

Comparison of classic laryngeal mask airway with Ambu laryngeal mask for tracheal tube exchange: A prospective randomized controlled study

Address for correspondence:

Dr. Shruti Jain,
H. No. 194, Sector 21-C,
Faridabad - 121 001,
Haryana, India.
E-mail: vineet.ortho@gmail.
com

Shruti Jain, Rashid M Khan¹, Syed M Ahmed¹, Manpreet Singh²

Departments of Anesthesiology, School of Medical Sciences and Research, Sharda University, Greater Noida, ¹J. N. Medical College, Aligarh, Uttar Pradesh, ²Department of Anesthesiology and Intensive Care, Government Medical College and Hospital, Chandigarh, Haryana, India

ABSTRACT

Background and Aim: Exchanging endotracheal tube (ETT) with classic laryngeal mask airway™ (CLMA™) prior to emergence from anaesthesia is a safe technique to prevent the coughing and haemodynamic changes during extubation. We had compared CLMA™ and AMBU laryngeal mask™ (ALM™) during ETT/laryngeal mask (LM) for haemodynamic changes and other parameters. **Methods:** A total of 100 American Society of Anesthesiologist Grade I and II adult female patients undergoing elective laparoscopic cholecystectomy under general anaesthesia were selected and randomly divided into two groups of 50 patients each. In Group I, CLMA™ and in Group II, ALM™ was placed prior to tracheal extubation. Haemodynamic parameters were recorded during ETT/LM exchange. Glottic view was seen through the LM using flexible fibrescope. Coughing/bucking during removal of LM, ease of placement and post-operative sore throat for both groups were graded and recorded. **Statistical Analysis:** Data within the groups was analysed using paired *t*-test while between the groups was analysed using unpaired *t*-test. Chi-square test was used to analyse grades of glottic view, coughing, and post-operative sore throat. **Results:** In Group I, there was a significant rise in systolic blood pressure and heart rate in contrast to insignificant rise in Group II. Glottis view was significantly better in Group II. Incidence of coughing, ease of placement and post-operative sore throat was identical between both groups. **Conclusion:** ALM™ is superior to CLMA™ for exchange of ETT before extubation due to greater haemodynamic stability during exchange phase and is better positioned.

Key words: Ambu laryngeal mask™, classic laryngeal mask airway™, endotracheal tube, extubation

Access this article online
Website: www.ijaweb.org
DOI: 10.4103/0019-5049.115613
Quick response code


INTRODUCTION

Respiratory complications are 3 times more common during endotracheal extubation than during tracheal intubation or induction of anaesthesia (4.6% vs. 12.6%).^[1] A smooth tracheal extubation without coughing, bucking or haemodynamic changes is one of the anaesthetic goals during any general anaesthetic procedure especially in neurosurgical, interventional neuro-radiological, otolaryngological, and ophthalmological patients or with patients having coronary artery disease.

On extensive literature search, it has been observed that various authors have advocated the exchange of the endotracheal tube (ETT) with laryngeal mask airway (LMA) prior to the emergence from anaesthesia. This had reduced the extubation associated complications without losing airway control.^[2-6] This ETT/laryngeal mask (LM) exchange procedure is easy and superior to use of an oropharyngeal airway.^[7]

There is a natural hesitancy to perform ETT/LM exchange and this maybe because the procedure involves jeopardizing a secure airway. Secondly,

How to cite this article: Jain S, Khan RM, Ahmed SM, Singh M. Comparison of classic laryngeal mask airway with Ambu laryngeal mask for tracheal tube exchange: A prospective randomized controlled study. Indian J Anaesth 2013;57:259-64.

the surgeries where exchange is often required, the patients may have some significant coexisting disease. Thirdly, the procedure may be unfamiliar to surgeons and operating room staff.^[2]

Majority of studies had used classic laryngeal mask airway™ (CLMA™) (with the index finger introduction method) as exchange for ETT immediately before extubation while inhalational anaesthesia was still continued.^[2-6] However, there is no study where Ambu laryngeal mask™ (ALM™) was used in such situation, which is introduced using pencil technique.

The present study evaluated the effect of exchange of ETT with CLMA™ versus ALM™ for haemodynamic changes, ease of placement, correct placement of CLMA™ and ALM™ as per fibre-optic examination, coughing/bucking during removal of LMA, incidence of post-operative sore throat and any other complication.

METHODS

After approval from Hospital Ethical Committee, 100 American society of anaesthesiologist (ASA) I and II female patients between age range of 20 years and 50 years and weighing 40-60 kg, undergoing elective laparoscopic cholecystectomy, who gave informed consent for participating in the study were selected. Patients with predicted difficult airway were excluded from the study. These patients were randomly divided into two groups of 50 patients each on the basis of type of LMA device used for exchange, using random computerized tables. The two groups were as follows:

Group I: CLMA™ was used for ETT/LM exchange, CLMA™ was placed by the index finger method

Group II: ALM™ was used for ETT/LM exchange (ALM™ was placed unaided, pencil technique).

Pre-medication included injection midazolam 0.025 mg/kg IV, injection fentanyl 2 mcg/kg IV, injection ondansetron 0.1 mg/kg IV 15 min prior to induction of anaesthesia. Anaesthesia was induced with injection propofol 2 mg/kg IV and neuromuscular blockade was achieved with vecuronium bromide 0.1 mg/kg IV. After achieving adequate relaxation, trachea was intubated and anaesthesia was maintained with a step-down technique of propofol infusion (10 mg/kg/h for 1st 15 min, 8 mg/kg/h for the next 15 min, and thereafter 5 mg/kg/h IV via syringe pump, till the conclusion of surgery). In addition, all patients received 66% N₂O in

O₂ and muscle relaxant top-up doses as per peripheral nerve stimulator. After the conclusion of surgery, N₂O was discontinued, but propofol was continued to run at the rate of 5 mg/kg/h. In Group I and II, CLMA™ and ALM™ (size 3, both) were placed respectively, but the cuff remained un-inflated. The number of insertion attempts was recorded.

Residual neuromuscular block was now reversed using a mixture of neostigmine (2.5 mg) and glycopyrrolate (0.4 mg). Adequate reversal of neuromuscular block was confirmed by a train-of-four ratio >0.9 and return of adequate tidal volume. ETT was now removed keeping LMA device in place. The cuff of LM (CLMA™ or ALM™) was now inflated with 20 ml air and the breathing system connected to LM. An adequate and smooth spontaneous respiration was re-confirmed clinically and by capnography. If inadequate, LM was removed and reinserted. Number of insertion attempts was again noted. Fiberoptic bronchoscopy was then performed via diaphragm of the swivel port to record the correct placement of CLMA™/ALM™. Propofol was now discontinued and the patient continued to breathe 100% O₂ until full awakening. The cuff of CLMA™ and ALM™ was now deflated and the device was extubated. Patient's response to LM removal was recorded. During this period of exchange ETT/LM exchange, patient's heart rate (HR) and systolic blood pressure (SBP) were recorded just prior to LM placement, post-LM placement, pre-extubation, post-extubation and thereafter at 3 and 5 min and immediately after LM removal and after 3 and 5 min.

Ease of placement was graded as Grade I if CLMA™/ALM™ placement was successful in the first attempt, Grade II, if more than one attempt was required to place it, Grade III, if we failed to place the CLMA™/ALM™. Attempt was considered unsuccessful if it took greater than 20 s or if the LM was removed from the patient's mouth.

If complete glottis was visualised through fiberscope, it was graded as Grade I, partial glottis with or without seeing epiglottis was Grade II, and if only epiglottis was visualised, it was labelled as Grade III.

Any episode of coughing/bucking during LM placement, ETT and LM removal was recorded. Coughing was graded as Grade I if there was no coughing/bucking, Grade II, if there was mild coughing/bucking (<5 cough) and Grade III if there was severe bout of coughing/bucking/laryngospasm (>5 cough).

Sore throat was noted by an independent blind observer post-operatively after 1 h. Absence of sore throat was recorded as Grade I. Sore throat, which was less severe than common cold/mild sore throat was Grade II, and which was similar to that noted with common cold/moderate sore throat was Grade III. Sore throat, which was more severe than common cold/severe sore throat was graded as Grade IV.

Statistical analysis

The primary outcome measured was change in haemodynamic parameters in both groups. We conducted a pilot study with seven patients in each group and presuming the difference in the haemodynamic parameters and effect size obtained to be true, calculated that 41 patients in each group would be required for the study with power of 0.8 and significance of 0.05. A total of 50 patients were taken in each group to compensate for dropouts.

All data in the tables have been presented as mean ± standard deviation. Data within the groups have been analysed using paired *t*-test while those between the groups were analysed using unpaired *t*-test. Value of *P*<0.05 was considered as significant in this study. Chi-square test has been used to identify the difference between two proportions. It was used to analyse grades of ease of LM placement, verification of glottic view by fiberscope, coughing during removal of LM and post-operative sore throat. Value of *z*>1.96 was considered significant. SPSS 14 programme was used for statistical analysis.

RESULTS

The SBP and HR in both groups in pre-LM placement time was nearly identical (*P*>0.05). As LM was placed, SBP and HR increased in both the groups [Tables 1 and 2], but reached the level of statistical significant only in Group I as compared to pre-LM placement values (*P*<0.05). After that, in patients of both groups, the SBP and HR started declining with a modest, but insignificant (*P*>0.05) rise as the tracheal tube was being removed [Tables 1 and 2].

Before ETT removal, LM could be placed in first attempt (Grade I) in 72% of Group I patients as compared to 84% of Group II patient. There was no patient where LM could not be placed (Grade III). There was no significant difference of proportion during placement of the LM (*z*<1.96). None of the patient required more than 2 attempts [Table 3].

After ETT removal adequate and smooth spontaneous respiration was achieved in all patients. After extubation, it was never necessary to reinsert the LM or shift to alternative airway.

The number of patients who showed complete glottic view (Grade I) through fiberoptic bronchoscope was noted to be significantly more (*z*>1.96) in Group II (96%) as compared to Group I (76%) [Table 4].

None of the patients of both the study groups had coughing or bucking during placement of LM as well as during removal of ETT. The incidence of smooth removal of LM, i.e., with no coughing and bucking (Grade 1) was 84% in Group II patients as compared to 72% in Group I, which is statistically insignificant (*z*<1.96) [Table 5].

Blood was not seen on the cup of LM, in any case of either group. Incidence of mild post-operative sore throat (Grade I) was identical in both groups (84%) [Table 6] and none of the patients had

Table 1: Changes in SBP during peri-extubation period

Timing of recording SBP	Group I (mmHg)	Group II (mmHg)
Pre-LM placement (control)	131.4±17.5	129.7±12.6
Post-LM placement	144.6±18.4*	132.8±14.4
Pre-extubation	135.2±13.9	131.2±13.0
Immediate post-extubation	139.4±16.7	137.2±15.0
3 min post-extubation	137.4±17.9	137±15.4
5 min post-extubation	135.8±17.0	135.3±15.3
Immediate after LM removal	134.3±18.37	133.8±15.3
3 min post-removal	131.6±17.9	130.8±15.4
5 min post-removal	127.8±16.1	128.4±15.0

SBP – Systolic blood pressure; LM – Laryngeal mask; **P*<0.05 as compared to control

Table 2: Changes in HR during peri-extubation period

Timing of recording HR	Group I HR/min	Group II HR/min
Pre-LM placement (control value)	76.8±11.8	79.1±11.7
Post LM placement	86.9±12.4*	83.8±14.2
Pre-extubation	83.2±12.8	83±16.8
Immediate post-extubation	87.8±15.0	86.5±17.0
3 min post-extubation	87.0±14.6	85.7±24.1
5 min post-extubation	84.8±15.1	85±15.9
Immediate after LM removal	84.1±15.4	85.2±16.9
3 min post-removal	82.9±15.4	84.5±15.9
5 min post-removal	79.7±15.1	83.4±15.7

HR – Heart rate; LM – Laryngeal mask; **P*<0.05 as compared to control

Table 3: Ease of LM placement

Grades of LM placement	Group I mean (%)	Group II mean (%)
Grade I	36 (72)	42 (84)
Grade II	14 (28)	8 (16)
Grade III	0 (0)	0 (0)

LM – Laryngeal mask

Table 4: Incidence of different grades of glottic view by fibroscope

Grades of glottic view	Group I mean (%)	Group II mean (%)
Grade I	38 (76)	48 (96)*
Grade II	12 (24)	2 (4)*
Grade III	0 (0)	0 (0)

*z>1.96 as compared to group I

Table 5: Grades of coughing during removal of LM

Grades of coughing	Group I mean (%)	Group II mean (%)
Grade I	36 (72)	42 (84)*
Grade II	14 (28)	8 (16)*
Grade III	0 (0)	0 (0)

LM – Laryngeal mask; *z<1.96 as compared to group I

Table 6: Incidence of post-operative sore throat

Grades of sore throat	Group I mean (%)	Group II mean (%)
Grade 0	42 (84)*	42 (84)*
Grade I	8 (16)*	8 (16)*
Grade II	-	-
Grade III	-	-

LM – Laryngeal mask; *z<1.96 as compared to group I

moderate (Grade II) or severe post-operative sore throat (Grade III).

DISCUSSION

Extubation is associated with significant haemodynamic changes, which may be detrimental for patients with cardiovascular compromise. Similarly, cough is a normal protective response during emergence from anaesthesia, but can be harmful in cases of eye surgery or neurosurgery.

Extubation of trachea in deeper planes of anaesthesia is a common method to avoid this stress response. This can be achieved by the use of inhalational agents or opioids, but they may cause loss of the airway and prolonged sedation.^[8,9] Pharmacological agents such as Lidocaine, beta blockers, calcium channel blockers, and dexmedetomidine are effective in controlling the haemodynamic response during extubation,^[10-12] but they do not prevent coughing over the tube. Moreover, their adequate dosage is still not exactly established.

One of the safe techniques for smooth extubation is to replace the ETT with LMA prior to emergence from anaesthesia. It effectively reduces coughing, bucking, sore throat, and haemodynamic response associated with extubation.^[2-6] Stix *et al.* in 2001,^[2] had used CLMA™ as ‘safe extubation device’ before extubation of ETT and thereafter maintenance of airway till

patient was awake fully. When patient regained consciousness, CLMA™ was removed and patient was shifted to post-operative room.

The CLMA™ is a supraglottic airway device, which provides an ‘oval seal around the laryngeal inlet’ and maintains the airway. It is made of silicon. It is reusable, but discarded after 40 autoclaving cycles. It provides better haemodynamic stability as it avoids stimulating infraglottic structures during insertion as well as during extubation.^[13] It is introduced using the index finger method or thumb insertion technique.

The ALM™ is single use airway device made of polyvinyl chloride, moulded in one piece, featuring a special build-in curve that replicates natural human anatomy. It has reinforced tip, which facilitates insertion of the mask with soft cuff. In addition, internal ribs are built into this curve, which gives the airway tube flexibility needed to adapt to individual anatomical variances and a wide range of head positions. It is introduced by pencil technique and there is no need of finger while introducing this airway equipment. All these features make its insertion easier than CLMA™.^[14] Furthermore, unlike CLMA™ it lacks epiglottic aperture bars.

We had chosen ALM™ for comparison with CLMA™ as they are the most commonly used LM devices. Most of studies have used CLMA™ for ETT/LM exchange. With an increasing concern for transmission of prion diseases, use of single devices like ALM™ is being advocated.^[14,15] Furthermore, we wanted to investigate that whether unaided placement of ALM™ would have any advantage over finger aided placement of CLMA™ in terms of post-ETT/LM exchange haemodynamic response, ease of placement, fibre-optic view, coughing/bucking, and post-operative sore throat.

Immediately after placement of LM, there was a significant rise of SBP and HR only in Group I (CLMA™). This can be attributed to the standard technique of finger support during CLMA™ insertion, resulting in overcrowding of hypopharynx and stretching of oropharyngeal structures. This is known to produce a vasopressor response.^[16] The preformed curved shape of ALM™ allows its insertion without any finger support. These factors may have been responsible for the attenuated rise of SBP and HR during placement of ALM™ as compared to CLMA™.

In Group I and Group II patients, the SBP and HR started

declining with a modest, but insignificant ($P>0.05$) rise as the tracheal tube was removed. Thereafter, the fall in both parameters continued towards control value.

To the best of our knowledge, there has been no reported study on haemodynamic changes during ETT/LMA exchange manoeuvre, so far. We have shown that between CLMA™ and ALM™, though both provide good haemodynamic control during ETT/LMA exchange, still latter has significantly better haemodynamic control during LMA insertion.

Minimal changes in SBP and HR following removal of CLMA™ or ALM™ in this study is in accordance to previous findings that removal of an LMA is associated with significantly reduced cardiovascular responses.^[13]

We graded ease of LM placement based on the number of attempts at insertion. There was no significant difference in ease of placement between the two devices. Sudhir *et al.*,^[15] and Ng *et al.*,^[14] also reported insignificant difference in first attempt insertion between these two devices. López *et al.*,^[17] studied 200 patients and compared four different LMA regarding ease of insertion and placement. They concluded that ALM™ and LMA Unique™ were easier to insert by inexperienced residents and were less traumatic for patients. However Shariffuddin and Wang,^[18] found that first insertion attempt was significantly better with the ALM™ compared than with CLMA™.

ALM™'s design unlike CLMA™ does not have epiglottic bars, which allow easier access for flexible fibreoptic examination. A significantly superior glottic view (Grade I) with ALM™ (96%) as compared to CLMA™ (76%) may be attributed to its in-built curved shape that allowed its bowl to take a better periglottic position after tracheal extubation. None of the patients in these two groups showed epiglottis through fiberscope. Shariffuddin and Wang,^[18] reported comparable fibreoptic view with both devices.

Though ALM™ had significantly superior glottic view as compared with CLMA™, yet all the patients had adequate spontaneous respiration on LM and none required reinsertion of LM. It has been seen that even when the epiglottis blocks fibreoptic visualization of the glottis (as seen from the airway tube), a satisfactory clinical airway is usually established.^[13,19]

None of the patients in both the study groups had coughing or bucking during placement of LMAs. This might be due to use of propofol for maintenance of anaesthesia in our study, which has known ability to suppress the cough reflex during upper airway manipulation. In contrast, Takita *et al.*,^[3] recorded 33.3% incidence of coughing/bucking during placement of CLMA™, using variable concentration of sevoflurane for maintenance of anaesthesia.

The incidence of smooth removal of CLMA™ and ALM™ was 72% and 84% respectively. It was observed that 28% patients of Group I and 16% patients of Group II had mild coughing and bucking during removal of CLMA™. None of the patients in both the groups presented with airway obstruction or laryngospasm. Koga *et al.*,^[5] reported that out of 20 patients, one patient had difficulty in ventilation via LM after extubation and three patients coughed during emergence from anaesthesia. Dob *et al.*,^[7] reported one case of coughing out of 26 patients in LMA group during emergence. Costa e Silva and Brimacombe,^[6] reported that no patient out of 10 coughed during emergence or removal of LMA. The findings of this study are in agreement with the above observations that an occasional patient may cough during removal of LM. However, the present study noted that removal of CLMA™ was more prone to coughing as compared to ALM™. This could possibly be secondary to a more anatomical design and a softer cuff material of ALM™ compared to CLMA™.^[14]

Incidence of post-operative sore throat was similar in both groups. There was no case of moderate/severe post-operative sore throat. ETT is known to cause more post-operative sore throat than LM. In our series, both ETT and LM were used in all patients yet the incidence of post-operative sore throat was less than what has been reported for ETT alone.^[20] This might be attributed to the fact that extubation of ETT was performed over LM and thus avoided straining on the tube, which is most often cause of post-operative sore throat. Ng *et al.*,^[14] reported lower incidence of sore throat with ALM™ as compared to CLMA™. Post-operative sore throat is also dependent upon the number of attempts taken to place LM, duration of insertion and cuff pressure. In our study, there was no significant difference in number of attempts for LM placement between both groups, but we didn't measure duration of insertion and cuff pressure in our study.

Pharmacological agents though are effective in controlling haemodynamic changes are costly and are unable to suppress the cough reflex during extubation. On the other hand, CLMA™ which is reusable after autoclaving is an economical solution to the problem. However, there is risk of infection with prion disease in reusable devices, which has promoted the use of ALM™.^[14,15]

There were certain limitations in our study. The effect was seen in ASA I/II patients, but the usefulness will be of immense help in high-risk cardiac patients, whom we could not study due to the absence of advanced cardiac set-up at our institute. Effect of ETT/LM exchange can be further studied in ASA III/IV cardiac or neurosurgical patients, where good haemodynamic control is required. We did not measure duration of insertion and cuff pressure in our study, which may have a bearing on post-operative sore throat.

CONCLUSION

Placement of ALM™ prior to tracheal extubation is associated with reduced haemodynamic changes and better glottic view through fibroscope. Thus, ALM™ should be considered superior to CLMA™ for ETT/LM exchange.

REFERENCES

- Asai T, Koga K, Vaughan RS. Respiratory complications associated with tracheal intubation and extubation. *Br J Anaesth* 1998;80:767-75.
- Stix MS, Borromeo CJ, Sciortino GJ, Teague PD. Learning to exchange an endotracheal tube for a laryngeal mask prior to emergence. *Can J Anaesth* 2001;48:795-9.
- Takita K, Yamane M, Morimoto Y, Kemmotsu O. The ED (95) of end-tidal sevoflurane concentration for the smooth exchange of the tracheal tube for a laryngeal mask airway is 2.97%. *Can J Anaesth* 2003;50:184-8.
- Sasano H, Sasano N, Hattori T, Tsubouchi H, Tsuda T, Katsuya H. Tracheal tube/laryngeal mask exchange to prevent coughing in lung volume reduction surgery. *Masui* 2000;49:278-81.
- Koga K, Asai T, Vaughan RS, Latto IP. Respiratory complications associated with tracheal extubation. Timing of tracheal extubation and use of the laryngeal mask during emergence from anaesthesia. *Anaesthesia* 1998;53:540-4.
- Costa e Silva L, Brimacombe JR. Tracheal tube/laryngeal mask exchange for emergence. *Anesthesiology* 1996;85:218.
- Dob DP, Shannon CN, Bailey PM. Efficacy and safety of the laryngeal mask airway vs Guedel airway following tracheal extubation. *Can J Anaesth* 1999;46:179-81.
- Smith I, Taylor E, White PF. Comparison of tracheal extubation in patients deeply anesthetized with desflurane or isoflurane. *Anesth Analg* 1994;79:642-5.
- Shajar MA, Thompson JP, Hall AP, Leslie NA, Fox AJ. Effect of a remifentanyl bolus dose on the cardiovascular response to emergence from anaesthesia and tracheal extubation. *Br J Anaesth* 1999;83:654-6.
- Mikawa K, Nishina K, Takao Y, Shiga M, Maekawa N, Obara H. Attenuation of cardiovascular responses to tracheal extubation: Comparison of verapamil, lidocaine, and verapamil-lidocaine combination. *Anesth Analg* 1997;85:1005-10.
- Fuhrman TM, Ewell CL, Pippin WD, Weaver JM. Comparison of the efficacy of esmolol and alfentanil to attenuate the hemodynamic responses to emergence and extubation. *J Clin Anesth* 1992;4:444-7.
- Turan G, Ozgultekin A, Turan C, Dincer E, Yuksel G. Advantageous effects of dexmedetomidine on haemodynamic and recovery responses during extubation for intracranial surgery. *Eur J Anaesthesiol* 2008;25:816-20.
- Brimacombe JR, Brain AIJ. *The Laryngeal Mask Airway*. Philadelphia: WB Saunders; 1997.
- Ng SY, Teoh WH, Lim Y, Cheong VG. Comparison of the AMBU Laryngeal Mask and the LMA Classic in anaesthetised, spontaneously breathing patients. *Anaesth Intensive Care* 2007;35:57-61.
- Sudhir G, Redfern D, Hall JE, Wilkes AR, Cann C. A comparison of the disposable Ambu AuraOnce Laryngeal Mask with the reusable LMA Classic laryngeal mask airway. *Anaesthesia* 2007;62:719-22.
- Hassan HG, el-Sharkawy TY, Renck H, Mansour G, Fouda A. Hemodynamic and catecholamine responses to laryngoscopy with vs. without endotracheal intubation. *Acta Anaesthesiol Scand* 1991;35:442-7.
- López AM, Valero R, Bovaira P, Pons M, Sala-Blanch X, Anglada T. A clinical evaluation of four disposable laryngeal masks in adult patients. *J Clin Anesth* 2008;20:514-20.
- Shariffuddin II, Wang CY. Randomised crossover comparison of the Ambu AuraOnce Laryngeal Mask with the LMA Classic laryngeal mask airway in paralysed anaesthetised patients. *Anaesthesia* 2008;63:82-5.
- Ovassapian A, Mesnick PS. The laryngeal mask airway. In: Ovassapian A, editor. *Fiberoptic Endoscopy and the Difficult Airway*. 2nd ed. Philadelphia: Lippincott-Raven Publishers; 1996. p. 231-46.
- Higgins PP, Chung F, Mezei G. Postoperative sore throat after ambulatory surgery. *Br J Anaesth* 2002;88:582-4.

Source of Support: Nil, **Conflict of Interest:** None declared

Announcement

INDIAN COLLEGE OF ANAESTHESIOLOGISTS – (ICA)

The Indian College of Anaesthesiologists (Academic wing of Indian Society of Anaesthesiologists) is registered as a separate trust with HQ at Delhi. Membership of the college is limited to ISA Members only. Membership fee Rs. 5,000/-,

For further details contact: **Dr. B Radhakrishnan, CEO**
Email: ceoica@isaweb.in Mobile: +91 98470 63190