Print ISSN: 2321-6379
Online ISSN: 2321-595X
DOI: 10.17354/ijss/2018/5

Original Article

Comparison of Effects of Laryngeal Mask Airway Supreme Cuff Inflation with Air, Air: Oxygen Mixture, and Oxygen: Nitrous Oxide Mixture in Adults: A Randomized Double-blind Study

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Abstract

Introduction: Laryngeal mask airway (LMA) cuff pressure has been implicated as a prime reason for post-operative sore throat. LMA cuff pressure increases when the air is used for the cuff inflation during oxygen: Nitrous oxide (O_2: N_2O) anesthesia, which results in post-operative pharyngolaryngeal adverse events. We conducted this study to compare the effect of LMA supreme cuff inflation with air, air: Oxygen, and oxygen: Nitrous oxide mixture in adults.

Aim: The aim of the study was to compare the changes in cuff pressure intraoperatively with different gas composition (air, air: Oxygen mixture, and oxygen: Nitrous oxide mixture) used to inflate the LMA supreme by a manometer and post-operative pharyngolaryngeal morbidity.

Design: It was a potential randomized double-blind study which was conducted on 120 patients admitted for elective surgery under general anesthesia.

Materials and Methods: A total of 120 patients were randomly allocated into three groups of 40 each according to the composition of gases used to inflate the supreme LMA cuff to achieve 40 cm H_2O cuff pressure, air was used as cuff inflation medium in Group A, air: Oxygen mixture in Group AO, and oxygen: Nitrous oxide mixture in Group ON.

Statistical Analysis: The cuff pressure, ventilatory parameters, and post-operative pharyngolaryngeal complications were noted. The analysis was done by Student's *t*-test and Chi-square test. $P < 0.05$ was considered statistically significant.

Results: In Group A and Group OA cuff pressure significantly increased from initial cuff pressure of 40 cm H_2O until the end of the surgery to 74.35 ± 7.41 cm H_2O and 56.35 ± 3.63 cm H_2O, respectively. An initial decrease in cuff pressure was observed at 15 min to a mean of 32.85 ± 1.42 cm H_2O in Group ON which again gradually increased to near initial pressures to a mean of 40.10 ± 2.31 cm H_2O toward the end of surgery. Cuff volume increased in Group A and Group AO; however, it decreased in Group ON (23.18 ± 4.45 ml, 18.73 ± 2.61 ml, and 11.50 ± 1.93 ml, respectively) from initial values. Ventilatory and hemodynamic parameters were comparable in all the three groups. A significant difference in pharyngolaryngeal morbidity was observed between Group A and Group ON.

Conclusion: Cuff inflation with 50% O_2: N_2O mixture provided more stable cuff pressure in comparison to air and O_2: Air mixture during O_2: N_2O anesthesia. Ventilatory parameters and hemodynamic parameters did not change with variation in SLMA cuff pressure. Post-operative pharyngolaryngeal morbidity had a strong correlation with cuff pressure and was more in Group A and least in Group ON.

Key words: Cuff inflation, Cuff pressure, Laryngeal mask airway supreme, Pharyngolaryngeal morbidity

Access this article online

www.ijss-sn.com

Month of Submission : 12-2018
Month of Peer Review : 01-2019
Month of Acceptance : 01-2019
Month of Publishing : 02-2019

INTRODUCTION

Airway devices including laryngeal mask airway (LMA) have cuffs which are permeable to various gases depending on their solubility and partial pressures. Nitrous oxide (N_2O)

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is an inhalational anesthetic that is frequently used for general anesthesia. However, N_2O increases the intracuff pressure due to diffusion of N_2O into the cuff during general anesthesia.[1] Intracuff pressure during anesthesia is also affected by various factors such as composition and thickness of cuff material and gases used to inflate the cuff. Intracuff pressure increases steadily and reaches a level high enough to impede the microcirculation in the tracheal mucosa within 1 h[2,3] which may cause damage to the tracheal tissue. Thus, LMA cuff pressure has been implicated as a prime reason for a post-operative sore throat. A number of studies suggested that manometer should be used to monitor cuff pressure intraoperatively.[4]

Several methods have been described to prevent an increase in cuff pressure including filling the cuff with anesthetic gas mixture[5,6] or saline[7] partial cuff deflation technique, intracuff pressure monitoring, or limiting to the pressure at which the seal occurs.

We have planned this study keeping in mind that use of air only, O_2: N_2O mixture, and air: O_2 mixture as LMA cuff inflating medium leads to cuff pressure changes and affects the post-operative pharyngolaryngeal morbidity, and by proper monitoring of cuff pressure, we can get to know which gas mixture used in anesthesia could provide stable and better intracuff pressures resulting in decreased incidence of post-operative sore throat.

Statistical Analysis

The sample size was calculated keeping in view at most 5% risk, with minimum 85% power, and 5% significance level (significant at 95% confidence interval). Raw data were recorded in a Microsoft Excel spreadsheet and analyzed using Statistical Package for the Social Sciences (SPSS version 23.00). The continuous data were presented as mean with standard deviation (mean ± SD). Number of patients and/or percentage of cases expressed discrete categorical data. Categorical variables were analyzed using Chi-square test. Normally distributed continuous variables were analyzed using independent sample *t*-test. Power analysis was done to compare cuff pressure by taking α error of 5% and beta error of 20%. The power achieved was well above 90%. The blinding was opened at the end of the study.

MATERIALS AND METHODS

After obtaining approval from the Institutional Ethics Committee, along with written and informed consent, a total of 120 adults of either sex belonging to American Society of Anesthesiologists (ASA) Grades I and II aged 18–60 years and scheduled to undergo general anesthesia were enrolled in a prospective randomized, double-blind, comparative study. Patients with inadequate mouth opening, body mass index >35 kg/m^2, anticipated difficult airway, patient having increased risk of aspiration such as gastroesophageal reflux disease, hiatus hernia, oropharyngeal pathology, ASA Grades III and IV, cervical spine pathology, and pregnancy were excluded from the study.

The study included a total of 120 patients which were selected randomly through computerized software [Figure 1]. The patients were further divided into three

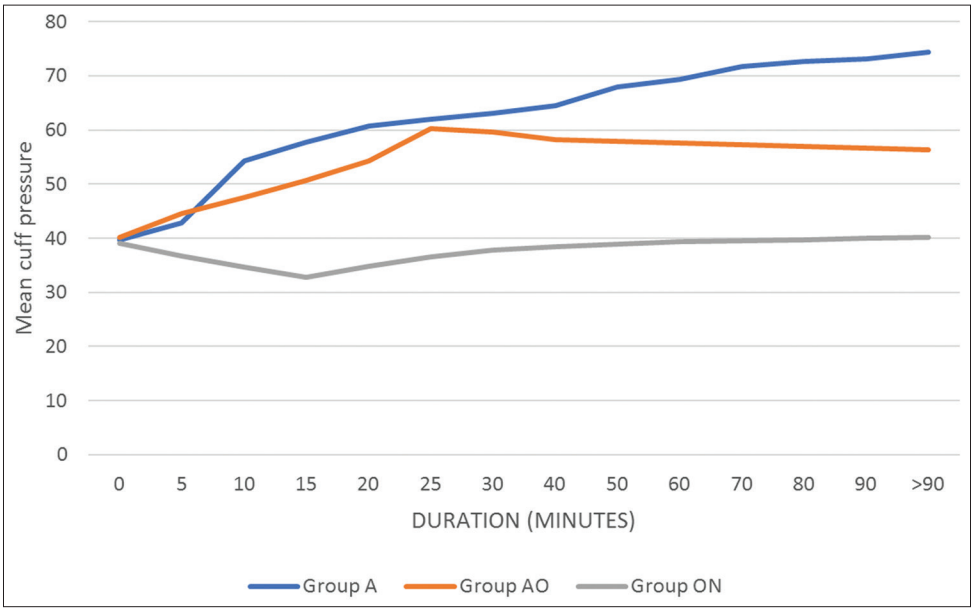

Figure 1: Cuff pressuring monitoring

groups, with each group containing 40 patients which were posted for surgery under general anesthesia using LMA Supreme cuff inflation with:

- Group A: Air only
- Group AO: Oxygen: Air mixture
- Group ON: Oxygen: Nitrous oxide mixture.

To maintain the blinding, the investigator was not involved in opening the envelope. The other anesthesiologist not involved in the study was asked to open the envelope just before the administration of general anesthesia and an appropriate gas-filled syringe was prepared according to the code to inflate the cuff. The same anesthesiologist was not allowed to take part in the management and observations. Gases of different composition were prepared just before the induction in the pre-operative room for each patient by an anesthesiologist not involved in the study.

Preanesthetic checkup including a detailed history and thorough general physical examination of the patient was carried out a day before surgery and was recorded. Venturi mask tubing was attached to the fresh gas outlet of anesthesia work station for the desired composition of gas for different groups that are Group A, Group AO, and Group ON. The other end of the tubing was attached to 50 ml syringe through three-way assembly. The fresh gas flow was set at a desired concentration and gas mixture at 5 L flow. Once desired gas was filled in the syringe, three-way was put in off position toward syringe and was disconnected from the tubing. The size of the LMA supreme was decided according to the manufacturer guidelines. The LMA cuff was checked for any leak. General anesthesia was induced with injection (inj.) propofol 1.5–2.5 mg/kg and inj. fentanyl 2 μg/kg given intravenously. After confirming adequate bag-mask ventilation, inj. vecuronium 0.1 mg/kg was administered and ventilation was performed with 100% O_2 at 5 L fresh gas flow for 3 min. A fully deflated LMA Supreme was inserted by a single anesthesiologist with more than 1 year of experience in insertion. The LMA cuff was inflated by the specified syringe to obtain a cuff pressure of 40 cm H_2O with the help of aneroid cuff pressure manometer attached to the pilot balloon. The volume of gas inflated was noted. Successful insertion was assessed by chest expansion and capnography.

At cuff pressure of 40 cm H_2O, oropharyngeal leak pressure was checked by closing adjustable pressure limiting valve at a fixed gas flow of 3 L/min. The airway pressure at which leak was heard (by stethoscope) was noted. Volume controlled ventilation was initiated, and initial ventilatory settings were adjusted to maintain end-tidal carbon dioxide ($EtCO_2$) between 35 and 45 mmHg. Fresh gas flow composition was changed to O_2:N_2O (50:50) with desflurane (0.8–1.4 minimum alveolar concentration) at 3 L for initial 5 min, then subsequently, flow was reduced to 1 L/min (500 ml O_2: 500 ml N_2O).

The cuff pressure and ventilator parameters were noted every 5 min for the first 30 min and then every 10 min until N_2O is switched off and 100% O_2 is given to the patient.

At the end of surgery, inj. myopyrolate (neostigmine + glycopyrrolate) 0.04–0.06 mg/kg was given as reversal. When the patient was awake and following commands, LMA supreme was removed, inflated. Parameters such as the presence of blood stain on the cuff, attempts for LMA supreme insertion, ease of insertion, use of Guedel's airway (due to difficult mask ventilation or to relieve post-operative upper airway obstruction), aspirated volume of gas from the LMA supreme cuff, and laryngospasm were noted. Oral suction was avoided as far as possible and if done was noted.

The patient was then shifted to the post-anesthesia care unit. After surgery, pharyngolaryngeal complications, consisting of a sore throat, dysphonia, and dysphagia were assessed at 1st, 2nd, 12, and 24 h postoperatively. The predetermined definitions of pharyngolaryngeal complications were used for the assessment. The post-operative sore throat pain was treated by intravenous fentanyl 1–1.5 μg/kg in titrated doses according to the patient's comfort. Patient satisfaction scores using visual analog scales (VAS) score was assessed at 1st, 2nd, 12, and 24 h postoperatively.

RESULTS

With respect to the demographic parameters, the patients in the three groups were analogous as is evident from Table 1. The mean duration of surgery was 58.97 ± 12.88 min in Group A, 60.35 ± 11.05 min in Group AO, and 53.77 ± 9.07 min in Group on. The difference was statistically nonsignificant ($P > 0.05$). Hemodynamic and ventilatory parameters were also found statistically and clinically insignificant ($P > 0.05$).

In our study in Group A, we observed a significant and progressive increase in mean cuff pressures from 40 cm H_2O to 74.35 ± 7.41 cm H_2O until the end of the surgery. In Group OA, cuff pressure increased significantly until 25 min to mean of 60.23 ± 3.70 cm H_2O and then gradually decreased to mean 56.35 ± 3.63 cm H_2O until the end of surgery. Intracuff pressures were almost stable in subjects belonging to Group ON during the course of anesthesia. An initial decrease in cuff pressure was observed at 15 min to a mean of 32.85 ± 1.42 cm H_2O which again gradually increased to near initial pressures to a mean of 40.10 ± 2.31 cm H_2O toward the end of surgery. Intracuff pressure was found to be statistically significant between the three groups ($P < 0.05$) [Table 2].

Table 1: Demographic characteristics of patients

Demographic data	Group A (air)	Group AO (air:Oxygen)	Group ON (Oxygen:Nitrou oxide)	*P* value
Age (years) mean±SD	30.05±15.4	32.65±9.49	31.73±8.94	>0.05
Sex (males:females)	8:32	18:22	16:24	>0.05
Duration OF surgery (minutes) mean±SD	58.97±12.88	60.35±11.05	53.77±9.07	>0.05
Duration of low flow anesthesia (minutes) mean±SD	52.65±8.40	55.32±14.46	56.35±15.39	>0.05

Duration (minutes)	Group A	Group AO	Group ON
	Mean±SD	Mean±SD	Mean±SD
0	39.75±1.10	40.13±0.79	39.13±1.92
5	42.88±5.72	44.58±1.20	36.65±1.08
10	54.30±6.58	47.48±1.47	34.73±1.18
15	57.70±5.96	50.73±2.05	32.85±1.42
20	60.75±4.78	54.33±2.80	34.80±1.42
25	61.95±5.11	60.23±3.70	36.53±1.28
30	63.15±4.48	59.55±3.79	37.78±1.42
40	64.45±4.86	58.15±3.87	38.48±2.14
50	68.00±6.63	57.88±4.69	38.98±2.45
60	69.28±7.08	57.63±5.72	39.30±4.93
70	71.73±7.59	57.23±4.90	39.55±4.51
80	72.68±8.62	56.93±3.03	39.73±3.95
90	73.08±8.38	56.63±3.31	40.03±3.25
>90	74.35±7.41	56.35±3.63	40.10±2.31

A minimal effective cuff inflating volume was used to achieve the LMA cuff pressure of 40 cm H_2O in our study. The initial volume of gas used to inflate LMA Supreme in Group A, Group AO, and Group ON was 13.98 ± 1.83 ml, 13.08 ± 2.28 ml, and 15.63 ± 2.18 ml which was enough to reach the desired pressure of up to 40 cm H_2O. In Group A and Group AO, mean difference between initial and final intracuff volume was observed to be 9.38 ± 4.27 ml and 5.08 ± 1.87 ml. In Group ON, mean difference between initial and final intracuff volume observed was 4.13 ± 1.24 ml. A significant difference between initial and final intracuff volume was observed in three groups ($P < 0.05$) [Table 3].

The incidence of a sore throat, dysphagia, and dysphonia was higher in Group A at 1st, 2nd, 12, and 24 h postoperatively in comparison to Group AO and Group ON. A significant difference in a sore throat, dysphagia was observed between Group A and Group ON in our study. Reduced post-operative morbidity (sore throat, dysphagia, and dysphonia) was observed in Group ON (<0.05). A more stable intracuff pressure trend observed in Group ON was directly related to decrease in the incidence of post-operative pharyngolaryngeal morbidity in this group. In our study, a significant difference in dysphonia was observed between Group A and Group ON at 1st h postoperatively. However, dysphonia at 2nd, 12, and 24 h was found to be statistically insignificant ($P > 0.05$) [Table 4].

VAS was measured postoperatively for a sore throat at 1st, 2nd, 12, and 24 h. Mean VAS scores for Group ON were observed to be 3 at a 1st h, 3 at 2nd h, 1 at 12 h, and 1 at 24 h postoperatively. The mean VAS scores for Group A and Group OA were observed to be 4.4 at 1st h, 3.3 at 2nd h, 3.2 at 12 h, and 3.2 at 24 h postoperatively. There was a significant difference in sore throat pain score between three groups ($P < 0.05$) and sore throat pain score was comparatively lower in Group ON at the end of 1st, 2nd, 12, and 24 h postoperatively [Table 5].

Rescue analgesia in the form of injection fentanyl 1–1.5 mcg/ kg was given in patients with VAS >3 at 1st, 2nd, 12, and 24 h. The result was highly significant in terms of the need for rescue analgesia in Group ON/Group A (<0.05) at a 1st h. Due to the limited duration of action and reoccurrence of throat pain injection fentanyl were repeated at 2nd, 12, and 24 h according to the patient's complaint. In Group ON at 1st h postoperatively, 6 patients were given rescue analgesia. 5 patients were given rescue analgesia at 2nd h. 3 patients and 1 patient were given rescue analgesia at 12 h and 24 h, respectively.

DISCUSSION

Air is most commonly used to inflate the cuff. Nitrous oxide (N_2O) is the least potent and the oldest inhaled anesthetic which has the property to diffuse into air-filled cavities and also through the semipermeable membrane of LMAs cuff, thereby gradually increasing the cuff pressures. High intracuff pressure can cause severe pharyngolaryngeal complications including a sore throat or hoarseness after LMA removal postoperatively. Although the application of minimum effective cuff inflating volume is suggested to maintain airway sealing and adequacy of ventilation for patients receiving general anesthesia with LMA at a lower level of the intracuff pressure, it is currently not standard care in most of the anesthetic departments.

Thus, the study was carried out keeping in mind that use of O_2: N_2O, Air: O_2, and air only as LMA cuff inflating medium leads to cuff pressure changes and effects the post-operative pharyngolaryngeal morbidity. LMA cuff pressure is an inherent risk factor for the development of this common complication, yet a number of techniques can reduce the incidence. Airway devices have cuffs which are permeable to a variety of gases depending on their partial pressure and solubility. The composition and thickness of the cuff material

(latex, silicone or polyvinyl chloride) play a significant role in the intracuff pressure changes during anesthesia.

All the three groups were compared with respect to changes in cuff pressure intraoperatively with a manometer and effect of LMA Supreme cuff pressure change on intraoperative ventilatory and hemodynamic parameters. Post-operative pharyngolaryngeal morbidity in the form of a sore throat, dysphagia, dysphonia, and rare complications of LMA insertion such as recurrent laryngeal nerve palsy, hypoglossal nerve palsy, and lingual nerve palsy was noted.

Table 2: Cuff pressure monitoring in intaoperative period

P value		
A/AO	AO/ON	A/ON
0.04	0.00	0.04
0.03	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.04	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00

In our study, there was a significant difference in cuff pressure in Group A, AO, and ON. The cuff pressure was noted every 5 min for the first 30 min and then every 10 min until N_2O was switched off. In Group A, we observed a significant and progressive increase in mean cuff pressures from 40 cm H_2O to 74.35 ± 7.41 cm H_2O until the end of the surgery. Similar increase in intracuff pressure was observed under N_2O: O_2 anesthesia in a study by Pallavi *et al.* in 2018 where cuff pressure and volume achieved at the end of surgery were much higher in air group as compared to lignocaine group ($P < 0.05$). Despite filling the ET cuff with air at below critical initial cuff pressure of 30 cm H_2O, there was an increase in mean cuff pressure to 49.86 ± 0.72 cm H_2O toward the end of surgery.[8]

In Group AO, cuff pressure increased significantly until 25 min to mean of 60.23 ± 3.70 cm H_2O and then gradually decreased to mean 56.35 ± 3.63 cm H_2O until the end of surgery. There has been not much literature to evaluate the effect of O_2 and air mixture on cuff pressure. However, a study by Mona *et al.* in 2016 found similar results where LMA Proseal cuff inflation with O_2: Air mixture increased the cuff pressure at 5 min which became statistically

Table 3: Intracuff volume variation

Variables	Group A	Group AO	Group ON	*t*-value			*P* value		
	Mean±SD	Mean±SD	Mean±SD	A/AO	AO/ON	A/ON	A/AO	AO/ON	A/ON
Initial	13.98±1.83	13.08±2.28	15.63±2.18	1.36	-5.10	-3.07	0.03	0.00	0.00
Final	23.18±4.45	18.73±2.61	11.50±1.93	5.20	11.81	12.22	0.00	0.00	0.00
Difference	9.38±4.27	5.08±1.87	4.13±1.24	5.11	2.53	6.56	0.00	0.00	0.00
Percentage change	64.11±17.97	39.67±13.19	26.52±6.38	6.33	5.50	10.19	0.00	0.00	0.00

Table 4: ST AT 1st, 2nd, 12 and 24-hour post operatively

Sore throat (hour)	Group A	Group AO	Group ON	Total	*P* value		
	n (%)	*n* (%)	*n* (%)	*n* (%)	A/AO	AO/ON	A/ON
1st h	16 (40.00)	12 (30.00)	6 (15.00)	34 (28.40)	>0.05	>0.05	<0.05
2nd h	14 (35.00)	10 (25.00)	5 (12.50)	29 (24.16)	>0.05	>0.05	<0.05
12 h	10 (25)	7 (17.50)	3 (7.50)	20 (16.60)	>0.05	>0.05	<0.05
24 h	7 (17.50)	5 (12.50)	1 (2.50)	13 (10.83)	>0.05	>0.05	<0.05

St: Sore throat

Table 5: VAS score for sore throat in post operative

Time in hours	Group A	Group AO	Group ON	*t* value			*P* value		
	Mean±SD	Mean±SD	Mean±SD	A/AO	AO/ON	A/ON	A/AO	AO/ON	A/ON
1	4.38±0.59	4.15±0.58	3.20±0.41	1.02	6.92	9.68	0.04	0.00	0.00
2	3.38±0.54	3.18±0.45	3.00±0.39	1.77	1.87	3.55	0.04	0.03	0.00
12	3.18±0.38	2.20±0.41	1.10±0.30	10.03	-9.53	1.94	0.00	0.00	0.02
24	2.25±0.49	1.18±0.38	1.05±0.22	11.58	1.82	17.48	0.00	0.04	0.00

VAS: Visual analog scales

significant at 10 min until 30 min then again decreased gradually until 90 min.[9]

Intracuff pressures were almost stable in subjects belonging to group ON during the course of anesthesia. An initial decrease in cuff pressure was observed at 15 min to a mean of 32.85 ± 1.42 cm H_2O which again gradually increased to near initial pressures to a mean of 40.10 ± 2.31 cm H_2O toward the end of surgery [Figure 2]. It is hypothesized that when LMA Supreme cuff is inflated with 50% N_2O, it creates a pressure above the atmospheric pressure at 40 cm H_2O which leads to a pressure gradient between the inside and outside of the cuff resulting in the diffusion of N_2O out of the cuff resulting in an initial decrease in pressure and volume. The results are consistent with that of an earlier study done in 2017 by Puneeth *et al.* where cuff inflation with N_2O: O_2 resulted in a significant decrease in intratracheal cuff pressure from 30 cm H_2O to mean pressure of 24.10 ± 0.90 cm H_2O at the end of 90 min in comparison to increased mean cuff pressures with air ($P < 0.001$).[10] Shenoy *et al.* stated that the practice of using 50% N_2O: O_2 for filling endotracheal tube cuff facilitates an inexpensive method for providing safe and stable cuff pressures during anesthesia.[11]

A minimal effective cuff inflating volume was used to achieve the LMA cuff pressure of 40 cm H_2O in our study. The volume of gas used to inflate LMA Supreme in Group A, Group AO, and Group ON was 13.98 ± 1.83 ml, 13.08 ± 2.28 ml, and 15.63 ± 2.18 ml which was enough to reach the desired pressure of up to 40 cm H_2O. Furthermore, a significant difference in the initial and final aspirated volume was observed in our study in all three groups [Figure 3]. Intracuff volume variation was more in Group A in comparison to Group AO whereas the least change in cuff volume was observed in Group ON. Mitchell *et al.* observed a progressive decrease in cuff pressure and final cuff volume when a gas mix (O_2: N_2O) was used to inflate the cuff.[11]

A significant difference in a sore throat, dysphagia was observed between Group A and Group ON in our study. Reduced post-operative morbidity (sore throat, dysphagia, and dysphonia) was observed in Group ON (<0.05). A more stable intracuff pressure trend observed in Group ON was directly related to decrease in the incidence of post-operative pharyngolaryngeal morbidity in this group. We also assessed the intensity of sore throat pain in three groups using VAS. Our study showed mean VAS scores for Group ON being 3 at 1st h, 3 at 2nd h, 1 at 12 h, and 1 at 24 h postoperatively. The mean VAS scores for Group A and Group AO were observed to be 4.4 at 1st h, 3.3 at 2nd h, 3.2 at 12 h, and 3.2 at 24 h postoperatively. There was a significant difference in sore throat pain score between three groups ($P < 0.05$) and sore throat pain score were comparatively lower in Group ON at the end of 1st, 2nd, 12, and 24 h postoperatively.

Rescue analgesia in the form of injection fentanyl 1–1.5 mcg/kg was given in patients with VAS >3 at 1st, 2nd, 12, and 24 h. In Group A, 16 patients required rescue analgesia at 1st h, 14 patients at a 2nd h, and 12.7 patients at 12 and 24 h postoperatively. A significant difference in the patients requiring rescue analgesia was observed at 1st, 2nd, 12, and 24 h ($P < 0.05$) postoperatively and need was least in Group ON at 1st h due to the comparatively low

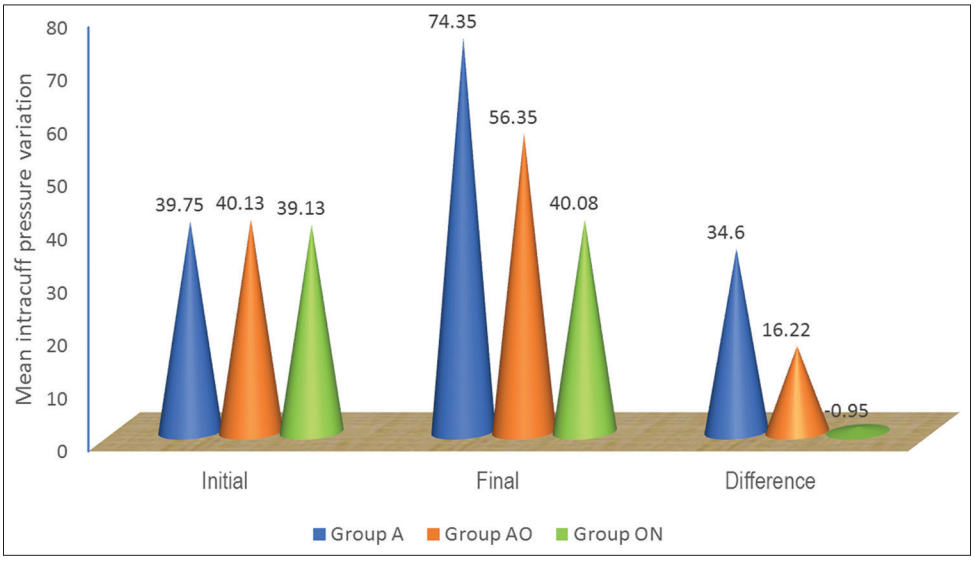

Figure 2: Intracuff volume variation

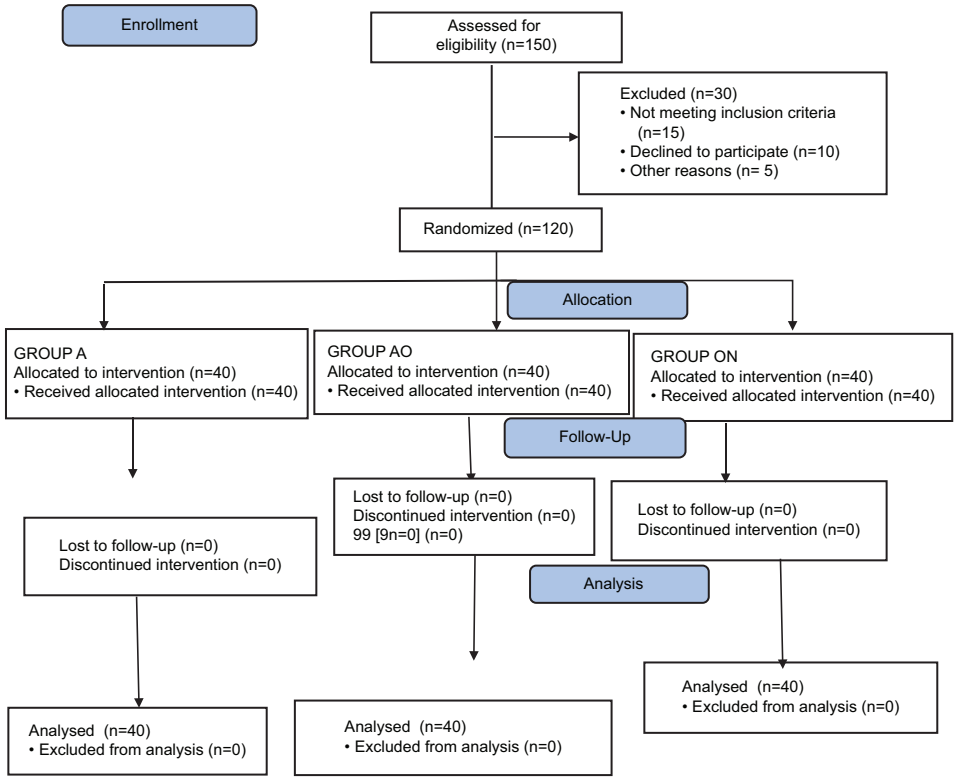

Figure 3: Consort flow diagram

incidence of a sore throat resulting in better pain score in this group.

The unique distinction of our study is that we have also taken into account the potential known confounders for pharyngolaryngeal complications that are the ease of LMA insertion, number of attempts of LMA insertion, use of Guedel's type airway, incidence of laryngospasm, presence of blood on LMA Supreme after removal, and use of pharyngeal suctioning. These univariate predictors of a sore throat were found to be non-significant ($P > 0.05$) and were comparable in all the groups.

LIMITATIONS

Limitations of the study were the inability to assess the concentration of N_2O inside the cuff at the start and end of general anesthesia as it would have given an idea of the concentration of N_2O diffusion into and out of cuff and its effect on emergence phenomenon. Another limitation of our study was the lack of enough number of patients to estimate the impact of intracuff pressure on the incidence of rare and more serious complications of LMA insertion such as recurrent laryngeal nerve palsy, hypoglossal nerve palsy, and lingual nerve palsy. In our study, the duration of surgery taken was from 90 to 100 min. Hence, due to the uniformity in the duration of surgery in three groups, no conclusion can be drawn regarding the incidence of a sore throat related to the duration of anesthesia. A more detailed study with varying duration of the procedure is required to further substantiate our findings. Furthermore, the correct position of LMA was not confirmed by fiberoptic bronchoscopy.

CONCLUSION

Thus, from our study, we are clearly able to conclude that the rise of cuff pressure with the progression of surgery during general anesthesia (N_2O: O_2) is better overcome when LMA Supreme is inflated with N_2O: O_2 mixture as compared to air and air: O_2 mixture. The practice of using 50% N_2O: O_2 mixture for filling LMA Supreme facilitates an inexpensive method for providing safe and stable cuff pressure during anesthesia and an improved protective effect in preventing post-operative pharyngolaryngeal morbidity in the form of sore throat, dysphagia, and dysphonia. Furthermore, we are able to show a clear benefit from the use of manometer after insertion of LMA Supreme to reduce pharyngolaryngeal complications.

FUTURE REFERENCE

From our study, we can say that N_2O:O_2 mixture provides a safe and stable cuff pressure during N_2O: O_2 anesthesia in comparison to other cuff inflating mediums. Thus, N_2O: O_2 mixture can be used as an inexpensive medium for cuff inflation and prevention of post-operative laryngopharyngeal morbidities. However, limited data are available, and more future studies need to be done so as to prove the same.

How to cite this article: Ranjana, Chatrath V, Sharma A, Kirti. Comparison of Effects of Laryngeal Mask Airway Supreme Cuff Inflation with Air, Air: Oxygen Mixture, and Oxygen: Nitrous Oxide Mixture in Adults: A Randomized Double-blind Study. Int J Sci Stud 2019;6(11):19-26.

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