



Original Research Article

A comparative study between cuffed oropharyngeal airway and laryngeal mask airway in spontaneously breathing anaesthetized patients for short surgical procedures

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ABSTRACT

Background: The art of endotracheal intubation has a long-chequered history being accepted as the gold standard of the airway. This study was done to compare LMA and COPA in spontaneously breathing anaesthetized patients for short surgical elective procedures.

Objectives: To compare Cuffed Oropharyngeal Airway (COPA) with Laryngeal Mask Airway (LMA) in terms of Placement success rate, Requirement of airway interventions and Intraoperative and postoperative complications.

Materials and Methods: A prospective Randomized Controlled clinical study was conducted among 60 patients undergoing elective surgical procedure under Department of Anaesthesia in Krishna Institute of Medical Sciences and Hospital, Karad. Randomization was done and patients were divided into two Groups- A and B. Chi-Square test was used for analysis.

Results: Male preponderance was seen in the study. Mean age in group A & B were 34.86 ± 10.64 & 35.53 ± 11.36 years respectively. First time successful insertion rate was higher in LMA group (93.33%) than COPA group (83.33%). No manoeuvres were required for clear, unobstructed airway in group A while in 40% of patients of COPA group required manoeuvres for clear, unobstructed airway. Coughing & gagging were observed in both the groups. But no intraoperative major complications are observed.

Conclusion: Considering technical aspects of airway management, LMA is better than COPA with respect to higher first-time success rate of LMA.

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1. Introduction

The art of endotracheal intubation has a long-chequered history being accepted as the gold standard of the airway. Most frequent cause of difficulty in administration of anaesthesia is an obstruction of airway.¹ No anaesthesia is safe or satisfactory unless diligent efforts are made towards maintenance of functioning, unobstructed airway. At first endotracheal intubation was the only mainstay of airway management during general anaesthesia.² It is not without complications, most of which arose from need to visualise larynx and insertion into the laryngeal opening.

The golden mean between the face mask and endotracheal intubation can be achieved with the help of Laryngeal Mask Airway and Cuffed Oropharyngeal Airway. The concept of Laryngeal Mask Airway was introduced by Archie J Brain in 1981.³ The LMA secures the airway by means of low-pressure seal around the laryngeal inlet by use of an inflatable cuff. It was designed by keeping in mind the fundamental characteristics of an artificial airway which are that: 1) It should overcome airway obstruction rapidly and easily. 2) It should be atraumatic when used by the unskilled. The Cuffed Oropharyngeal Airway (COPA) was invented by Robert S. Greenberg, MD at the Johns Hopkins Hospital, Baltimore, Maryland in 1990 and is intended as an alternative to face mask

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use during spontaneous ventilation.⁴ COPA is a relatively new device for maintenance of airway in spontaneously breathing anaesthetised patients. It serves much the same role as the LMA and the device indeed is a direct competitor to the LMA.⁴ Both devices can be used to establish an airway for spontaneously breathing anaesthetised patients with little difficulty or trauma. So, the rationale behind the study was to compare LMA and COPA in spontaneously breathing anaesthetized patients for short surgical elective procedures.

2. Materials and Methods

2.1. Study design

Prospective randomized controlled comparative study.

2.2. Study settings

Department of Anaesthesia in Krishna Institute of Medical Sciences and Hospital, Karad.

2.3. Study duration

2001- 2002 (1 year)

2.4. Study population

Patients aged between 18- 55 years of both the sexes undergoing elective surgical procedure according to ASA I and ASA II.

2.5. Sampling technique

Randomization

2.6. Inclusion criteria

Duration of the procedures being up to 60 minutes, patients of both sexes, ranging in the age from 18 to 55 years were included.

2.7. Exclusion criteria

Patients with significant cardiovascular, respiratory, neurological or endocrine diseases, upper respiratory tract pathology, patients at high risk of aspiration were excluded from the study.

2.8. Sample size

Total 60 patients during the study period who followed the inclusion criteria were studied.

2.9. Consent type

Written Informed consent.

2.10. Ethical consideration

Permission was granted by Institutional Ethics Committee.

2.11. Methodology

All the patients were kept nil by mouth overnight and informed consent was confirmed prior to operative procedure. The patients were randomly assigned to either LMA (Group A) or COPA (Group B) placement. Premedication was done using Inj. midazolam 0.05 mg/kg IV, inj. pentazocine 0.6 mg/kg, inj. glycopyrrolate 0.004 mg/kg, inj. ranitidine 1 mg/kg & inj. metoclopramide 0.1 mg/kg IV given 20 minutes before induction of anaesthesia. Patients were preoxygenated with 100% oxygen for 3 minutes. 20 minutes after premedication baseline reading of pulse & blood pressure were taken. All the patients were induced on injection thiopentone sodium 4- 6 mg/kg IV to loss of eyelash reflex and injection suxamethonium chloride 1.5 mg/kg was given intravenously to facilitate airway placement. Patients lungs were ventilated with 100% Oxygen for 45 seconds. LMA was inserted according to standard technique described by Brain and COPA was inserted by Guedel's or reverse Guedel's technique.⁵ Patients were excluded from the study if the insertion of airway took more than two attempts. Proper placement of airway was confirmed by equal chest inflation, bilateral equal air entry on auscultation. At the end of procedure, postoperative complications like coughing, vomiting and straining were recorded.

2.12. Statistical analysis

Data was expressed in terms of percentages. Epi-info 7 software was used for analysis. Chi-Square test was used for analysis. P value <0.05 is considered statistically significant.

3. Results and Observations

As per Table 1 Mean age in group A & B were 34.86 ±10.64 & 35.53 ±11.36 years respectively. Two groups were comparable with respective age. P>0.05 means differences of age in two groups are insignificant. Male preponderance is seen in both groups.

Table 2 shows placement success rate in terms of no. of attempts required for insertion of the airway. First time successful insertion rate was higher in LMA group (93.33%) than, COPA group (83.33%). This is by clinical observation. Second time success rates were 2 of 30 cases (6.66%) for LMA & 5 of 30 cases (16.66%) for COPA group. But by statistical analysis, P>0.05 (chi - square test), with respect to first time success rate there are no significant differences in two groups.

According to Table 3 No manoeuvres were required for clear, unobstructed airway in group A while in 40% of patients of COPA group required manoeuvres for clear,

Table 1: Age and sex wise distribution of both groups

Age (yrs)	Group A	% Group A	Group B	% Group B
18-25	4	13.33%	5	16.66%
26-35	13	43.33%	13	43.33%
36-45	6	20%	5	16.66%
46-55	7	23.33%	7	23.33%
Total	30		30	
Male	26	86.66%	21	70%
Female	4	13.33%	9	30%

Table 2: Placement success rates in both groups

No of Attempts for insertion of airway	Group A	% Group A	Group B	% Group B
First Attempt	28	93.33%	25	83.33%
Second Attempt	2	6.66%	5	16.66%
Total	30		30	

Table 3: Requirement of airway interventions in both groups

Airway Interventions	Group A	% Group A	Group B	% Group B
Maneuvers required	Nil	0%	12	40%
Maneuvers not required	30	100%	18	60%
Total	30		30	

unobstructed airway. So, airway interventions were required more commonly with COPA group while no interventions were required for LMA group.

$P > 0.05$ - So there are no significant differences in intraoperative complications in both the groups. Coughing & gagging are observed in both the groups. But no intraoperative major complications are observed in both the groups like laryngospasm, O_2 desaturation & regurgitation. Hiccup is also not seen in both the groups.

$P < 0.05$ means there are significant differences in two groups. It means that immediate sore throat is common in group A than in group B. So LMA is associated with more sore throat than COPA in immediate postoperative period. No patients had hoarseness of voice, dysphagia, lip swelling & ear pain in immediate postoperative period.

As per Table 6 since $P > 0.05$ i.e., there are no significant differences in late complications in both the groups.

4. Discussion

Laryngeal mask airway & Cuffed oropharyngeal airway are being called as "Missing link between face mask and endotracheal tubes". Advantages over face mask are hands free ventilation and that it seals the airway more effectively. Advantages over endotracheal tube are ease of insertion, no requirements of laryngoscope, no need of muscle relaxant for insertion of airway, less hemodynamic effects, less increase in intraocular pressure and less complications. So, these two supraglottic devices are used whenever there is difficult mask fit, need for "Hands Free" ventilation - so that anaesthesiologist's hands remain

free for performing some other important task. Cuffed oropharyngeal airway (COPA) is a new device and it requires some experience by practitioners to define its role in difficult intubation. Laryngeal mask airway & cuffed oropharyngeal airway both causes minimal sympathetic stimulation in both normotensive & hypertensive patients & are used when minimal sympathetic stimulation is desired. In Ophthalmic Surgery where rise in intra-ocular pressure is dangerous, these supraglottic devices are used. In our hospital, we have organized clinical randomized study comparing laryngeal mask airway & cuffed oropharyngeal airway in spontaneously breathing anaesthetized adult ASA I & II patients for short surgical elective procedures. Total 60 patients were included in the study with group A containing 30 patients (laryngeal mask airway group) & group B containing 30 patients (cuffed oropharyngeal airway group). Total 60 patients were studied. Out of 60, 30 patients received LMA & 30 received COPA. Out of 30 patients of LMA group, in 28 patient's insertion of LMA was successful in first attempt while 2 patients required second attempt for insertion. In group B, insertion of COPA was successful in 25 patients out of 30 patients in first attempt while 5 patients of group B required second attempt for COPA placement. So, considering the rate, first time success rate was 93.33% in LMA group while it was 83.33% in COPA group. LMA & COPA have been studied earlier by HSU Y W, PAN MH, HUANG CJ⁵ with respect to first time success rate. In their study, 80 ASA grade I & II patients scheduled for short elective procedures (less than 1hr) were studied. Propofol was used as an induction agent & comparison was done between LMA & COPA

Table 4: Intra-operative complications in both groups

Intraoperative complications	Group A	% Group A	Group B	% Group B
Coughing	2	6.66%	2	6.66%
Gagging	2	6.66%	1	3.33%
No complications	26	86.66%	27	90%
Total	30		30	

$P > 0.05$ – non-significant, $X^2_C = 0.158$

Table 5: Post-operative immediate complications in both groups

Complications	Group A	% Group A	Group B	% Group B
Sore Throat	8	26.66%	2	6.66%
No sore throat	22	73.33%	28	93.33%
Total	30		30	

$P < 0.05$, $X^2_C = 4.32$

Table 6: Latepost-operative complications in both groups

Complications	Group A	% Group A	Group B	% Group B
Sore throat	3	10%	2	6.66%
Lip swelling	Nil	0	1	3.33%
Ear pain	1	3.33%	2	6.66%
No complications	26	86.66%	25	83.33%
Total	30		30	

$P > 0.05$, $X^2_C = 0.118$

with respect to first time success rate. First time successful insertion was possible in 76 out of 80 patients (95%) & 68 of 80 patients (85%). The conclusion of the study was that first-time success rate was higher in LMA group than in COPA group. Another study done by Greenberg RS, Brmacombe J⁶ compared COPA with LMA in spontaneously breathing patients under anaesthesia. They studied total 453 patients, of which 302 received COPA & 151 received LMA, first time successful insertion was possible with 134 out of 151 patients (89%) of LMA group & 244 out of 302 patients (81%) of COPA group. By clinical observation, conclusion of the study was that LMA is better with respect to first time success rate than COPA. But applying statistics, according to chi-square test $P > 0.05$ i.e. no significant difference was found with respect to first time success rate in two groups. Another study done by Brimacombe JR, Brimacombe JC⁷ compared LMA with COPA in 120 adult patients. Anaesthesia was induced with propofol. The first-time success rate was 88 of 60 cases (97%) for the LMA & 33 of 60 cases (55%) for COPA ($P < 0.00001$). Conclusion of their study, by clinical observation & by statistics was that with respect to first time success rate LMA is better than COPA. Voyagis G.S., Dimitniou V.K. & KYN' AKIS KP⁸ studied prolonged use of LMA & COPA in spontaneously breathing anaesthetized patients. In our study, 4 patients of LMA group had complications while 3 patients of COPA group had complications during intraoperative period. Out of 30 patients of LMA group studied, 2 patients had coughing & 2 patients reported gagging during intraoperative period while out of 30

patients of COPA group studied 2 patients had coughing & one patient reported gagging during intraoperative period. Voyagis G.S., Dimitniou V.K.⁸ compared prolonged use of COPA & LMA in spontaneously breathing anaesthetized patients. They observed that incidences of intraoperative coughing, gagging, laryngospasm, O_2 desaturation & hypercarbia were similar in both the groups. Hsu YW, Pan MH⁵ compared COPA with LMA in spontaneously breathing anaesthetized patients. They observed that LMA & COPA are equivalent with respect to intraoperative complications. Pusch F, Wilding E⁹ compared COPA with LMA for elective minor procedures in 252 female adult patients & they concluded that in immediate postoperative period, postoperative complaints & mucosal injuries were higher with LMA than with COPA. Blood is detected more commonly on LMA than on COPA & concluded that LMA is associated with sore throat in immediate postoperative period. Ezri T, Ady N,¹⁰ compared use of COPA vs LMA in elderly patients & observed that postoperative immediate sore throat occurred in 20% patients of LMA group vs 10% of COPA group. Bloody secretions were present in two patients managed with LMA.

5. Conclusion

Considering technical aspects of airway management, LMA is better than COPA with respect to higher first-time success rate of LMA. More airway manipulation is required with COPA. LMA is associated with more incidences of sore throat in immediate postoperative period than COPA.

Postoperative late sore throat incidences are similar with LMA & COPA.

6. Source of Funding

None.

7. Conflict of Interest

None declared.

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