have the aperture bars and is deeper than the bowl of Classic LMA.

The airway tube is flexible and wire reinforced.It's diameter is smaller than that of the Classic Laryngeal Mask Airway.

The inflation line is attached to the mask and has an inflation balloon to inflate and deflate the mask.

The gastric drain tube is a unique feature of the ProsealLaryngeal Mask Airway.It is attached to the airway tube with the help of a bite block which prevents biting of the tube and hence the airway obstruction and damage due to it. The gastric tube traverses through the bowl of the Proseal Laryngeal Mask Airway and has an aperture at the distal end to vent the air during accidental gastric insufflation and also to enable the

passage of an orogastric tube.It has a plastic supporting ring distally which prevents it from collapsing on inflating the cuff. The drain tube also prevents the airway tube obstruction due to the epiglottis.

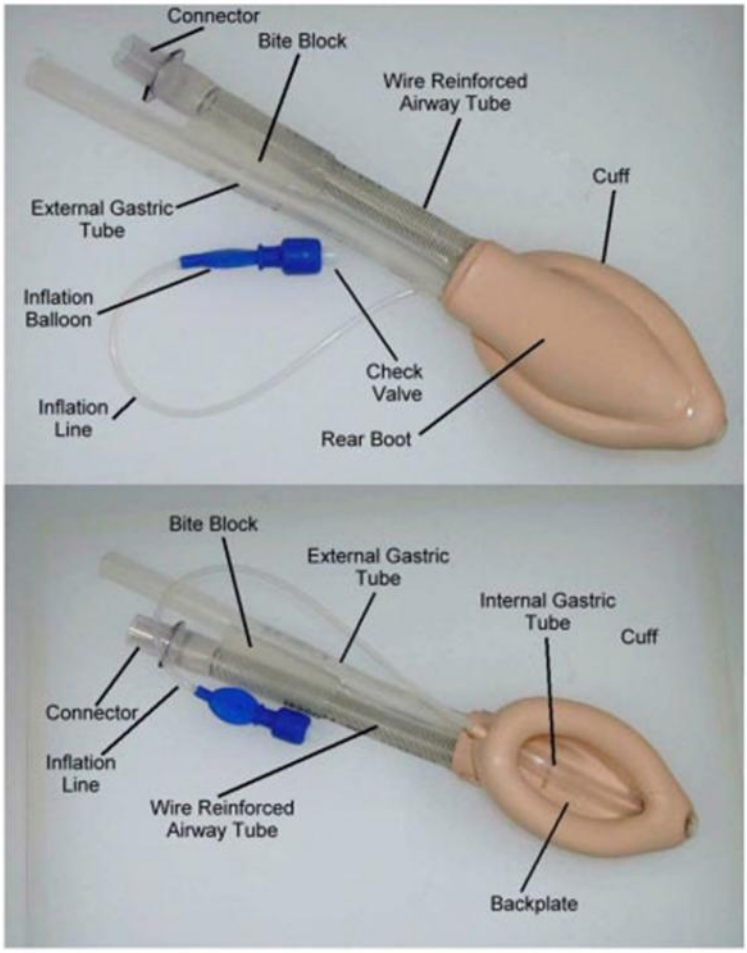


figure-6 :Proseal Laryngeal Mask Airway

Sizes:

Proseal LMA is available in 7 sizes:1, 1.5, 2, 2.5, 3, 4 and 5 and size Selection is similar to Classic Laryngeal Mask Airway.

Indications:

Proseal Laryngeal Mask Airway can be used as a better alternative to Classic Laryngeal Mask Airway in all the indications as mentioned above for the Classic Laryngeal Mask Airway. In addition it can also be used as an airway device in procedures which require access to the gastrointestinal tract like the laparoscopic surgeries.

Contraindications:

1) In non fasting patients.

2) In suspected oesophageal damage the orogastric tube should not be passed through the Proseal LMA.

Insertion Techniques[7]:

The Proseal LMA can be inserted via 2 techniques:

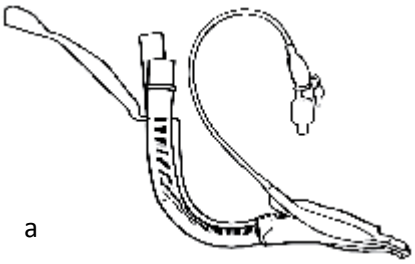
1) **Digital Insertion:**

   This technique is similar to that described for Classic LaryngealMask Airway.

2) **Introducer –guided insertion :**

The introducer is a metal blade with a guiding handle which can be reused and is easily detachable. It is coated with thin layer of silicone on its inner surface and tip to reduce the risk of trauma. Before inserting

the Proseal LMA, the tip of the introducer is placed into the retaining strap of the rear of the cuff. The tube is then folded around the convex surface of the blade and the proximal end of the airway tube is fitted into the matching slot in the tool. The device is then inserted under direct vision by pressing the tip of the cuff upward against the hard palate and flattening the cuff against it as it is slided in. The device is then rotated inwards in one smooth circular movement keeping the introducer blade close to the chin. During the insertion the curve of the introducer must be followed and the device must be advanced into the hypopharynx until a definite resistance is felt. The non-dominant hand should then stabilise the tubes before the introducer is removed. The cuff should be inflated with air enough to obtain an intracuff pressure equivalent to 60 cm of H2O.



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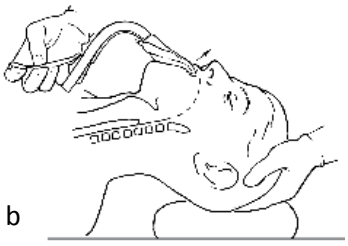

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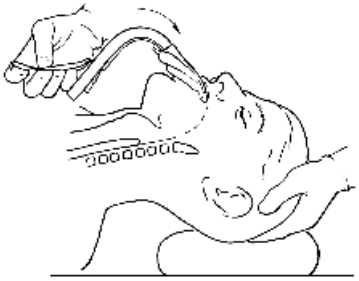

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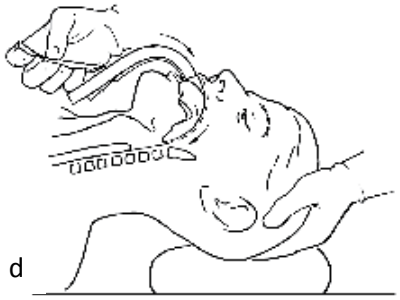

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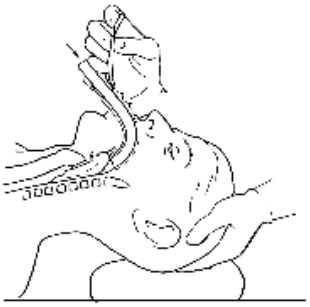
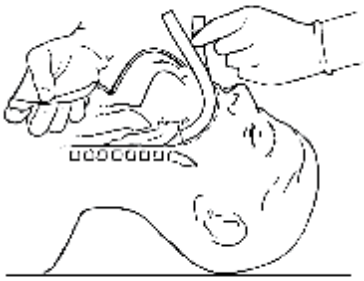
e  f 

figure-7 : Introducer guided insertion of Proseal LMA

Signs of correct placement of Proseal LMA:

1) Bite block placed correctly in between the teeth.

2) Adequate chest expansion on ventilation.

3) A visible square wave capnographic tracing.

4) Seal pressure>20 cm of H2O.

5) Gel displacement test: On the proximal opening of the drain tube of the Proseal LMA, a small amount of a water soluble jelly is laced.The bag is then gently inflated . If the Proseal LMA is correctly seated then the gel should not eject out from the drain tube.

6) The ability to pass an orogastric tube through the drain tube .

7) Fiberoptic examination.

FLEXIBLE FIBEROPTIC BRONCHOSCOPE[8]

It contains a fiberoptic system that transmits an image from the tip of the instrument to an eyepiece or video camera at the opposite end. The main component of the fiberscope is the insertion cord which contains a collection of approximately 10,000 glass fibers, 25 µ each in diameter.Each fiber is coated with a 1 µ layer of glass having a different optical density to keep the light from being lost during transmission.This helps in total internal reflection of the light entering the fiber. Individual fibers cannot provide a good resolution and hence the need for a collection of approximately 10,000 fibers in a bundle. The fiberscope contains another set of fiberoptic bundle to serve as a cable for transmitting light from a light source to the end of the insertion cord. The components of the flexible fiberscope system are :

1)Eyepiece

2)Control section

3)Insertion cord

4)Universal cord for light transmission

5)Light source

The eyepiece contains the lenses. The operator's visual acuity can be focused with the help of an adjustment ring.

The control section of the fiberscope contains the angulation control lever for flexing and de-flexing the distal tip of the fiberscope.Nearly 360º visualization can be achieved along with these movements and rotation of the fiberscope. In adult and larger paediatric fiberscopes , this section also contains the suction or biopsy channel, the connectors and their ports. This channel can also be used for oxygen insufflation, instillation of saline or local anaesthetics, placement of biopsy wire or for suction.

The insertion cord is the most fragile part of the fiberoptic bronchoscope. It encases the fiberoptic and optical bundles , the angulation wires and the channel for suction. The whole thing is encased in an outer sheath. The fiberoptic bundles can break on acute or forcible bending and can appear as black dots in the image and may lower illumination intensity.

The universal cord transmits the light from the light source. It is attached to the fiberscope at the level of the control section.

USES OF THE FLEXIBLEFIBEROPTIC BRONCHOSCOPE:

Diagnostic:

1)To visualize any airway abnormalities.

2)To confirm the position of Endotracheal tube, Laryngeal Mask Airway etc.

3) To dobronchoalveolar lavage or to obtain lung tissue biopsy.

4) For evaluation of a patient with bleeding in the lungs, foreign body, chronic cough and other lung pathologies.

Therapeutic:

1) For removal of foreign bodies in the airway, blood or mucous plugs obstructing the airway.
2) For doing laser resection of benign strictures in the airway.
3) As an aid while doing percutaneous tracheostomy.
4) For insertion of stents as a palliative measure when the tracheobronchial lumen is compressed extrinsically by benign or malignant growths.
5) For intubation of the trachea in patients with difficult airway.

COMPLICATIONS AND RISKS:

Though the complications from flexible bronchoscopy are extremely low, care needs to be taken to avoid trauma to the mucous membrane of the airways , laryngospasm and excessive bleeding while doing biopsy. Fiberoptic intubation should be avoided in presence of pharyngeal abscess and blood and secretions in the oral cavity.

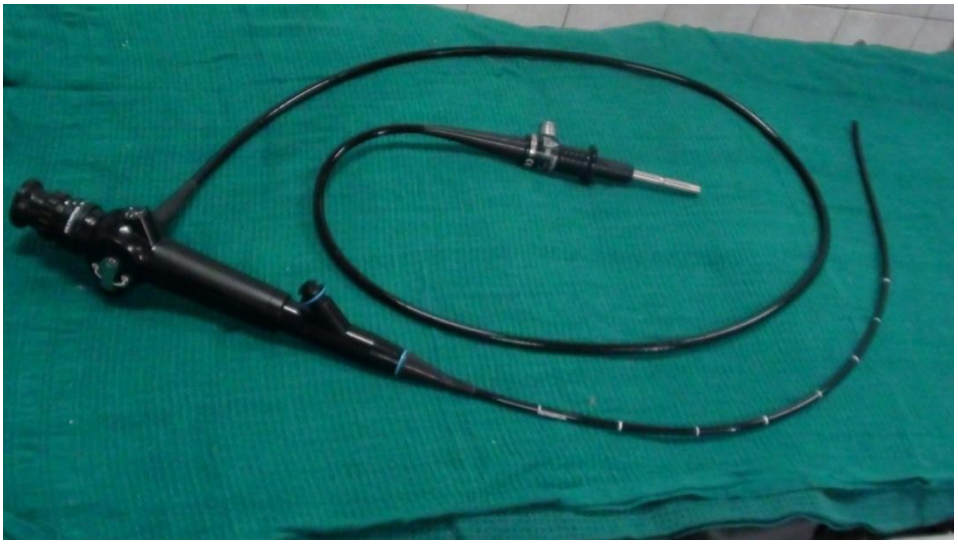


figure-8 : Flexible Fiberoptic Bronchoscope (FOB)

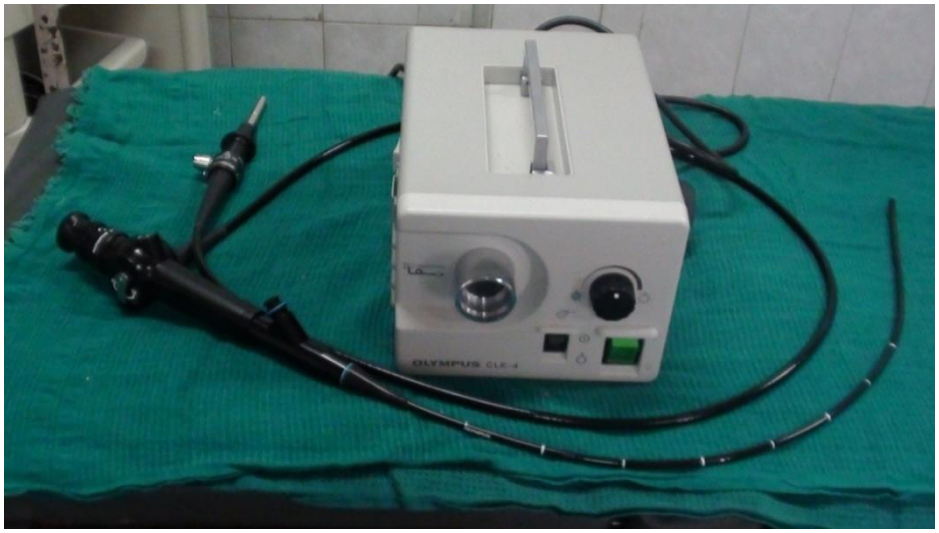


figure-9 : FOB with Light Source.

REVIEW OF LITERATURE

1) **PraveshKanthedet al**[9] conducted a study in anaesthetised paralysed children to compare LMA Classic with LMAProseal.A prospective randomised study was carried out in which 100 children of either sex ,aged 1-8 years,weighing 10-30 kg of ASA physical status I-II who were scheduled for elective lower abdominal or inguinal surgical procedures were enrolled.Children were randomly allocated to either PLMA or CLMA group.After induction of anaesthesia with 50% nitrous oxide in oxygen and sevoflurane(6-8%)and neuromuscular blockade with atracuriumbesylate 0.5 mg/kg the device was inserted.The ease of insertion,no.of attempts were noted.The PLMA or CLMA was connected to a circle breathing system and the cuff was inflated to a pressure of 60 cm H2O using a cuff pressure monitor.After ensuring effective ventilation of the device by bilateral chest movements and square wave capnograph trace on manual ventilation,the oropharyngeal seal pressure was determined by closing the expiratory valve of the circle system at a fixed gas flow of 5 litres/min and recording the airway pressure at which equilibrium was reached.The fiberoptic grading of the airway tube was carried out.The fiberoptic position was graded as 1:vocal cords not seen;2:vocal cords and anterior epiglottis visible;3:vocal cords and posterior epiglottis visible;4:only vocal cords visible.The complications like nausea, vomiting,laryngospasm,bronchospasm ,regurgitation,aspiration,blood on mask and hoarseness were noted.They also noted the ease of insertion of the orogastric tube.The two LMAs

were found to be comparable in terms of ease of insertion, the number of attempts and the time taken for insertion. The OSP was significantly higher for PLMA (18.72 cm of H2O) than CLMA(15.43 cm of H2O). The fiberoptic grading was comparable and no statistically significant difference was found while comparing the complications.They concluded that PLMA had an upper hand over CLMA in paediatric patients due to higher OSP although the other parameters were found to be comparable.

2)**H.Shimbori et al**[10] did a similar study in 60 ASA physical status I-II patients aged 1-6 years weighing 10-20 kg undergoing herniorrhaphy ,myringotomy and orchiopexy.They found that the ease of insertion and airway sealing pressure were similar between the two LMAs.They tested only size 2 LMAwhich lacks a rear cuff.They attributed the similarity between the two LMAs to lack of this rear cuff in the size 2 LMA which is instrumental in forming a better seal than classic LMA.They also found no difference in the fiberoptically determined anatomical positions of the two LMAs.

3)**Duncan Johnson**[11]**et al** also compared LMA Classic and LMAProseal during positive pressure ventilation in children.They randomly allocated 49 children, ASA I and II,10-20 kg to receive either a size 2 CLMA or PLMA.Oropharyngeal leak was defined as airway plateau pressure during inspiratory hold with a closed APL valve and FGF of 200ml/kg/min.A

blinded observer assessed gastric insufflations by epigastric auscultation.They also did not find any significant difference between the 2 groups for OPL.They graded the laryngeal view through a 5.3 mm fiberoptic bronchoscope as:

1)Trachea in line with distal lumen of LMA and clear view of glottis.

2)Glottis and posterior epiglottis visible.

3)Glottis and anterior epiglottis <50% glottis obscured.

4)Glottis and anterior epiglottis >50% glottis obscured.

5)Glottis not seen.

Grades 1-3 were taken as satisfactory.

Laryngeal view was rated as satisfactory more often with the PLMA.Thus they concluded that size 2 CLMA and PLMA have similar functional characteristics during IPPV with a manageable airway leak in most patients at Pinsp<20 cm H2O but for fiberoptic laryngoscopy,the PLMA is a significantly better conduit.

3) **Brimacombe J**[12] compared PLMA with the standard LMA in 60 adult patients who were anaesthetised and paralysed.They inserted both the devices in each patient and observed the oropharyngeal sealing pressure and fiberoptic view during inflation of cuff from 0 to 40 ml in 10 ml increments. They also studied the ease of insertion of Proseal LMA with and without the introducer. They found that it was more difficult to insert the PLMA unless an introducer tool was used.Airway seal pressure

was found to be 8-11 cm H2O higher for the PLMA at all cuff volumes (P<0.00001) and was higher in female patients for both devices.Fiberoptic position was found to be better with the LMA at all cuff volumes(P<0.00001)but vocal cord visibility was similar. For PLMA,gastric tube placement was successful in all the patients.

4) **A.I.J.Brain[13] et al** introduced the LMA Proseal via a preliminary study by comparing it with the standard Laryngeal Mask Airway in 30 adult female patients undergoing procedures under general anaesthesia.They paralysed all the patients before inserting the devices.They defined effective ventilation as ability to achieve expired tidal volume of more than 8 ml/kg.They found that ease of insertion was equal for both the devices.The insertion tool did not affect the ease of insertion.At an intracuff pressure of 60 cm of H2O, they found the mean seal pressures were twice as high with the Proseal LMA as with the standard LMA.They graded the fiberoptic view as 1=full view of cords, 2= view of cords partially blocked by epiglottis, 3=only arytenoids visible, 4= no laryngeal structures visible. A score of 1 was found in 15 Proseal LMA s and 13 Classic LMAs, whereas scores of 2 and 3 were found in 5 Proseal and 7 Classic LMAs.But statistically the difference was not significant.They found that the nasogastric tube insertion was easy in 28 patients and difficult in 2 patients in the proseal LMA.The complications were comparable between the two LMAs in their study.

5) **Brimacombe J[14] et al** also did a multicenter study in 2002 in which three hundred eighty four anesthetised but nonparalyzed patients were subjected randomly to PLMA or CLMA for airway management .They also subjected 50% of the patients randomly for orogastric tube placement . The intraoperative data was noted by the unblinded observers while the postoperative data was collected by blinded observers.They had a higher first attempt success rate for the CLMA (91 vs 82 %,P=0.015).The time taken to achieve an effective airway with the CLMA was less than that for PLMA(P=0.02).But the PLMA was found to provide a more effective seal (P<0.0001).They found a better view fiberoptically with the CLMA(P<0.0001).Orogastric tube insertion was found to be more successful after two attempts (P<0.0001) and quicker with the PLMA.They also had failure of PLMA twice in the form of leak and stridor and of the CLMA once due to laryngospasm .Total intraoperative complications and incidence of sore throat were similar for both the groups.Their conclusion was that in anesthetized,nonparalyzedpatients ,it was easier and quicker to insert the CLMA but the oropharyngeal seal was better and the placement of orogastric tube placement was faster in patients with PLMA.There was no statistically significant difference between the two groups in terms of intraoperative and postoperative complications.

6) **Lardner DR [15]et al** had done a study comparing the two LMAs in ventilated children receiving neuromuscular blockade.They conducted a randomized,controlled,single-blinded study in 51 ASA I or II children weighing 10-20 kg .They found that the oropharyngeal leak pressure

measured by neck auscultation was higher for the PLMA compared to the CLMA (P=0.009) .But when they measured the oropharyngeal leak pressure by inspiratory hold maneuver they did not find any significant difference.The fiberoptic view of larynx was found to be satisfactory more often with the PLMA rather than the CLMA group(P=0.003).Gastric insufflations during leak determination was more common with the CLMA (P=0.006).They concluded that the size 2 PLMA gave a higher leak pressure by auscultation and lesser gastric insufflation compared to CLMA in children undergoing IPPV with neuromuscular blockade and that the fiberoptic view was markedly better with the PLMA.

7) **Bimla Sharma [16]et al** did a comparative evaluation of respiratory mechanics of PLMAversus I-gel in patients undergoing laparoscopic cholecystectomy.They evaluated both theLMAs in terms of dynamic compliance,the oropharyngeal sealing pressure and the fiberoptic view.They studied the respiratory mechanical parameters(dynamic compliance,resistance,work of breathing,measured minute ventilation and peak airway pressures) of the two LMAs using the respiratory mechanics module(RESP MECH MODULES M F 4RM0777G,GE Medical Systems by Novametrix Medical Systems,Wallingford,USA) and found that the respiratory mechanics parameters using the two devices were comparable apart from the dynamic compliance,which was significantly higher with i-gel($P<0.05$).The oropharyngeal leak pressure ,as measured by closing the expiratory valve of the circle at a fixed gas flow of 5 litres/min and

recording the pressure at which an audible sound was heard from the mouth,was higher for PLMA(P=0.007).The fiberoptic grading was comparable in the two groups but malrotation was found more commonly with the i-gel.They concluded that both the LMAs provided optimal ventilation and oxygenation but the PLMA formed a better seal while the i-gel provided a higher dynamic compliance.

8) **Woo Y C[17] et al** did a study in which they compared PLMA with Streamlined Liner of the Pharynx Airway(SLIPA) in mechanically ventilated paralyzed patients undergoing laparoscopic gynaecologic surgery.One hundred and one patients were subjected to SLIPA or PLMA group.They found the two devices to be comparable in terms of insertion success rate,gastric insufflations,perilaryngeal leakage,fiberoptic view,respiratory mechanics and severity of sore throat and incidence of blood and regurgitated fluid on the device.However they found that SLIPA caused less perilaryngeal gas leakage than the PLMA with change in head positionand during insufflations of the peritoneal cavity.

9) **Janakiraman C[18] et al** compared Classic LMA with i-gel in 50 spontaneously breathing anaesthetised patients and found that the success rate for insertion on first attempt was more for Classic LMA, the oropharyngeal leak pressure was higher for the i-gel(20 cm of H2O against 17 cm of H2O for CLMA) and the fiberoptic view was significantly better with the i-gel than the Classic LMA.

10) **Natalini G**[19] **et al** compared the Proseal LMA with the Classic LMA in 60 obese patients undergoing surgery under mechanical ventilation. They found that the mean leak fraction was 6.1 (SD 2.9%) with the Classic LMA and 6.4% (3.5%) with the Proseal LMA (P=0.721). The cuff pressure was found to be >100 cm H2O in 7% of the Proseal LMA and 38% of the Classic LMA groups.They also found that the incidence of sore throat was similar in both the groups and was not related to the cuff pressure. They concluded that both the LMAs can be used for mechanical ventilation in obese patients but the Classic LMA requires higher cuff pressures than the Proseal LMA.

11) **T.M.COOK** [20] **et al** did a randomised study comparing Proseal LMA and Classic LMA in anaesthetised, unparalysed patients and found that the Proseal took more time and attempts for insertion than the Classic LMA. The amount of air required to achieve an intracuff pressure of 60 cm of H2O was 6 ml more for size 4 and 12 ml more for size 5 for the Proseal LMA than that in Classic LMA.They found the median seal pressure to be 29 cm of H2O with the Proseal and 18 cm of H2O with the Classic LMA. They concluded that the Proseal LMA was more difficult to insert than the Classic LMA but remained stable and allowed positive pressure ventilation more reliably than the Classic LMA.

12) **SumanSarkar[21] et al** did a study on use of the proseal laryngeal mask airway in facilitating percutaneous dilatational tracheostomy in 60 patients in intensive care unit.They found that pro-seal LMA provides a reliable airway and allows effective during percutaneous tracheostomy .They inserted a fiberoptic bronchoscope through the proseal LMA to aid the correct placement of the guidewire and found that the passage of the fiberscope through the poseal LMA was easy and provided a good and clear view of the glottis as well as trachea.

13) **UdayAmbi[22] et al** compared classic and proseal LMA in 50 paralyzed and anaesthetized adult patients .They concluded that the proseal LMA caused minimum change in the haemodynamics on insertion and formed a reliable airway securing device as it formed an effective glottis seal and ensured better ventilation than classic LMA.

14) **Soad A. Mansour [23] et al** compared the safety and efficacy of proseal LMA with classic LMA and endotracheal tube during elective surgery in paralysed adult patients.They found that there was significant haemodynamic response in all 3 groups on insertion as well as removal of device. Thefiberoptic score was comparable in both the LMAs.The rate of insertion was also comparable.Oxygenation and ventilation after carboperitoneum was optimum in proseal LMA and endotracheal tube but was suboptimal in the classic LMA.They found that the complications like sore throat, bronchospasm and postoperative

vomiting were more common with endotracheal tube and less in both the LMAs.

15) **Brimacombe[24] et al** assessed the stability of Classic LMA and Proseal LMA in various head and neck positions in thirty anaesthetised and paralysed adult male patients.They found that both the LMAs had a stable anatomical position despite changes in headand neck positionsas judged with fiberoptic bronchoscope. The head and neck flexion and rotation were associated with an increase and head and neck extension a decrease in oropharyngeal sealing pressure and intracuff pressure.

16) **Bikramjit Das[25] et al** compared classic and proseal LMA in paediatric patients and found that both the LMAs were comparable in terms of hemodynamic response and oropharyngeal sealing pressure . The time taken for insertion and the airway trauma was found to be more with proseal than classic LMA in their study.

17) **Tulay Hosten[26]et al** compared supreme LMA and proseal LMA in anaesthetised patients posted for laparoscopic cholecystectomy and found the oropharyngeal sealing pressure to be comparable in both the groups.The first attempt success rate was equal in both the LMAs. The mean airway device insertion time was significantly shorter with supreme LMA.The pharyngolaryngeal morbidity was also similar in both the groups.

18) **Lee AK [27] et al** compared Proseal LMA with single use Supreme LMA and found no difference between the two in terms of ease of insertion. The Proseal LMA was found to have significantly higher oropharyngeal sealing pressure than the supreme LMA. (31.7±6.3 vs 27.9±4.7 cm H2O). The tidal volume also was found to be lower with the supreme LMA.There was no difference between the two groups in the incidence of complications.

19) **Joo Hyun Jun[28]et al** in their study compared the ease of Proseal LMA insertion and the fiberoptic scoring in the presence of a difficult airway and with different head position.They concluded that a difficult airway and a change in head position did not alter the ease of PLMA insertion and the fiberoptic score.They recommended that the head position can be selected according to the individual patient's condition.

20) **Seet[29] et al** did a study in which they used a manometer to limit the LMA cuff pressure to less than 44 mm Hg and compared the incidence of complications with a control group without limitation of pressure.They found that limiting the LMA cuff pressure reducespharyngolaryngeal complications by 70% .

MATERIALS AND METHODS:

STUDY DESIGN:

This study was conducted in Institute of Obstetrics and Gynaecology, Chennai from January 2012 to March 2012.The study was a single blinded,randomised,prospective comparative evaluation of the two supraglottic devices.

Study setting and population:

After obtaining institutional ethical committee clearance,sixty ASA I-II female patients undergoing short duration gynaecological surgeries under general anaesthesia were enrolled for the study.The insertion of the devices and collection of the data was done by the author.

Patient selection:

Inclusion criteria:

1)18-60 years

2)BMI<30 kg/m2

3)ASA I-II

4)MPC I-II airway

5)surgery:elective minor short duration

6)who have given valid informed consent

Exclusion Criteria:

1)not satisfying inclusion criteria

2)Patients with difficult airway

3)pregnant female

4)history of gastro oesophageal reflux disease

5)Patients with acute or chronic respiratory disease.

6)Patients with musculoskeletal abnormality affecting cervical vertebra

7)Patients with history of allergic reactions to the drugs used in the study

The current study was designed to find out whether a functional difference exists between LMAProseal and LMA Classic in terms of ease of insertion,airway leak, fiberoptic laryngeal view and the complications.

The sample size was calculated using G power analysis to get an expected 30% difference between the two groups in ease of insertion,oropharyngeal leak pressure,fiberoptic view and the complications.

The patients were randomly assigned to one of the two groupsviz Group P (Proseal) and Group C (Classic)using a closed envelope with predetermined numbers and then single blinded.

The patients were evaluated the day before surgery with complete medical history,physical examination and investigations.They were kept fasting overnight and tab.Ranitidine 150 mg and tab.Metoclopramide 10 mg were given as acid aspiration prophylaxis the night before surgery.

In the operation theatre,ECG,Pulse oximeter and Non invasive blood pressure monitors were connected.The patients were premedicated with Inj.Glycopyrrolate 0.2 mg I.M., Inj.Ranitidine 50 mg and Inj.Metoclopramide 10 mg I.V half an hour before induction of general anaesthesia. Inj.Fentanyl 2 µg/kg was given to all patients 5 mins prior to induction.The patients werepreoxygenated with 100% oxygen for 3 minutes.Preinduction baseline cardio-respiratory parameters like Heart Rate (H.R.), Blood Presure (B.P) and oxygen saturation (SpO2) were recorded.Anaesthesia was induced with Inj.Propofol 2mg/kg I.V followed by neuromuscular blockade with inj.Atracurium 0.5 mg/kgI.V.Patient was ventilated with bag and mask withsevoflurane 2% and oxygen for 3 minutes and an appropriate sized LMA,based on body weight was inserted.The patient was given a "sniffing" position by giving head extension and neck flexion.In patients weighing between 30-50 kg size 3 LMA was used and in patients weighing between 50-70 kg size 4 LMA was used in both the groups as per the manufacturer's instructions.Both the devices were inserted by the standard technique as per the manufacturer's instructions. ProsealLMA was inserted without the introducer to maintain parity between the insertion techniques of both the LMAs.After insertion the cuff was inflated with the recommended volume of air for that particular size.The proper insertion of LMA was confirmed by ability to achieve effective ventilation that is adequate chest movement bilaterally and the ability to achieve an expiratory tidal volume of 7 ml/kg.The LMA was fixed and the cuff pressure was checked with the help ofPortex cuff pressure monitor and ensured to be 60 cm of H2O.Anaesthesia was maintained with oxygen in nitrous oxide (1:3) with sevoflurane 1-2% and additional doses of Injatracurium if the

patient came out of neuromuscular blockade before the end of surgery.The ease of insertion,the number of attempts for insertion and the time taken for insertion were recorded. Then the H.R.,B.P. and the SpO2at 1 and 5 minutes post insertion of LMA were also noted down. The LMA cuff pressure was checked twice intermittently and was maintained below 60 cm of H2O.

Easeof insertion was graded as:

1-easy, without any resistance

2-difficult, with some resistance.

3-impossible

In case of failure to insert the LMA properly as judged by an audible leak or inability to achieve adequate chest expansion,the device was removed and reinserted.Maximum three attempts were allowed and if effective ventilation could not be achieved endotracheal intubation was planned.

Time taken for insertion was defined as time elapsed between picking up of an airway device in hand and achieving effective ventilation.

The oropharyngeal leak was determined by closing the adjustable pressure limiting (APL) valve of the circle system at a fixed gas flow of 3 litres/min and recording the airway pressure at which equilibrium was reached(maximum allowed was 40 cm H2O).Equilibrium was taken as the point at which an audible leak could be heard from the mouth.The Dragger machine with the provision of recording airway pressures was used.

After recording the above observations,a 4.9 mm fiberoptic bronchoscope was passed through the LMA till its tip lies 1 cm proximal to the end and the view was assessed by a standard score devised by Brimacombe and Keller.

Grade1:vocal cords not seen

Grade 2:vocal cords and anterior epiglottis seen

Grade 3:vocal cords and posterior epiglottis seen

Grade 4:only vocalcords seen.

Grade 3 and 4 were taken as desired views,grade 2 as satisfactory while grade 1 as non satisfactory view.

The surgery was then allowed to commence and intraoperative and postoperative complications like bronchospasm,aspiration,nausea,vomiting,sore throat and blood staining of the device after removal were noted and treated.

At the end of surgery,sevoflurane was cut off,the neuromuscular blockade was reversed with Inj.glycopyrrolate and inj.neostigmine and the LMA was removed when patient was conscious and obeying commands.Patient was shifted to recovery room and observed for 6 hours and the sore throat was assessed immediately and 6 hours after surgery.

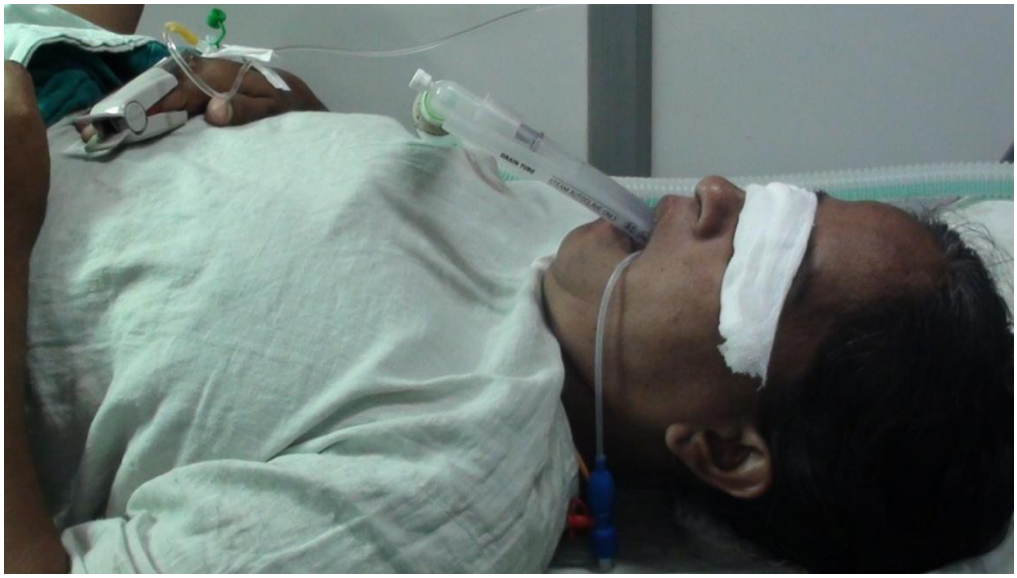


figure-Anaesthesia with Proseal LMA.

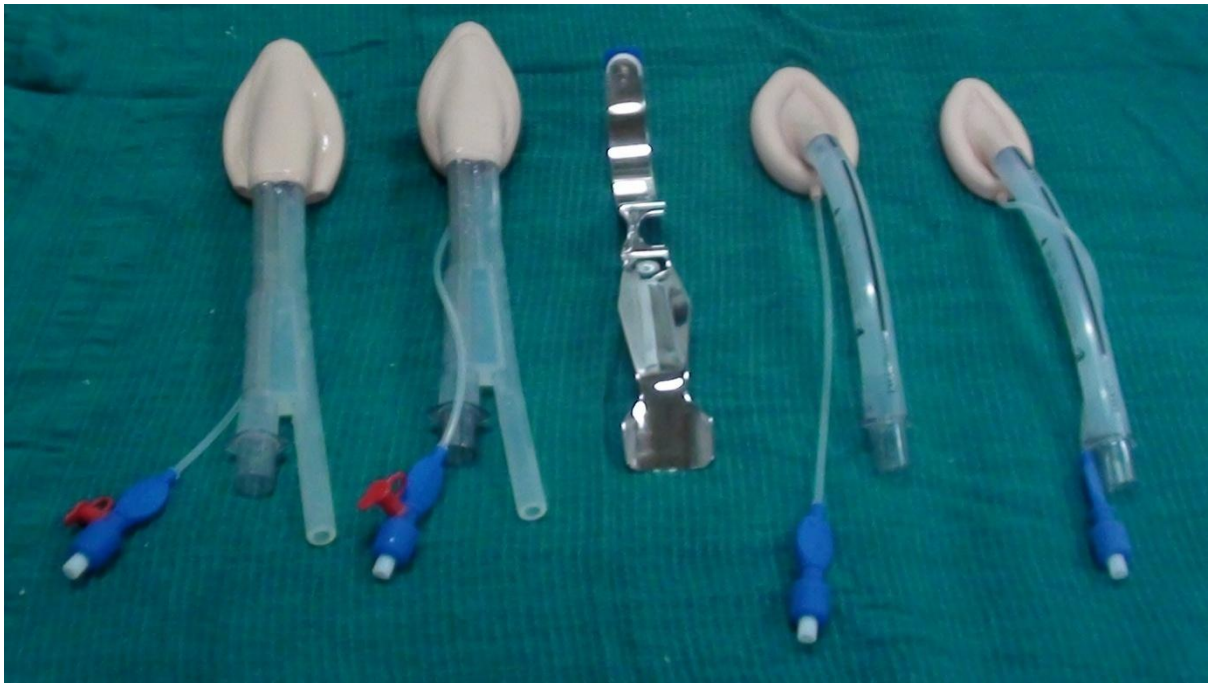


figure- Size 3 and 4 Classic and Proseal LMA.

figure-Portex cuff pressure manometer.

OBSERVATIONS AND RESULTS:

This study was conducted in sixty ASA I-II adult female patients who underwent elective short duration gynaecological surgical procedures. It was ensured that they had fulfilled the inclusion and exclusion criteria as mentioned in the chapter materials and methods.

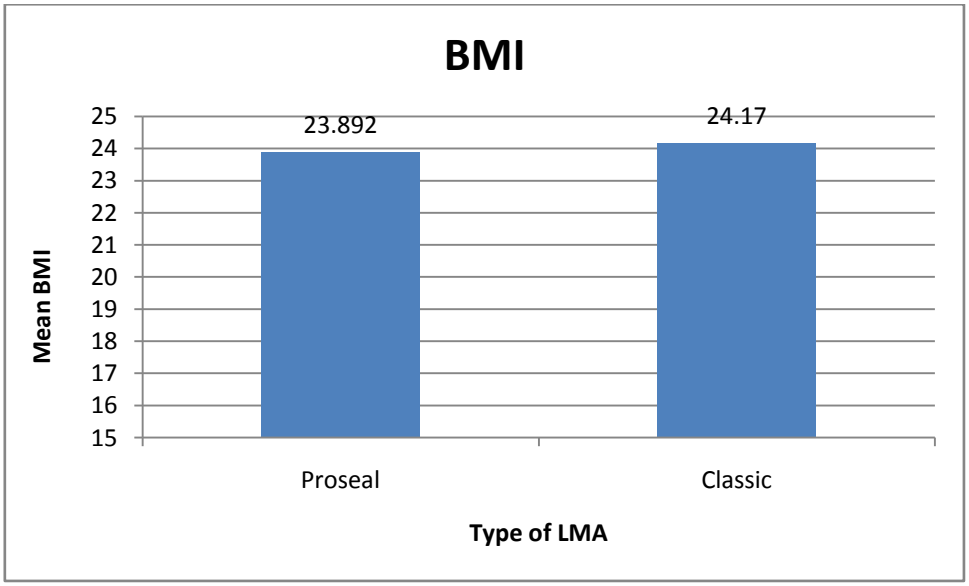
The data was analysed using the SPSS software version 17.0. The qualitative parameters such as ease of insertion,number of attempts,fiberoptic view and the complications were analysed using the Pearson Chi-square test. The quantitative parameters such as demographic data,the time taken for insertion,the oropharyngeal sealing pressure (OSP) and the haemodynamics were analysed using the students t test.

The p value less than 0.05 was taken as significant.

Demographic Characteristics :

The two groups P and C were comparable with respect to the demographic characteristics. There was no significant difference between the two groups in terms of age in years or the BMI.

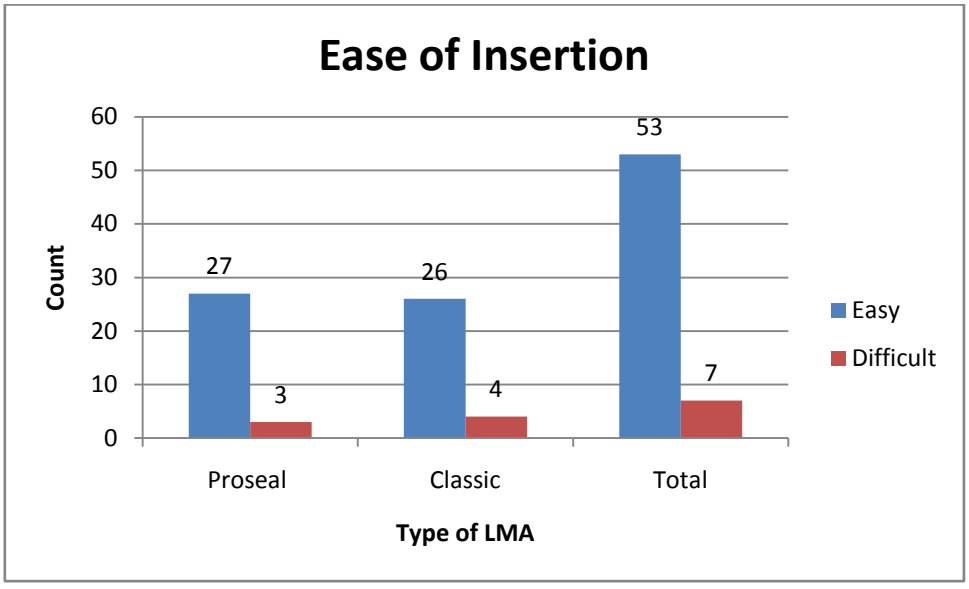
	Group P	Group C	P Value	Statistic Significance
Age	38.63	42.17	0.138	NS
BMI	23.89	24.17	0.649	NS



Ease of Insertion :

	Group P	Group C	Total
Easy	27	26	53
Difficult	3	4	7
Total	30	30	60

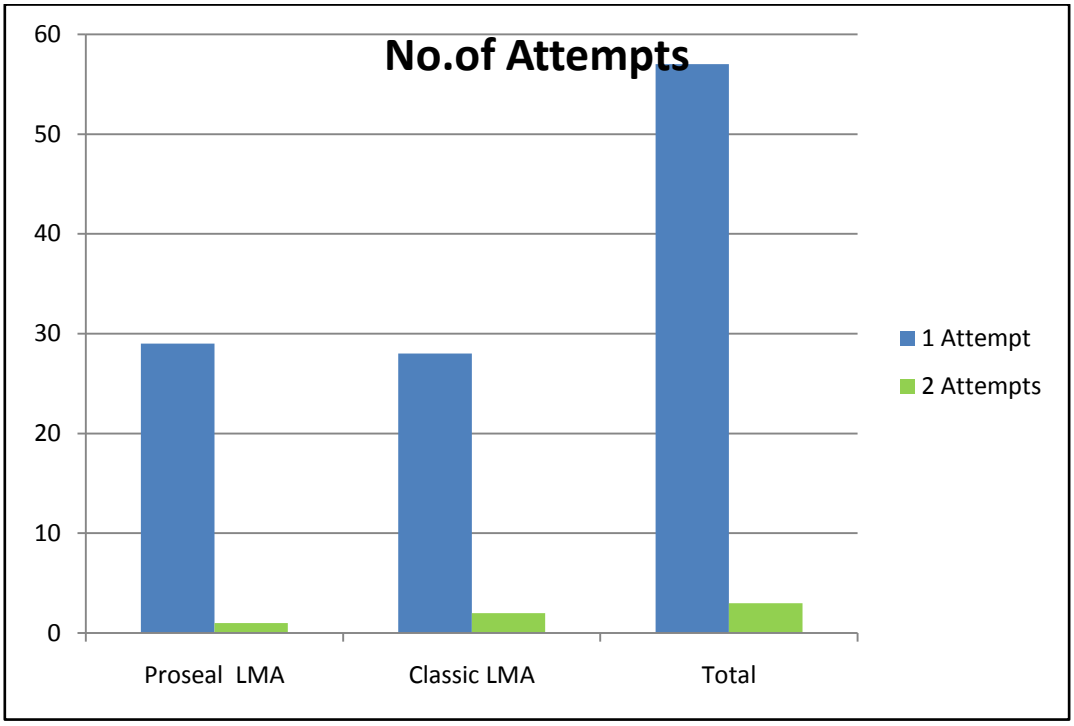
The ease of insertion of both the devices was comparable and the difference was not significant statistically (p =0.688). Out of the total number of 60 patients, the insertion was easy in 53 cases and was difficult in only 7 cases. 90% of the cases of Proseal LMA had easy insertion whereas 86.7% cases of Classic LMA had easy insertion. This is evident from the table and charts.There were no cases of failure of LMA insertion in both the groups.



Number of Attempts Required for Insertion :

No of attempts	Group P	Group C	Total
First	29	28	57
Second	1	2	3
Total	30	30	60

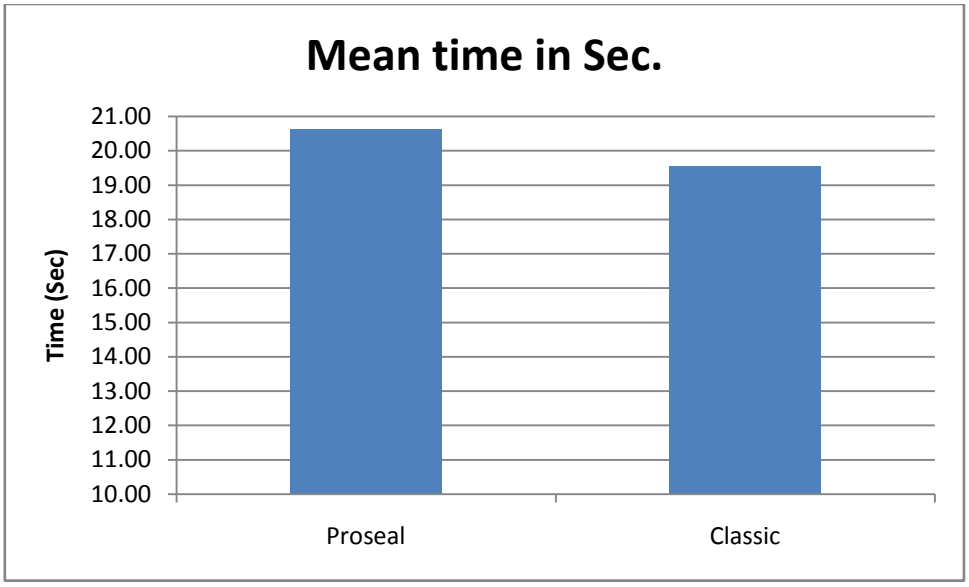
The number of attempts required for insertion was also comparable and the difference was not statistically significant (p = 0.554). Out of the total number of 60 patients, the insertion was achieved in first attempt in 57 patients and second attempt was required only in 3 cases out of which 2 were for Classic LMA and one was for Proseal LMA.



Time Taken for Insertion :

	Group P	Group C	P Value	Statistic Significance
Mean Time (Sec)	20.63± 3.908	19.53± 6.067	0.407	NS

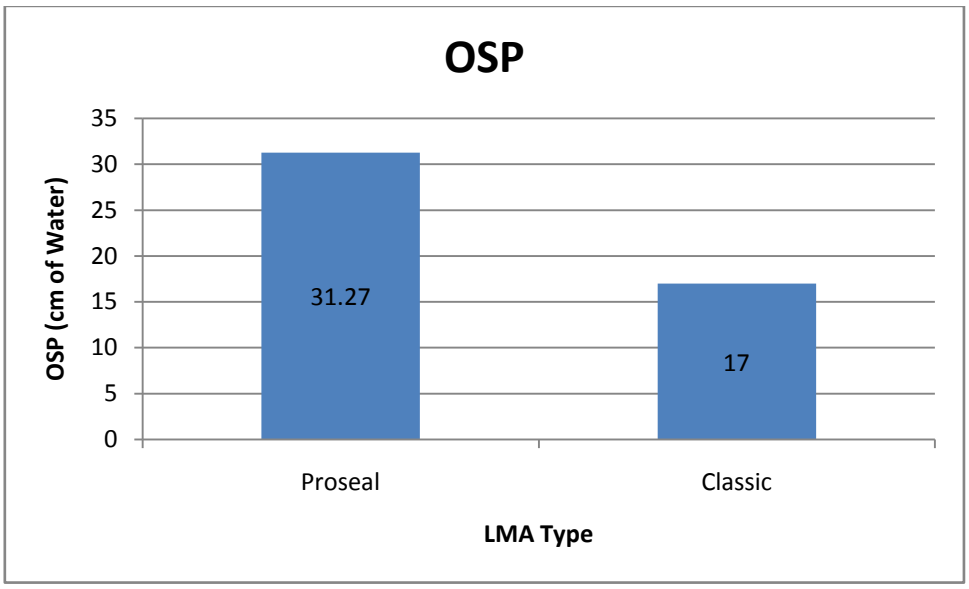
Time taken for insertion was also comparable and the p value was 0.407 and was not significant statistically.The mean time required for insertion of Proseal LMA was 20.63 seconds as against the mean time of 19.53 seconds required in case of Classic LMA.

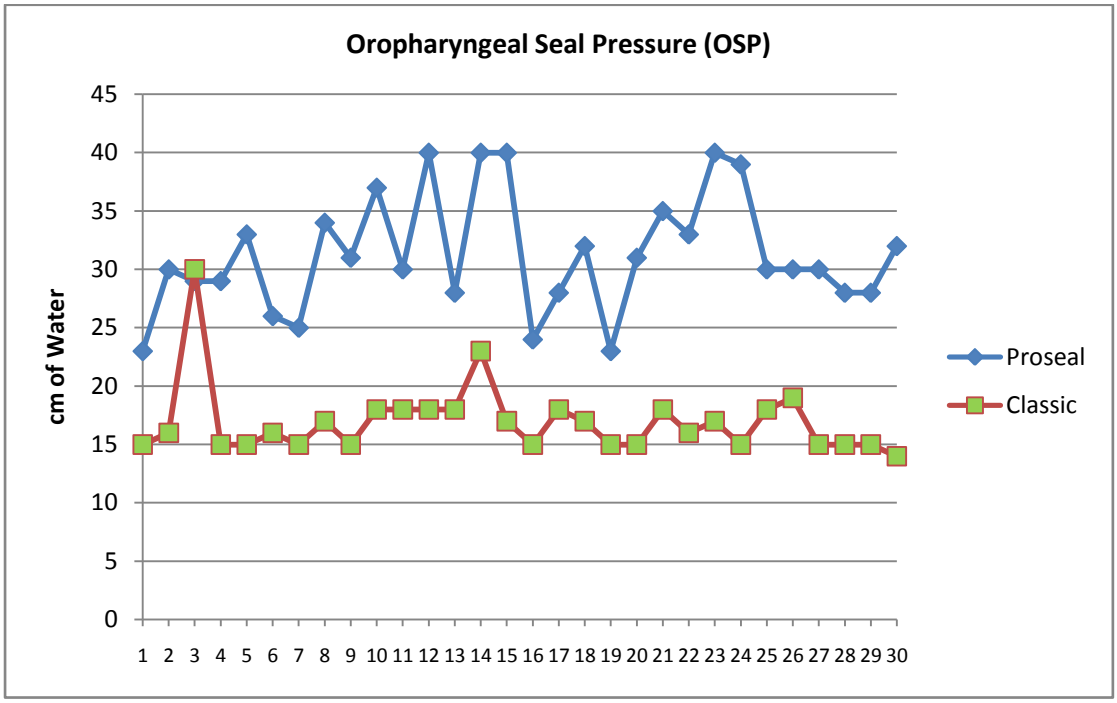


Oropharyngeal Sealing Pressure (OSP) :

	Group P	Group C	P Value	Statistic Significance
OSP (cm of water)	31.27± 5.065	17.00± 2.464	< 0.001	S

The oropharyngeal sealing pressure was found to be significantly higher with the proseal LMA. The mean OSP achieved with PLMA was 31.27 cm compared to 17 cm of H20 with the Classic LMA. The p value was <0.001 and was statistically significant.The maximum OSP with PLMA was 40 cm of H2O and it was achieved thrice. The maximum OSP with CLMA was 30 cm of H2O but it was attained only once.





Fiberoptic Score :

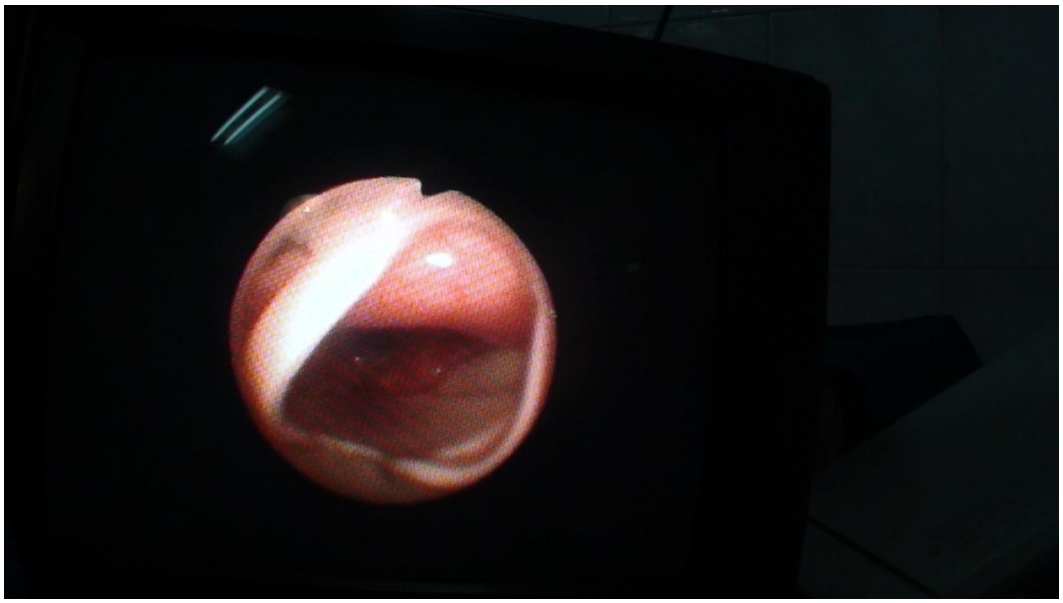


figure- Grade 2 view

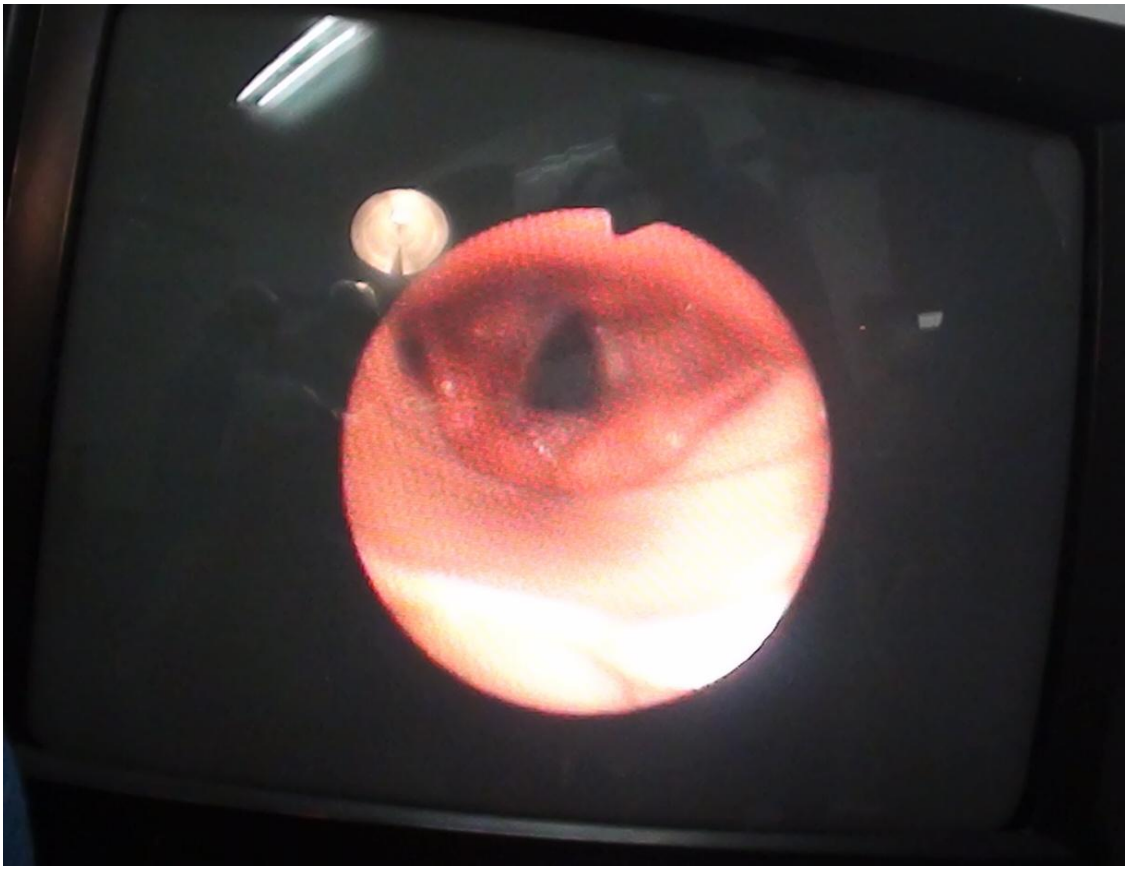


figure- Grade 3 view

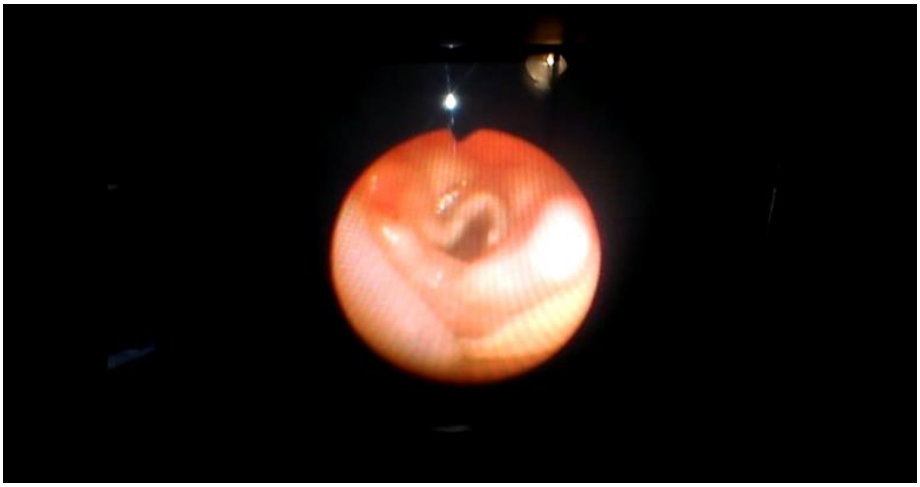
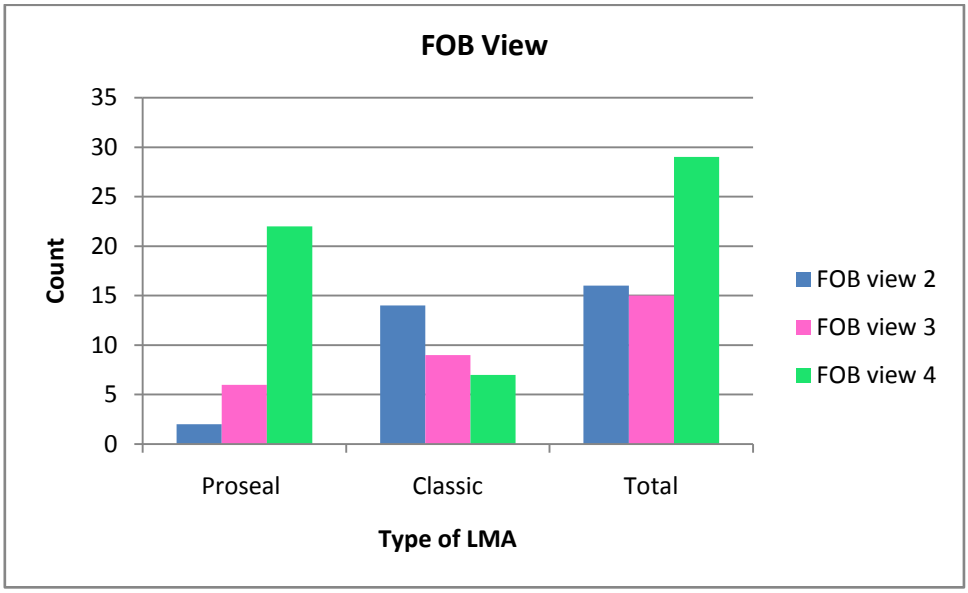


figure- Grade 4 view

	Group P	Group C	Total	P- Value	Statistical Significance
FOB view 2	2	14	16	<0.001	S
FOB view 3	6	9	15		
FOB view 4	22	7	29		

The fiberoptic view was found to be significantly better with the Proseal LMA than the Classic LMA. Grade 3 and Grade 4 were taken as the desired views whereas Grade 2 was taken as satisfactory. It was seen that, out of 30 patients with Proseal LMA, the view was Grade 4 in 22, grade 3 in 6 and Grade 2 in 2patients. Whereas, Classic LMA gave Grade 4 view in 7 patients, Grade 3 view in 9 patients and Grade 2 view in 14 patients out of the total number of 30. None of the patients in both the groups had Grade 1 view. This difference is highly significant statistically with the P-value being less than 0.001. Out of the total number of 44 cases which gave the desirable view i.e., Grade 3 and Grade 4 FOB views, 63.6 % cases were those of Proseal LMA and only 36.7 % cases were those of Classic LMA. Within the total number of 30 cases each of Proseal LMA and Classic LMA, the desirable view was achieved in 93.3% cases of Proseal LMA and only 53.3% cases in case of Classic LMA.


FOB View
35
30
25
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10
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Count
Proseal
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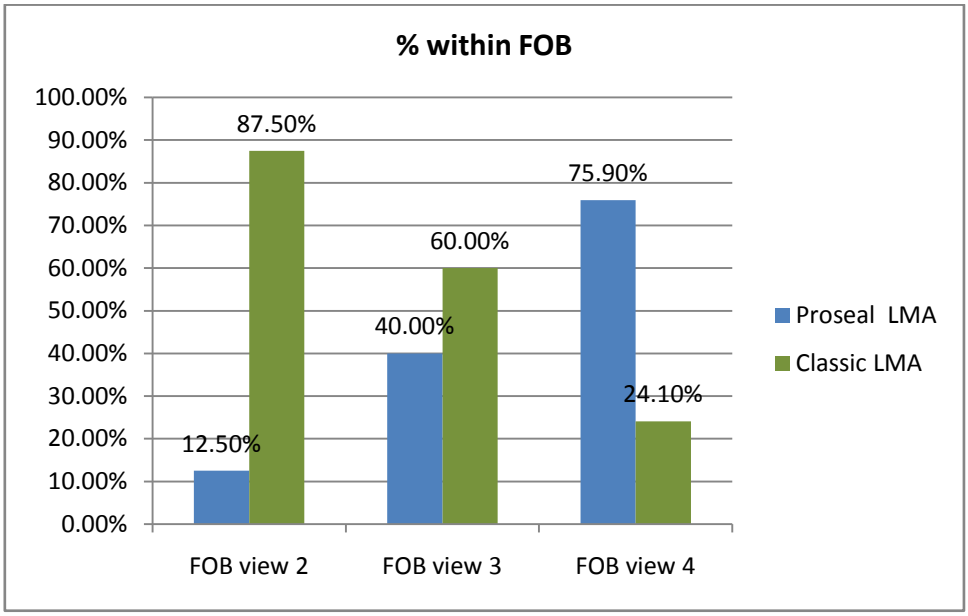
Type of LMA
FOB view 2
FOB view 3
FOB view 4


% within FOB
100.00%
90.00%
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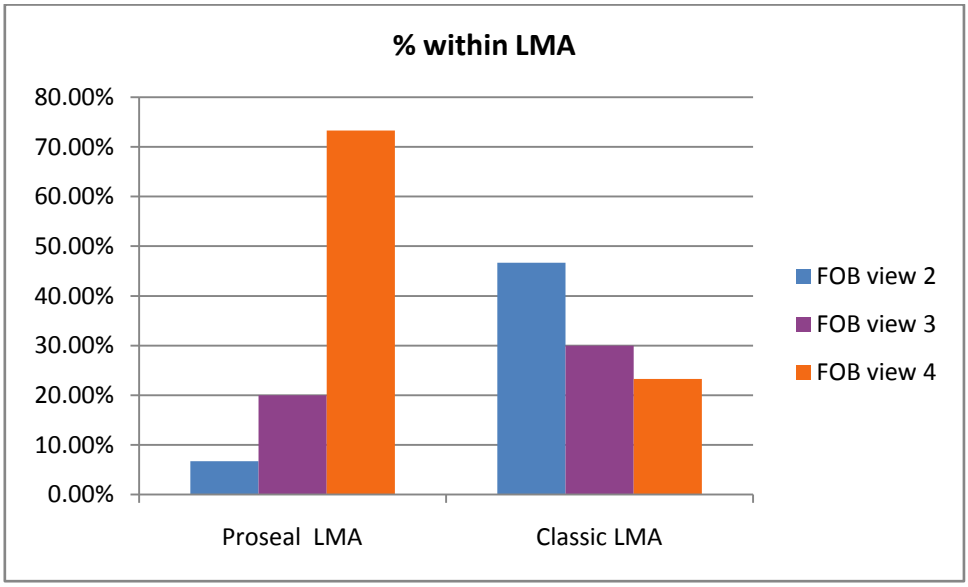
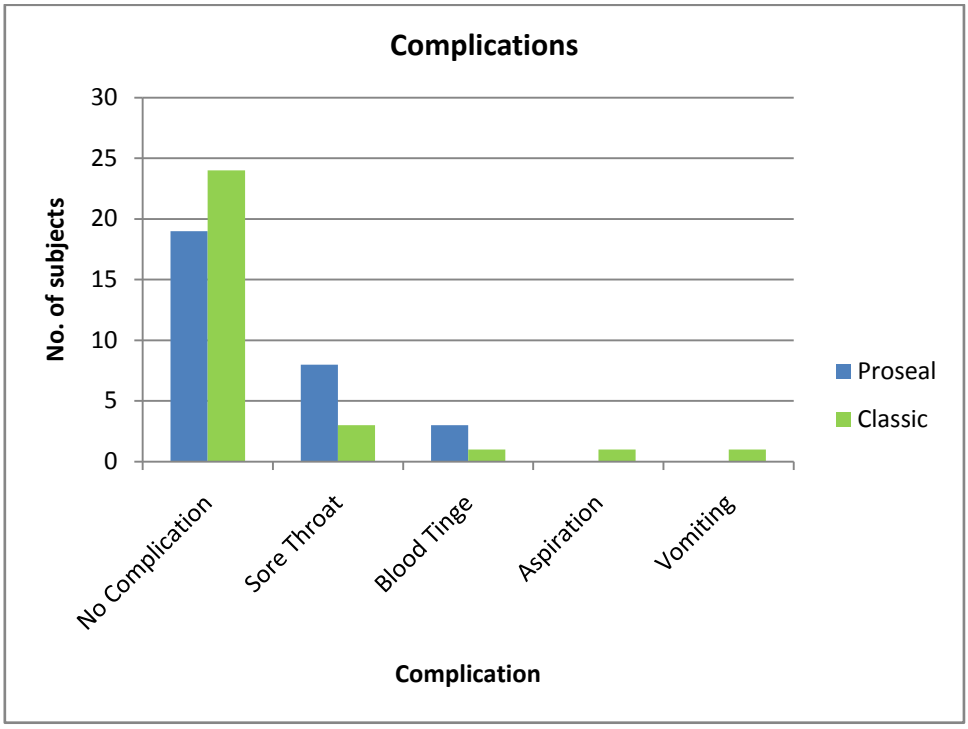
40.00%
30.00%
20.00%
10.00%
0.00%
87.50%
75.90%
60.00%
40.00%
24.10%
12.50%
FOB view 2
FOB view 3
FOB view 4
Proseal LMA
Classic LMA

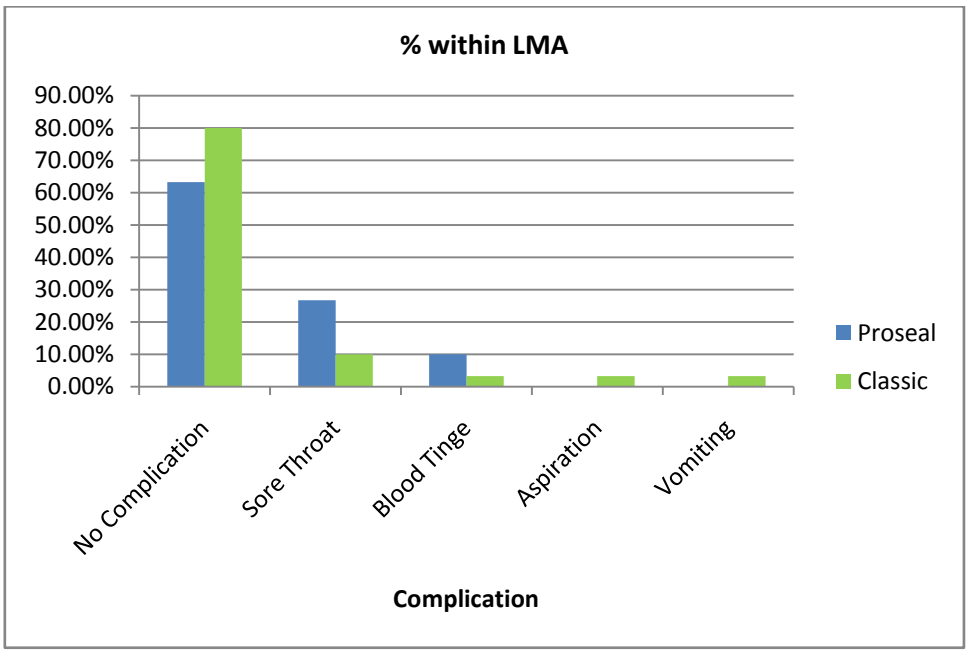

% within LMA
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Proseal LMA
Classic LMA
FOB view 2
FOB view 3
FOB view 4

Complications

	Group P	Group C	Total
No Complication	19	24	43
Sore Throat	8	3	11
Blood Tinge	3	1	4
Aspiration	0	1	1
Vomiting	0	1	1
Total	30	30	60

In terms of development of either intraop or postop complications, the difference between the two groups was not found to be significant. Out of total number of 60 cases, 43 did not have any complications at all. Out of the 17 cases in which complications were observed 11 had sore throat, 4 had blood tinge and 1 patient had aspiration and one patient had vomiting. Out of the 11 cases with sorethroat, 8 were of PLMA group while 3 were of CLMA group. Out of the 4 cases with blood tinge on the LMA , 3 were of PLMA group while 1 patient was of CLMA group. Both aspiration and vomiting were observed only in patient of classic LMA group. None of the cases had bronchospasm or laryngospasm intra or postop.

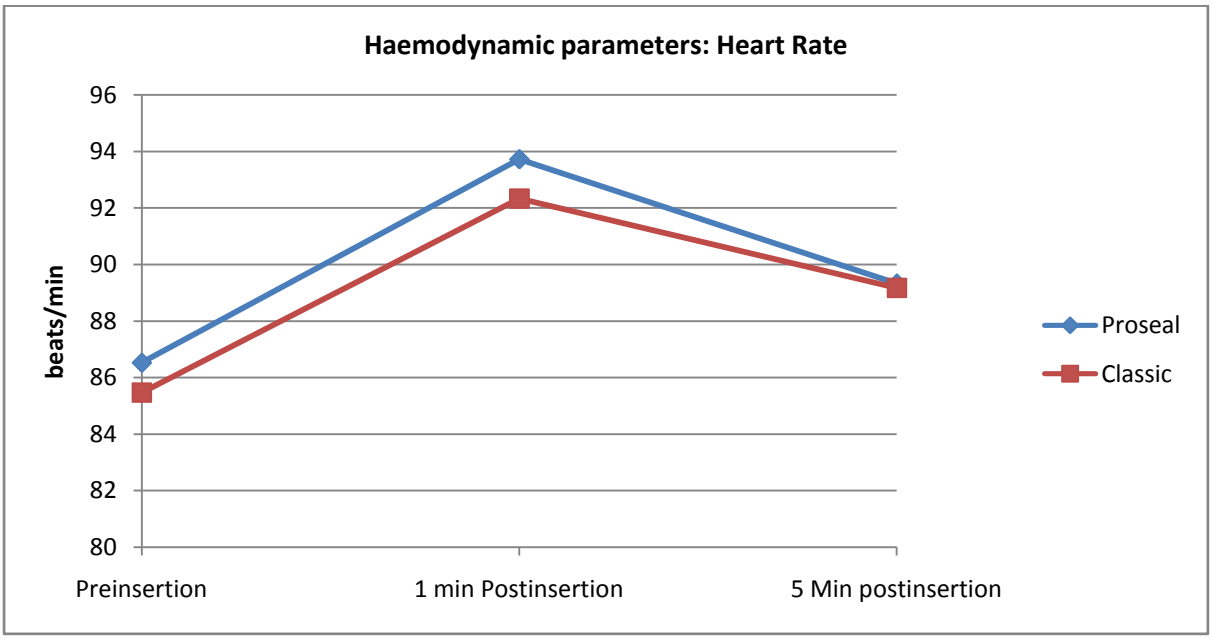

Complications
30
25
20
15
10
5
0
No. of subjects
Proseal
Classic
No Complication
Sore Throat
Blood Tinge
Aspiration
Vomiting
Complication


% within LMA
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Proseal
Classic
No Complication
Sore Throat
Blood Tinge
Aspiration
Vomiting
Complication

Haemodynamic parameters: Heart Rate

Heart Rate	Group P	Group C	P-value	Statistic Significance
Preinsertion	86.53± 9.822	85.47± 10.624	0.688	NS
1 min Postinsertion	93.73± 7.524	92.33± 12.047	0.591	NS
5 Min postinsertion	89.33± 6.682	89.17± 9.660	0.938	NS

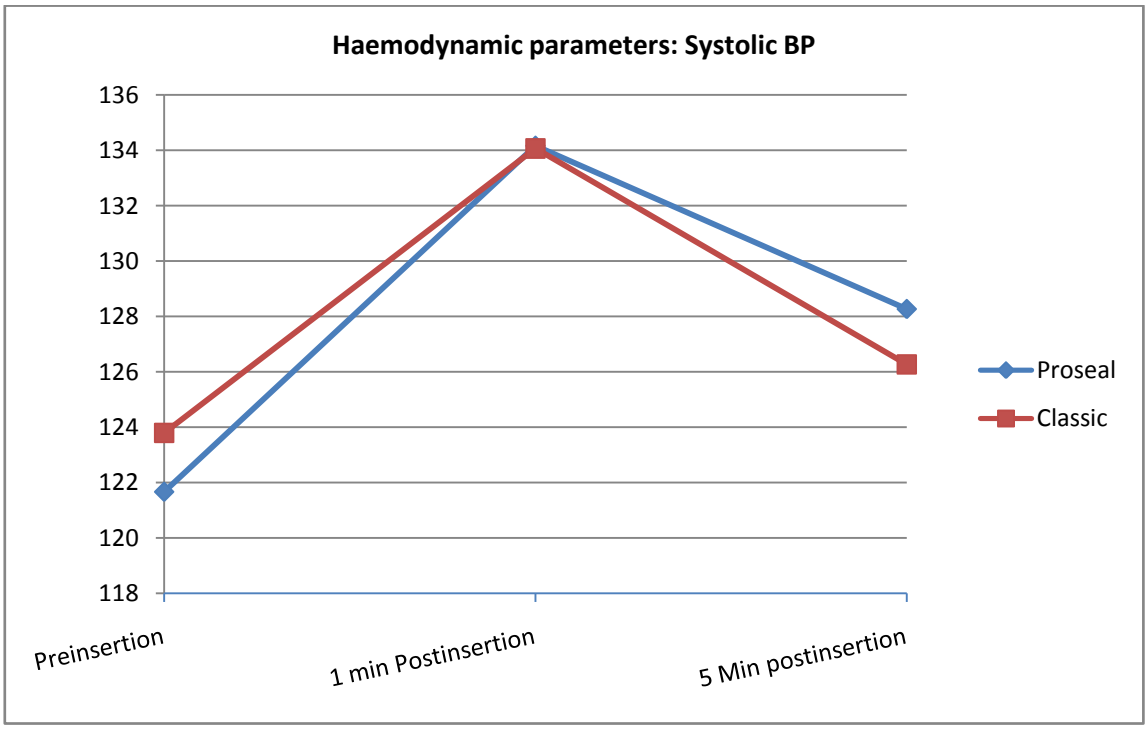
Comparison of preinsertion, 1 min postinsertion and 5 min postinsertion Heart Rate in Proseal and Classic LMA cases did not show any statistically significant difference as evident from the above table.



Haemodynamic parameters: Systolic BP

Systolic BP	Group P	Group C	P-value	Statistic Significance
Preinsertion	121.67± 11.050	123.8± 13.522	0.506	NS
1 min Postinsertion	134.17± 11.920	134.07± 19.142	0.981	NS
5 Min postinsertion	128.27± 11.471	126.27±18.103	0.611	NS

Comparison of preinsertion, 1 min postinsertion and 5 min postinsertion Systolic Blood Pressure in Proseal and Classic LMA cases did not show any statistically significant difference either.

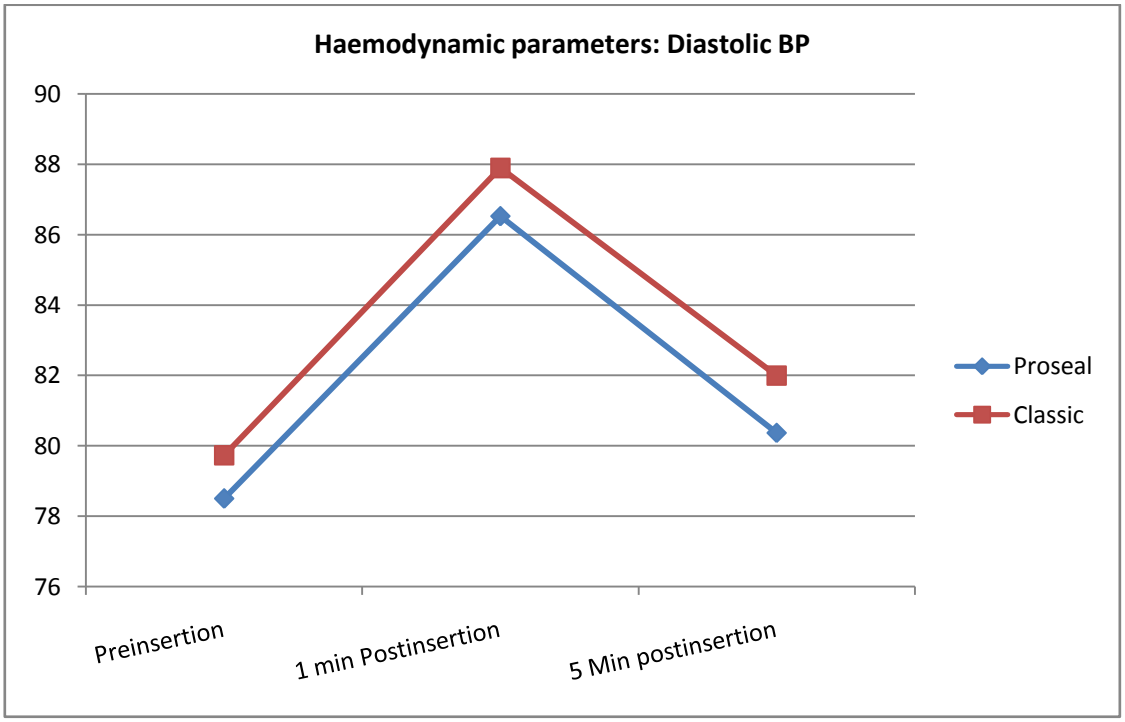


Haemodynamic parameters: Diastolic BP

Diastolic BP	Group P	Group C	P-value	Statistic Significance
Preinsertion	78.50± 7.758	79.73± 8.497	0.559	NS
1 min Postinsertion	86.53 ± 8.939	87.9± 19.951	0.733	NS
5 Min postinsertion	80.37± 8.904	82.00± 9.176	0.487	NS

Comparison of preinsertion, 1 min postinsertion and 5 min postinsertion Diastolic Blood Pressure in Proseal and Classic LMA cases too did not show any statistically significant difference.

All the haemodynamic parameters were found to have marginal peak effect at 1 min post insertion in both the groups.



DISCUSSION:

This study was conducted in Institute of Obstetrics and Gynaecology (MMC,Chennai) between January 2012 to March 2012 and involved 60 patients in ASA I-II physical status .They were randomized into 2 groups P-group and C-group and the following parameters were analysed:

1)Ease of insertion

2)Number of attempts for insertion

3)Time taken for insertion

4)Fiberoptic view

5)Oropharyngeal sealing pressure

6)Complications

The demographic data was comparable between the two groups hence the bias against age and weight distribution was ruled out.

In our study,we found that the ease of insertion was comparable in both the groups. The LMAs could be inserted in all the patients and there was no failure or the need to insert an alternative device or to intubate the patient.

We inserted the ProsealLma without the introducer to maintain parity in insertion techniques between the two LMAs and found no difficulty in the insertions. The time taken for insertion of the two devices and the number of attempts for insertion were similar for both the devices.This was in accordance with the findings of **PraveshKanthed et al**[9] and

H.Shimbori et al[10] who did a similar study in children.The preliminary study done by **A.I.J. Brain et al** [13] in adult female patients during the introduction of the Proseal LMA also had similar findings.But the studies done by **Brimacombe et al**[12] in adult patients concludes that the Proseal was more difficult to insert and took longer time for insertion than the Classic LMA.They also compared the time for insertion with and without the introducer and found that the use of introducer made the insertion of Proseal easy. However **A.I.J.Brain et al**[13] found that the introducer made no difference with regards to the ease of insertion.

The primary variables studied in our study were the Fiberoptic scoring and the oropharyngeal sealing pressure.The fiberoptic view was better with ProsealLMA more often than with Classic LMA.The fiberoptic views were(1,2,3,4):Classic LMA(0,14,9,7) and ProsealLMA(0,2,6,22).The p value was placed at <0.001 and was highly significant.This finding correlated with the study of **Lardner et al**[15]who also found that the Prosealgave a better view of the cords (p=0.003).**A.I.J.Brain et al**[13] also found that the Proseal LMA gives full view of the cords more number of times than the Classic (15 for prosealvrs 13 for classic) but statistically the difference was not significant in their study.

The fiberoptic scoring of the LMA has many implications.It is very difficult to predict the placement of LMA clinically and fiberoptic assessment is the gold standard for assessing the placement of LMA.A properly placed LMA not only provides good seal around the larynx and improve ventilation but also decreases the risk of aspiration.Also a separate study done by **T.M.Cook et**

al[30] with the use of a Proseal LMA and a Ravussinicricothyroid needle in the management of laryngeal and subglottic stenosis causing airway obstruction has shown that a good fiberoptic view can help in procedures like vocal cord biopsy in patients with growth over the vocal cord.

A study done by**Rosilu Ferreira Barbosa et al**[31] with ProsealLMA for surfactant administration in the treatment of Respiratory Distress Syndrome in a premature infant has demonstrated that surfactant can be delivered effectively through the LMA.Here also the proper placement of the LMA is the key for the proper dispersion of the surfactant.

The reason for ProsealLMA giving a better view of the larynx could be that its dorsal cuff pushes the ventral cuff more firmly into the periglottic tissues and thus not only forms a better seal around the larynx but also prevents rotation of the LMA and thus provides stability to the device.

The orophayngeal sealing pressure(OSP) was the other primary variable tested.We found significant difference between the 2 LMAs in terms of the leak pressure. The mean OSP with Proseal LMA was 31.27 cm of H2O and with Classic LMA was 17 cm of H2O. The p value was <0.001.This was in accordance with studies of **Brimacombe et al**[12], **A.I.J.Brain et al**[13] and **T.M.Cook et al**[20] in adult patients though the studies done by **Duncan Johnson et al**[11] and **H.Shimbori et al**[10] in paediatric patients found no

difference between the 2 groups with regard to the leak pressure.They used size 2 ProsealLMA which lacks the dorsal cuff and have sighted that as a reason for finding no difference between the 2 groups.While similar studies by **PraveshKanthed et al**[9] in paediatric patients with size 2 ProsealLMA have found a significantly higher leak pressure with the prosealLMA($p<0.001$).

The complications were comparable between the 2 groups and the difference was not significant ($p = 0.210$).This finding coincided with the studies of **Brimacombe et al**[14] and **H.Shimbori et al**[10].In our study we used a portex cuff pressure manometer and kept the LMA cuff pressure less than 60 cm of H2O during surgery in both the LMAs.The total incidence of complications in our study was 28.3%.The study by **Seet et al**[29] has shown that the pharyngolaryngeal morbidity can be decreased by 70% if the LMA cuff pressure is monitored and kept lower than 44mm Hg.

The incidence of complications with Classic LMA was 20% as against 36.7% with Proseal LMA.But this was not statistically significant.Sore throat and blood tinge over the LMA were more common with Proseal LMA whereas aspiration and vomiting were seen only with Classic LMA.All the complications were mild in nature and managed conservatively.

Studies[32] suggest an incidence of aspiration of 1 in 5000 uses of the LMA and in most of the reported cases the aspiration was found to be relatively mild.

Both vomiting and aspiration are related to gastric insufflation and can occur if the oropharyngeal sealing pressure is very low.

While comparing Classic and Proseal LMA we found Proseal LMA to have a better oropharyngeal sealing pressure and placement and hence Proseal LMA gets and advantage over Classic LMA in managing patients who are paralysed during General Anaesthesia.

SUMMARY:

Laryngeal Mask Airway has come a long way since its introduction in the year 1988 with multiple modifications coming up. The Proseal LMA is one such modification of the Classic LMA which incorporates additional features like a dorsal cuff and a drain tube by virtue of which it forms a better seal around the larynx. But, as mentioned earlier, although newer versions are increasingly seen in the Anaesthesiologist's armoury , the Classic LMA has its own place.

Hence we have compared these two LMAs in terms of ease of insertion, the time taken for insertion, the number of attempts required for insertion, the fiberoptic view after the insertion, the oropharyngeal sealing pressure and complications.

This study was performed on 60 ASA I-II physical status female patients who were undergoing elective short duration gynaecological surgeries under general Anaesthesia.The ethical committee approval and the patient's consent were obtained before starting the study. The study was a single blinded randomised study and the observations were done by the author after inducing general anaesthesia with a standard protocol.

We observed no significant difference between the two LMAs in terms of ease of insertion, number of attempts and time taken for insertion.The fiberoptic view was significantly better with the Proseal LMA . The Oropharyngeal sealing pressure also was significantly higher than that of Classic LMA. There was no difference in the two LMA s in

terms of complication both intra and postop.The haemodynamic response on insertion was also found to be comparable between the 2 LMAs.

CONCLUSION:

We hereby conclude that, Proseal LMA not only gives a better anatomical fit in the laryngopharynx as compared to the Classic LMA but also allows significantly better ventilatory conditions as assessed by the fiberoptic view and the oropharyngeal sealing pressure, respectively. There is no statistically significant difference between the two LMAs in terms of ease of insertion, intraop and postop complications.

BIBLIOGRAPHY:

1.M E O'Meara and J G Jones. The laryngeal mask.BMJ.1993 January 23;306(6872):224-225.

2. D. John Doyle. . A brief history of clinical airway management. Revista Mexicana de Anestesiologiavol .32.Supl. 1, April-June 2009,pp S 164-S 167.

3.Morgan's ClinicalAnesthesiology -3rd edition.-pg 65.

4. Harold Ellis, Stanley J. Feldman, William Harrop-Griffiths –Anatomy for Anaesthetists –eighth edition-Pg 39-40.

5. Dorsch andDorsch – Understanding Anaesthesia equipment.-4 th edition – pg 464-482.

6. Miller's Anesthesia – seventh edition –pg 1581-1584.

7. LMA PROSEAL –Instruction Manual.

8. Rashid M Khan –Airway Management -4th Edition-Pages 93-96.

9. PraveshKanthed, Bimla Sharma, JayashreeSood, V P Kumra. Comparison of LMA-Proseal with LMA Classic in Anaesthetised Paralysed Children. Indian Journal of Anaesthesia 2008; 52 (1):44-48.

10.H.Shimbori, K.Ono, T.Miwa, N.Morimura, M.Noguchi andK.Hiroki. Comparison of the LMA-Proseal and LMA-Classic in children.British Journal of Anaesthesia 93(4):528-31 (2004).

11.Duncan Johnson, David R. Lardner, Bronwyn L. Parkinson, Blythe A.Sweet, Daniel R. Wood.Comparison of the LMA –Proseal and LMA-Classic During Positive Pressure Ventilation in Children.American Society of Anaesthesiologists Abstract A1371 October 26, 2005.

12.Brimacombe J, Keller C.The Proseal laryngeal mask airway: A randomized, crossover study with the standard laryngeal mask airway in paralyzed, anesthetized patients.Anesthesiology .2000 Jul;93(1):104-9.

13. A.I.J. Brain ,C. Verghese and P.J.Strube. The LMA 'ProSeal – a laryngeal mask with an oesophageal vent.British Journal of Anaesthesia 84(5):650-4(2000).

14. Brimacombe J, Keller C, Fullekrug B, Agro F, Rosenblatt W, Dierdorf SF, Garcia de Lucas E, Capdevilla X, Brimacombe N. A multicenter study comparing the ProSeal and Classic laryngeal mask airway in anesthetized, nonparalyzed patients. Anesthesiology. 2002 Feb;96(2):289-95.

15. Lardner DR, Cox RG, Ewen A, Dickinson D. Comparison of laryngeal mask airway (LMA)-Proseal and the LMA-Classic in ventilated children receiving neuromuscular blockade. Can J Anaesth.2008 Jan;55(1):29-35.

16.BimlaSharma, RaminderSehgal, Chand Sahai,JayashreeSood. PLMA vs.I-gel: A comparative evaluation of respiratory mechanics in laparoscopic cholecystectomy. J AnaesthesiolClinPharmacol 2010;26:451-7.

17. Woo YC, Cha SM, Kang H, Baek CW, Jung YH, Kim JY, Koo GH, Park SG, Kim SD. Less perilaryngeal gas leakage with SLIPA than with LMA-ProSeal in paralyzed patients. Can J Anaesth. 2011 Jan;58(1):48-54.

18. Janakiraman C, Chethan DB, Wilkes AR, Stacey MR, Goodwin N. A randomised crossover trial comparing the i-gel supraglottic airway and classic laryngeal airway.Anaesth .2009 Jun;64(6):674-8.

19.Natalini G, Franceschetti ME, Pantelidi MT, Rosano A, Lanza G, Bernardini A. Comparison of the standard laryngeal mask airway and the ProSeal laryngeal mask airway in obese patients. Br J Anaesth . 2003 Mar;90(3):323-6.

20. M.Cook, C.Verghese .Randomized crossover comparison of the ProSeal with the classic laryngeal airway in unparalysed anaesthetized patients.British Journal of Anaesthesia.2002;88:527-33.

21. SumanSarkar, P Shashi, Anil Kumar Paswan, R.P. Anupam, S. Suman and Surya Kumar Dube. Use of the Proseal laryngeal mask airway facilitates percutaneous dilatational tracheostomy in an intensive care unit.Indian Journal of Critical Care Medicine.2010 Oct-Dec;14(4):185-187.

22.UdayAmbi, Ramesh Koppal, Chhaya Joshi, Prakashappa D.S, HemlataIyer. LMA Classic and LMA Proseal: A Comparative Study in Paralyzed Anaesthetized Patients.Journal of clinical and Diagnostic Research.2011Oct; 5(5):940-943.

23. Soad A. Mansour ,WafaaG.Ahmed, Kawthar A. Azzam, Tarek M.EL said. Safety and efficacy of Proseal laryngeal Mask Airway versus Classic

Laryngeal Mask Airway And Endotracheal Tube During Elective surgery.The Egyptian Journal of Hospital Medicine Vol.,21:82-94.

24. Brimacombe J, Keller C. Stability of the LMA-Proseal and standard laryngeal mask airway in different head and neck positions:a randomized crossover study.

25. Bikramjit Das, Shahin N Jamil, SubhroMitra, Rohit K Varshney. A prospective, randomized, Single-blinded, comparative study of Classic Laryngeal Mask Airway and ProSeal Laryngeal Mask Airway in pediatric patients. . J AnaesthesiolClinPharmacol [serial online] 2012 [cited 2012 Nov 13];28:318-321.

26. TulayHosten, TulaySahinYildiz, AlparslanKus, Mine Solak, KamilToker. Comparison of Supreme Laryngeal Mask Airway and ProSeal Laryngeal Mask Airway during Cholecystectomy.Balkan Med J 2012;29:314-9.

27. Lee AK, Tey JB, Lim Y, Sia AT. Comparison of the single-use LMA supreme with the reusable ProSeal LMA for anaesthesia in gynaecological laparoscopic surgery.Anaesth Intensive Care.2009 Sep;37(5):815-9.

28. Joo Hyun Jun, Hee Jung Baik, Jong Hakkim, Youn Jin Kim, Ri-Na Chang. Comparison of the ease of laryngeal mask airway ProSeal insertion and the fiberoptic scoring according to the head position and the presence of a difficult airway.Korean J Anesthesiol.2011 April;60(4):244-249.

29. SeetE, Yousaf F, Gupta S, Subramanyam R , Wong DT, Chung F . Use of manometry for laryngeal mask airway reduces postoperative pharyngolaryngeal adverse events: a prospective, randomized trial.Anesthesiology .2010 Mar;112(3):652-7.

30.T.M.Cook, M.Asif, R.Sim, J.Waldron. Use of a ProSeal laryngeal mask airway and a Ravussincricothyroidotomy needle in the management of laryngeal and subglottic stenosis causing upper airway obstruction. Br J Anaesth 2005;95:554-7.

31. Rosilu Ferreira Barbosa ; Juliana de Oliveira Marcatto; Ana Cristina Simões e Silva ; Yerkes Pereira e Silva.Proseal laryngeal mask airway for surfactant administration in the treatment of respiratory distress syndrome in a premature infant.RevistaBrasileira de TerapiaIntensiva vol. 24 no.2 Sao Paulo Apr/june 2012.

32.BrimacombeJR,BerryA.The incidence of aspiration associated with the laryngeal mask airway:ametaanalysis of published literature.JClinAnesth 1995;7:297-305.

MASTERCHART

S NO	NAME	AGE	ASA	MPC	WEIGHT	HEIGHT	BMI	DIAGNOSIS	SX	LMA	SIZE	EASE	ATTEMPT	TIME	FOB	OSP	COMPLI	HR PRE	SBP PRE	DBP PRE	HR 1M	SBP 1M	DBP 1M	HR 5M	SBP 5M	DBP 5M
1	Maria Gracy	25	1	2	40	134	22.3	P2L2	Int steri	1	3	1	1	25	3	23	2	106	118	66	102	106	74	100	112	76
2	Kanchana	38	1	1	60	150	26.7	Cerv pol	polypectomy	2	4	1	1	23	2	15	4	86	118	76	84	108	72	82	102	70
3	Maha	40	1	2	45	140	23.0	AUB	frac curett	1	3	1	1	25	4	30	0	94	126	78	97	136	90	88	110	70
4	Sulochana	45	1	2	45	134	25.1	AUB	frac curett	1	3	1	1	23	3	29	1	90	131	78	102	144	74	96	122	66
5	Pasura	35	1	2	47	144	22.7	AUB	frac curett	1	3	1	1	24	4	29	1	98	112	78	102	124	88	96	122	86
6	Jamuna	35	1	1	46	140	23.5	AUB	frac curett	1	3	1	1	22	4	33	1	94	126	74	100	133	94	95	118	76
7	Thilakavathy	42	1	2	56	156	23.0	AUB	frac curett	2	4	1	1	22	2	16	0	106	108	66	102	119	78	109	118	90
8	Amudha	28	1	1	50	151	21.9	Wound Ga	Resuturing	1	3	1	1	20	3	26	1	82	110	76	89	122	80	90	122	84
9	Dharma	27	2	2	60	154	25.3	Wound Ga	Resuturing	2	4	2	1	24	4	30	0	82	108	66	96	144	88	92	136	88
10	Madhavi	20	2	2	50	154	21.1	P2L2	Int steri	1	3	1	1	16	4	25	0	78	118	78	86	124	80	88	126	78
11	Sarala	22	1	2	49	148	22.4	P2L3	Int steri	1	3	1	1	16	4	34	1	92	126	84	88	132	84	90	128	76
12	Latha	24	2	1	40	140	20.4	Wound Ga	Resuturing	1	3	2	2	30	2	31	0	88	126	82	94	132	88	90	122	82
13	Amudha	43	2	1	62	154	26.1	AUB	EUA	1	4	2	1	26	4	37	1	86	133	74	90	140	68	76	123	73
14	Fathima	47	2	2	64	162	28.2	Adenomyo	frac curett	2	4	2	1	20	2	15	0	84	150	90	92	156	86	88	144	78
15	Saraswathi	50	2	2	45	145	21.4	adenomyo	frac curett	1	3	1	1	15	4	30	0	92	131	78	84	122	72	85	133	68
16	Dharam	45	2	2	68	158	27.2	PMB	frac curett	2	4	1	1	25	2	15	0	86	145	96	98	175	114	94	54	96
17	Sengani	49	2	2	65	155	27.1	PMB	frac curett	1	4	1	1	20	4	40	2	78	126	96	88	134	94	90	130	90
18	NeelaBai	54	2	2	54	145	25.7	AUB	frac curett	2	4	1	1	20	3	16	1	83	140	80	96	163	96	90	135	95
19	Rani	21	2	1	55	149	24.8	P2L2	Int steri	1	4	1	1	20	4	28	0	60	126	70	86	136	90	84	132	92
20	Vadivazhagi	52	2	2	64	156	26.3	Fibroid	frac curett	1	4	1	1	25	4	40	0	86	132	80	98	147	92	94	136	92
21	Krishnaveni	40	2	2	58	151	25.4	AUB	frac curett	1	4	1	1	25	4	40	0	92	131	92	96	146	94	92	136	92
22	Kanniyammal	35	2	1	48	143	23.5	AUB	frac curett	2	3	1	1	20	2	15	0	102	131	91	108	121	172	100	133	93
23	Vijaya	44	2	2	48	147	22.2	Fibroid	frac curett	2	3	1	1	25	3	17	0	85	121	84	96	106	72	88	110	78
24	Angamma	44	2	2	60	151	26.3	AUB	frac curett	2	4	1	1	25	2	15	0	68	119	72	78	159	96	72	132	84
25	Lakshmi	34	2	2	64	154	27.0	AUB	frac curett	2	4	1	1	25	3	18	0	90	130	80	96	146	96	90	128	78
26	Sathiya Bhama	35	1	1	64	151	28.1	AUB	frac curett	2	4	1	1	22	3	18	0	78	122	84	84	142	86	88	128	78
27	Selvarani	30	2	2	65	153	27.8	AUB	frac curett	2	4	1	1	14	3	18	0	82	130	90	98	148	96	90	133	90
28	Rani	58	2	2	61	159	24.1	PMB	frac curett	2	4	1	1	15	4	18	1	86	118	90	114	154	98	94	156	90
29	Mumtaz	44	1	1	62	158	24.8	AUB	frac curett	2	4	1	1	20	3	23	1	92	126	74	112	147	94	98	148	96
30	Mumtaz	23	1	2	64	158	25.6	P2L2	Int steri	2	4	1	1	15	2	17	0	92	126	80	88	100	60	89	120	76
31	Komala	36	1	1	58	155	24.1	Fibroid	frac curett	2	4	1	1	16	2	15	2	116	135	85	124	145	90	122	129	68
32	Muniyammal	50	1	1	46	146	21.6	PMB	EUA	2	3	1	1	16	3	18	0	64	166	90	66	156	99	72	144	92
33	Jayalakshmi	44	1	1	45	142	22.3	AUB	frac curett	2	3	1	1	17	3	17	0	78	117	88	84	133	96	85	122	78
34	Annapoornam	57	2	2	58	159	22.9	AUB	frac curett	1	4	1	1	18	4	24	0	72	122	82	80	136	90	82	126	80
35	Ramanammal	46	1	2	55	154	23.2	Adenomyo	frac curett	2	4	2	1	20	2	15	0	88	110	70	90	125	76	84	115	74
36	Jesintha	41	2	2	60	154	25.3	Fibroid	frac curett	2	4	1	1	16	2	15	0	94	126	70	88	124	72	86	144	78
37	Kasthuri	45	1	2	42	145	20.0	AUB	frac curett	2	3	1	1	16	4	18	0	86	106	74	90	96	66	84	122	84
38	Banu	50	2	2	66	157	26.8	PMB	frac curett	1	4	1	1	17	4	28	0	86	110	70	83	132	92	82	151	101
39	Sujatha	46	1	1	52	155	21.6	fibroid	frac curett	2	4	1	2	16	2	16	0	92	126	84	98	132	95	86	144	100
40	Poomani	45	2	2	49	152	21.2	PMB	frac curett	2	3	1	1	15	4	17	0	89	108	70	94	118	74	90	126	72
41	Vijaya	45	2	2	60	157	24.3	AUB	frac curett	2	4	1	1	15	2	15	0	84	118	76	82	126	74	80	124	80
42	Anjala	48	2	2	50	150	22.2	Fibroid	frac curett	2	3	1	1	16	4	17	0	89	120	76	98	126	84	94	118	72
43	Manjula	35	2	1	56	152	24.2	AUB	frac curett	2	4	1	1	15	4	18	0	78	116	70	84	132	74	86	120	86
44	Thulakkam	39	2	2	41	141	20.6	AUB	frac curett	2	3	1	1	16	4	19	0	78	117	89	74	120	78	80	118	66
45	Tamil	31	1	1	55	154	23.2	P2L2	Int steri	1	4	1	1	20	4	32	0	92	110	70	104	112	74	90	120	72
46	Umadevi	43	1	2	70	160	27.3	AUB	frac curett	1	4	1	1	25	2	23	0	86	126	88	92	139	94	84	118	76
47	Dhanam	45	2	2	38	141	19.1	AUB	frac curett	1	3	1	1	25	4	31	0	110	100	70	114	118	80	108	120	74
48	Rajeshwari	50	2	1	38	143	18.6	AUB	frac curett	1	3	1	1	20	4	35	0	78	100	70	86	124	84	80	118	78
49	Yashoda	40	2	2	46	141	23.1	AUB	frac curett	1	3	2	1	20	3	33	0	86	126	78	95	155	94	88	144	86
50	Meghala	45	2	3	70	164	26.0	Fibroid	frac curett	1	4	1	1	20	4	40	1	82	147	94	94	155	98	88	165	90
51	Padma	40	2	2	52	143	25.4	AUB	frac curett	1	4	1	1	20	4	39	1	90	133	73	94	144	101	100	132	80
52	Usha	45	2	2	50	148	22.8	AUB	Ther.curet	2	3	1	1	15	2	15	0	79	129	80	84	136	94	92	128	78
53	Dhanam	35	2	2	60	159	23.7	Fibroid	frac curett	1	4	1	1	20	4	30	0	82	118	76	88	135	93	90	124	74
54	Uammaheshwari	31	1	1	49	149	22.1	Fibroid	frac curett	1	3	1	1	18	4	30	0	89	110	70	96	133	90	94	129	72
55	Agilandam	60	1	2	50	147	23.1	Fibroid	frac curett	2	3	1	1	14	3	15	0	69	108	69	88	126	76	84	124	76
56	Saraswathi	42	1	1	62	151	27.2	AUB	frac curett	1	4	1	1	16	4	30	0	73	106	86	88	133	72	84	122	68
57	Vidya	38	1	2	58	150	25.8	AUB	frac curett	1	4	1	1	15	3	28	0	92	133	90	98	154	94	88	142	82
58	Charulatha	40	1	1	48	145	22.8	AUB	frac curett	2	3	2	2	45	2	14	3	78	120	82	84	139	85	86	133	76
59	Malathi	40	1	2	64	156	26.3	Adenomyo	frac curett	1	4	1	1	17	3	28	0	82	111	76	96	132	96	85	133	95
60	Akila	43	1	1	62	155	25.8	PMB	frac curett	1	4	1	1	16	4	32	2	80	126	78	102	145	82	83	132	82

PROFORMA

Date: Roll No: Airway Device:

Name: Age: Sex: IP No:

Diagnosis: Surgical Procedure Done:

Ht: CVS HB:

Wt: RS:

Airway: MPC: MO: Dentition

Pre op Assessment: ASA I/ASAII

History: Any Co-morbid illness
H/O Documented Difficult Airway
H/O Previous surgeries, Allergy to Drugs

Airway Device –

Measures of Study Outcome:

1) Ease of Insertion: Easy Difficult Impossible

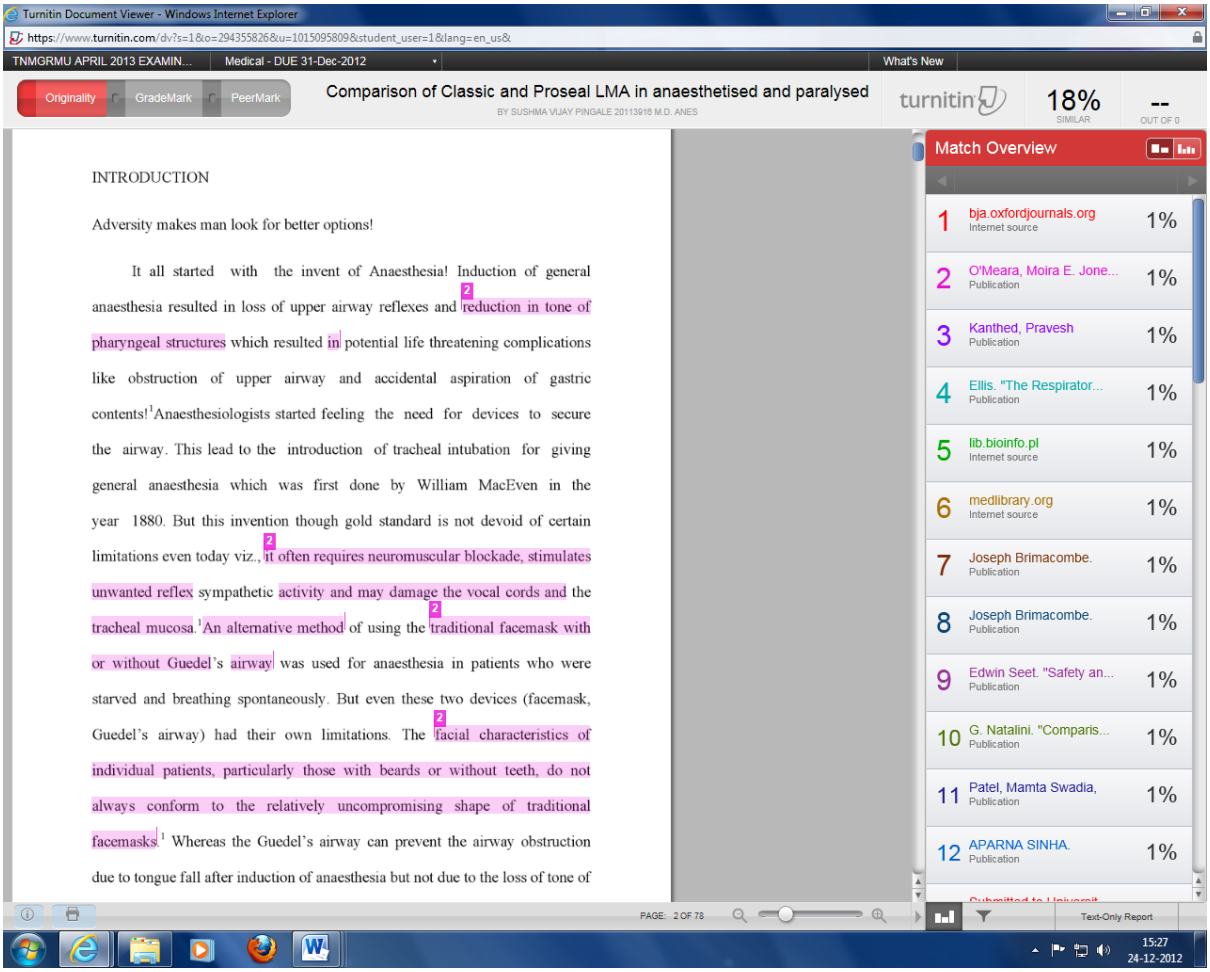
2) No of Attempts:

3) Time Taken for Insertion:

4) Vitals

	HR	SBP	DBP	MAP	SPO2
Pre insertion					
Post Insertion of Device					
1 min.					
5 min.					

5) Oropharyngeal sealing pressure
6) Fiber optic Grading
7) Complication after removal of device Post op
sore Throat:
Laryngospasm
Blood Staining of Airway Device
Vomiting
Aspiration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Comparison of Classic and Proseal LMA in anaesthetised and paralysed
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INTRODUCTION
Adversity makes man look for better options!
It all started with the invent of Anaesthesia! Induction of general anaesthesia resulted in loss of upper airway reflexes and reduction in tone of pharyngeal structures which resulted in potential life threatening complications like obstruction of upper airway and accidental aspiration of gastric contents![1]Anaesthesiologists started feeling the need for devices to secure the airway. This lead to the introduction of tracheal intubation for giving general anaesthesia which was first done by William MacEven in the year 1880. But this invention though gold standard is not devoid of certain limitations even today viz., it often requires neuromuscular blockade, stimulates unwanted reflex sympathetic activity and may damage the vocal cords and the tracheal mucosa.[1]An alternative method of using the traditional facemask with or without Guedel's airway was used for anaesthesia in patients who were starved and breathing spontaneously. But even these two devices (facemask, Guedel's airway) had their own limitations. The facial characteristics of individual patients, particularly those with beards or without teeth, do not always conform to the relatively uncompromising shape of traditional facemasks.[1] Whereas the Guedel's airway can prevent the airway obstruction due to tongue fall after induction of anaesthesia but not due to the loss of tone of
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