ORIGINAL RESEARCH PAPER

Volume-7 | Issue-8 | August-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

AWAKE FIBEROPTIC BRONCHOSCOPY-GUIDED NASOTRACHEAL INTUBATION: LIGNOCAINE NEBULISATION VS AIRWAY NERVE BLOCK

Anesthesiology

Dr. Manju Jha — Professor and HOD Department of Anaesthesiology and Critical Care, Pravara Institute of Medical Sciences, Loni.

Dr. Prerna Punj* — MD Scholar Department of Anaesthesiology and Critical Care, Pravara Institute of Medical Sciences, Loni. *Corresponding Author

Dr. Prashant Rai — MD Scholar Department of Anaesthesiology and Critical Care, Pravara Institute of Medical Sciences, Loni.

Dr. Vanshika saxena — DA Scholar Department of Anaesthesiology and Critical Care, Pravara Institute of Medical Sciences, Loni.

ABSTRACT

Introduction: The preferred management strategy for difficult airways is awake fiberoptic bronchoscopy guided intubation, which requires effective airway anaesthesia to ensure patient comfort and acceptance. This prospective case control study was conducted to compare lignocaine nebulisation and airway nerve block for airway anaesthesia prior awake intubation.

Aim: To compare lignocaine nebulisation and airway nerve block for awake fiberoptic bronchoscopy guided nasotracheal intubation.

Methodology: Twenty adult patients scheduled for surgical procedures under general anaesthesia were studied under two groups depending upon the premedication recieved. Group N received jet nebulisation (10ml of 4% lignocaine) and Group B received bilateral superior laryngeal and transtracheal recurrent laryngeal nerve block(each with 2ml of 2% lignocaine) followed by fiberoptic bronchoscopy-guided nasotracheal intubation. All patients received procedural sedation with dexmedetomidine. The intubation time, intubating conditions, vocal cord position, cough severity and degree of patient satisfaction were recorded. Student's t test used to analyse quantitative data and Fisher's test to qualitative data. P values <0.05 were considered statistically significant.

Result: The time taken for intubation was significantly shorter in Group B as compared to Group N (P = 0.029). The intubating conditions and degree of patient comfort were better in Group B compared to Group N. Although all patients were successfully intubated, patient satisfaction was higher in Group B.

Conclusion: Airway nerve blocks are preferable to lignocaine nebulisation as they provide superior quality airway anaesthesia. However, nebulisation may be a suitable alternative when nerve block is not feasible.

KEYWORDS

Airway Nerve Block, Lignocaine Nebulisation, Awake Fibre-optic Intubation

Introduction:

Administrating general anaesthesia in an unanticipated difficult airway can jeopardize patient's life, in these situations an awake fiberoptic intubation is considered as safe method for intubating trachea under vision [1] and can be done in patients with cervical spine instability, facial fractures, craniofacial abnormalities, TMJ Ankylosis [2, 3]. To suppress airway reflexes and discomfort during bronchoscopy, appropriate anaesthesia for nose, oropharynx, larynx, and trachea is prerequisite. For deep and rapid anaesthesia airway nerve blocks [4] are frequently used while nebulisation with local anaesthesia saves the patient from multiple needle pricks. With Dexmedetomidine for procedural sedation comparison of airway nerve block and lignocaine nebulisation was conducted. These techniques help to allay anxiety so that the patient is more cooperative during the procedure [5].

Aims and objectives:

This randomized study was conducted to compare the efficacy of lignocaine nebulisation and airway nerve block for achieving airway anaesthesia before awake fiberoptic bronchoscopy-guided intubation. The primary objective was to compare the intubation time of the two techniques, and the secondary objectives were to assess the quality of airway anaesthesia, degree of patient comfort, and post-operative patient satisfaction.

Methodology:

After gaining clearance from institutional ethical committee and informed consent from patients, study was conducted on 40 patients (20 in each group), of either gender, aged between 18-60 years, under class ASA 1 and 2, undergoing surgery under general anaesthesia RMC, Loni and willing for the study. Patients who were unwilling, allergic to any study drug, asthmatics, epileptics, hemodynamically unstable, or deranged coagulation profile were excluded.

The minimum sample size calculated using open- epi software, applied to study by pooja et al.[6] for power of 0.8 and type 1 error of 0.05, was 30 (15 in each group). To allow for study error and attrition, a total of 40 patients were included in this study.

After thorough airway assessment, preanaesthetic checkup and explanation of procedure, patients were randomly allotted in two groups. Patients were taken into procedure room, after obtaining baseline parameters; i.v.line was secured for ringer's lactate intravenous infusion. Glycopyrolate (0.005/kg) was administered intravenously and two drops of xylometazoline 0.1% were instilled in the nasal cavity. Midazolam (0.05g/kg, IV) and dexmedetomidine (1 µg/kg, IV) were infused over a 10-min period to achieve procedural sedation. In Group N, patients (n = 20) received 10 ml of 4% lignocaine jet nebulizer for 15 min. In Group B, patients (n = 20) received bilateral superior laryngeal nerve block using 2cc of 2% lignocaine and intra-tracheal block with 4cc of 4% lignocaine. 1 ml of 2% lignocaine jelly was applied to the nasal mucosa in both groups and awake intubation performed using Fiberoptic bronchoscope by senior anaesthesiologist (performed > 50 successful Fiberoptic intubation) who was blinded to the groups. General anaesthesia was achieved with propofol (2 mg/kg, IV) and vecuronium bromide (0.1 mg/kg, IV). Post-op assessment was done for adverse effects like sore throat, hoarseness.

Statistical analysis included using Student's t test for parametric data, the Mann-Whitney U test for non-parametric data, and Fisher's test for categorical data. Continuous variables are expressed as means ± standard deviation, and categorical variables as proportions (%). P values < 0.05 were considered to be statistically significant. The statistical evaluation was done using Graph Pad software version PRISM 7.

Table 1: Grading system used to assess intubating condition, vocal cord position and patient satisfaction

	Intubating condition	Vocal cord position	Patient comfort indices			
			cough severity	**comfort during intubation**	**post intubation assessment**	**post –op patient satisfaction**
Grade 1	Optimal (no hold-up or collision of tracheal tube with vocal cords)	Relaxed/ glottis open	No cough	No reaction	Cooperative	Excellent

Grade 2	Suboptimal (hold-up relieved by one rotation of the tube)	Moving/ glottis partially open	Slight (≤ 2 coughs)	Grimacing	Restless/ minimal resistance	Good
Grade 3	Difficult (hold-up requiring more than one rotation of the tube)	Adducted/ glottis closed	Moderate (3–5 coughs)	Verbal objection	Severe resistance/ requirement for immediate general anesthesia	Fair
Grade 4	(failed attempt at awake fiberoptic intubation)		Severe (> 5 coughs)	Defensive movements		Poor

Observations and Result:

No failure of intubation was observed in any of the group and all 40 patients were considered for statistical evaluation.

A] Position of vocal cord after nebulisation with lignocaine



B] Position of vocal cords after bilateral superior laryngeal nerve block.

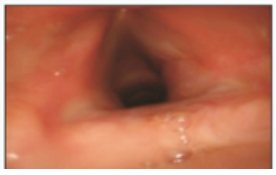
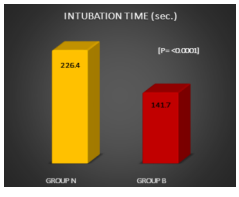


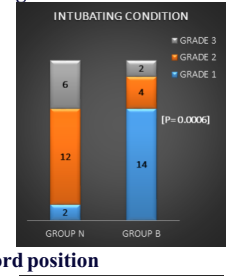
Table 2: Demographic data, Airway assessment, Intubation time

	Group N	Group B	Test applied	P value
Age (yr.)	46.2 ± 9.4	48.8 ± 8.7	Unpaired t test	0.5290
Sex (M/F)	14/6	11/9	Chi square test	0.5136
Weight (Kg)	60.3 ± 11.2	57.6 ± 9.1	Unpaired t test	0.5614
ASA (I/II)	12/8	15/5	Chi square test	0.4996
Modified Mallampatti grade (3/4)	8/12	4/16	Chi square test	0.3006
Thyromental distance (cm) (> 6.5/< 6.5)	18/2	16/4	Chi square test	0.6579
Intubation time (seconds)	226.4 ± 29.6	141.7 ± 22.4	Unpaired t test	<0.0001

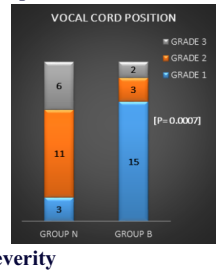
Graph 1: Intubation time



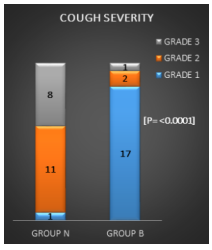
Graph 2: Intubating condition



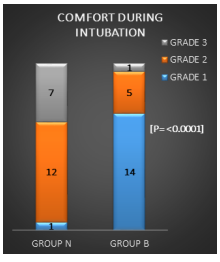
Graph 3: Vocal cord position



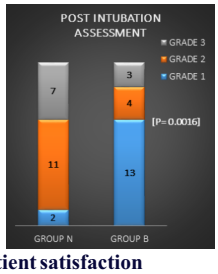
Graph 4: Cough severity



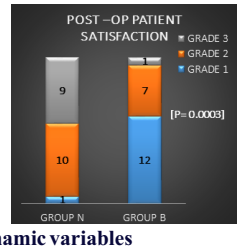
Graph 5: Comfort during intubation



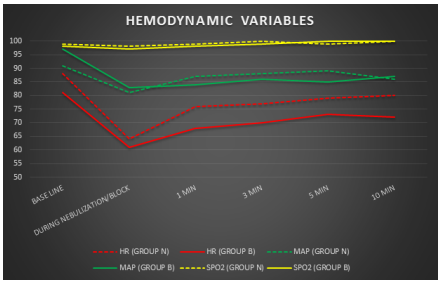
Graph 6: Post intubation assessment



Graph 7: Post-op patient satisfaction



Graph 8: Hemodynamic variables



Result for hemodynamic variables: On applying one-way ANOVA for inter group comparison, no significant statistical difference was observed at point for heart rate, mean arterial pressure and oxygen saturation. On intra group comparison by applying repeated measures ANOVA, significant fall was observed in heart rate and mean arterial pressure at the time of giving nebulization/ block, which returned to base line after intubation. The rise in heart rate and mean arterial pressure after intubation was more in Group N, however the rise in either group was not statistically significant. Oxygen saturation was comparable to baseline in both groups at all-time intervals.

Discussion:

Several authors have compared different airway anaesthesia

techniques like Webb et al. [7] compared trans-cricoids lignocaine injection with use of the spray-as-you-go technique, Graham et al. [8] compared three different methods of providing airway anaesthesia, Kundra et al. [9] compared nebulised lignocaine 4% with combined regional nerve block. Airway nerve block provides rapid and deep anaesthesia with only small doses of local anaesthetic but procedure involves risk of accidental intravascular injection and nerve injury, and airway nerve block is not feasible in distorted anatomy. Nebulisation of local anaesthetics is another technique that deposits fine droplets directly over the mucosa, obviating the need for multiple painful injections, can also be used in cases where nerve block cannot be performed. In our study, no failure of intubation was noted in either group. The mean intubation time was significantly shorter in the nerve block group; this was similar to the findings of Gupta et al. [10], who reported a mean intubation time of 123 ± 46.7 s in a nerve block group and 200.4 ± 72.4 s in a nebulisation group (P = 0.047). However, Reasoner et al. [11] found no significant difference in intubation time between nerve block and topical anaesthesia groups and in both of their groups the intubation time was longer than in any other study. The intubating conditions were better in Group B compared with Group N, similar to the studies of Webb et al. [7], Graham et al. [8], and Sethi et al. [12]. However, Reasoner et al. [11] and Gupta et al. [10] found no significant difference in intubating conditions between groups. We compared patient comfort between our two study groups according to cough severity and intubation comfort scores during and after intubation; patient comfort was higher in the nerve block group. Gupta et al. [10] also observed significant coughing in their nebulisation group compared with a nerve block group. Hemodynamic parameters remained stable in our patients and there was no sympathetic stimulation during intubation due to use of dexmedetomidine infusion for sedation. Although significant reduction in mean heart rate and blood pressure from baseline just after intubation in both groups were noted. Contrary to our study, Kundra et al. [9] reported a progressive increase in heart rate and mean arterial pressure in all of their patients, was significantly greater in the nebulisation group. In our study, patient satisfaction scores recorded 24 hours after surgery were higher in Group B than in Group N. Adverse effects, such as sore throat, hoarseness, and unpleasant memories, were not found to differ significantly between the groups. No other adverse effects, like hypoxia, severe hypotension, severe bradycardia, bradyarrhythmia, bronchospasm, or seizures due to lignocaine toxicity were recorded in either group.

Conclusion:

This study revealed that airway anaesthesia using airway nerve blocks is superior to lignocaine nebulisation for awake fiberoptic bronchoscopy-guided nasotracheal intubation, in terms of ease of intubation and patient comfort and satisfaction. Nevertheless, lignocaine nebulisation may be used as an alternative technique for airway anaesthesia when nerve block is not feasible, because we observed no case of failure of awake Fiberoptic intubation and no complications related to nebulisation. Airway nerve blocks are considered a gold standard: bilateral superior laryngeal nerve blocks, which anesthetize the larynx above the level of the vocal cords and block glottic closure reflex; and transtracheal nerve blocks, which anesthetize the trachea and larynx below the level of the vocal cords and abolish the cough reflex.

References

1. Panchabhai TS, Mehta AC. Historical perspectives of bronchoscopy. Connecting the dots. Ann Am Thorac Soc 2015; 12:631- 41.
2. Yrigoyen E, Fujikawa YF. Flexible fiberoptic bronchoscopy. Anesthesia, technique and results. West J Med 1975; 122: 117- 22.
3. Diaz-Jimenez JP, Rodriguez AN. Interventions in Pulmonary Medicine. Houston, Springer. 2013, pp 13-31.
4. Parkes SB, Butler CS, Muller R. Plasma lignocaine concentration following nebulization for awake intubation. Anaesth Intensive Care 1997; 25:369-71.
5. Dhasmana SC. Nasotracheal fiberoptic intubation: patient comfort, intubating conditions and hemodynamic stability during conscious sedation with different doses of dexmedetomidine. J Maxillofac Oral Surg 2014; 13:53-8.
6. Pooja Rawat Mathur, Neena Jain, Aji Kumar, Beena Thada, Veena Mathur, and Deepak Garg et al. Comparison between lignocaine nebulization and airway nerve block for awake fiberoptic bronchoscopy-guided nasotracheal intubation. Korean J Anesthesiol 2017; 2017-e54
7. Webb AR, Fernando SS, Dalton HR, Arrowsmith JE, Woodhead MA, Cummin AR. Local anaesthesia for fibreoptic bronchoscopy: transcricoid injection or the "spray as you go" technique? Thorax 1990; 45:474-7.
8. Graham DR, Hay JG, Clague J, Nisar M, Earis JE. Comparison of three different methods used to achieve local anesthesia for fiberoptic bronchoscopy. Chest 1992; 102:704-7.
9. Kundra P, Kutralam S, Ravishankar M. Local anaesthesia for awake fibreoptic nasotracheal intubation. Acta Anaesthesiol Scand 2000; 44:511-6.
10. Gupta B, Kohli S, Farooque K, Jalwal G, Gupta D, Sinha S, et al. Topical airway anesthesia for awake fiberoptic intubation: Comparison between airway nerve blocks and nebulized lignocaine by ultrasonic nebulizer. Saudi J Anaesth 2014; 8(Suppl 1): SI 5-9.
11. Reasoner DK, Warner DS, Todd MM, Hunt SW, Kirchner J. A comparison of anesthetic techniques for awake intubation in neurosurgical patients. JNeurosurg Anesthesiol 1995; 7:94-9.
12. Sethi N, Tameja VK, Madhusudanan TP, Shouche S. Local anaesthesia for fiberoptic intubation: a comparison of three techniques. Med J Armed Forces India 2005; 61:22-5.