Research Paper

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Comparative Study of Lignocaine Viscous Versus 10% Lignocaine Spray For Preparation of Airway in Awake Fibreoptic Intubation

Medical Science

KEYWORDS : Airway management, bronchoscopy, laryngeal nerves, lidocaine.

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ABSTRACT

Overview: Awake fibreoptic bronchoscope (FOB) guided intubation is the gold standard of airway management in patients with difficult airway. It is essential to sufficiently anesthetize the upper airway before the performance of awake FOB guided intubation in order to ensure patient comfort and cooperation. This randomized controlled study was performed to compare two methods of airway anesthesia, Lignocaine viscous versus 10% Lignocaine Spray for preparation of airway in awake fibreoptic intubation

Materials and Methods: A total of 50 adult patients with difficult airway were randomly allocated into two groups. Group V received airway anesthesia with lignocaine viscus and Group S received 10% lignocaine spray and both commonly received airway blocks (bilateral superior laryngeal and transtracheal recurrent laryngeal) each with 2 ml of 2% lignocaine. FOB guided orotracheal intubation was then performed. Hemodynamic variables at baseline and during the procedure, patient recall, vocal cord visibility, ease of intubation, coughing/gagging episodes, and signs of lignocaine toxicity were noted.

Results: The observations did not reveal any significant differences in hemodynamic parameters at any time during the study. However, the time taken for intubation was significantly more in group S as compared with the Group V. Maximum excellent score seen in the both groups but group V patients shows better satisfaction than others. Overall patient comfort was same in Group S and group V with fewer incidences of unpleasant recalls in group V.

Conclusion: Both Lignocaine Viscous and 10% Lignocaine Spray for Preparation of Airway in Awake Fibreoptic Intubation as assessed by patient haemodynamic parameters, coughing/gagging episodes, ease of intubation, vocal cord visibility, and time taken to intubate.

Introduction and review of Literature:

Awake Fibreoptic Intubation and anaesthetising upper airway are difficult to master and should be in the armamentarium of all practising anaesthetists.[1] Amornyotin S et al conducted a comparative study between Lignocaine viscous versus 10% Lignocaine spray for ease during esophagogastroduodenoscopy. They demonstrated that lidocaine spray had a better outcome compared to lignocaine viscous.[2] However, Mogensen S et al stated that some amount of discomfort was caused by the spray which could be overcome by use of a Lidocaine lozenge instead. They evaluated the same and found a better acceptability towards lozenge compared to spray.3 There is insufficient literature available regarding comparison between Lidocaine viscous and Lidocaine spray in awake fibreoptic intubation. This study aims to compare the two in terms of ease of intubation as well as patient satisfaction.

Objectives of the study:

I. To compare effect of Lignocaine viscous and 10% Lignocaine Spray for preparation of airway in awake fibreoptic intubation among patient posted for elective surgeries under general anaesthesia in terms of

i. Patient discomfort
ii. Ease of intubation
iii. Patient satisfaction

Justification and Relevance for the conduct of the study:

Awake fibreoptic intubation is a skill which gives the anaesthetist control over the airway in potentially difficult intubating condition such as oral cavity tumours, trauma and cervical spine injury where direct laryngoscopy offers a limited view of the vocal cords. This is a relatively new area where there is great potential for research. Our study will help to determine which methodology offers ideal intubating conditions as well as a better degree of acceptability to the patient.

Methodology:

I. Number of patients: 50

II. Inclusion criteria

i. 18 – 50 year old patients posted for elective surgery under General Anaesthesia
ii. ASA grade I and II
iii. Mallampatti class I and II

III. Exclusion criteria

i. ASA grade III and IV
ii. Mallampatti class III and IV
iii. Pre-existing cardiovascular or cerebrovascular disease
iv. Allergy to any drug used in the study

IV. Study Design

i. Duration of study: 6 months
ii. Place of study: S.S. Institute of Medical Sciences and Research Centre
iii. Sample Size: 50 patients between 18 – 50 years of age scheduled for elective surgeries under General Anaesthesia
iv. Study type: Single-blinded and randomized trial
v. Informed written consent obtained from every patient after giving an explanation regarding the procedure following which he/she was randomized into two groups: Lignocaine spray and Lignocaine viscous, using a sealed envelope chosed by an assistant.

Airway preparation: The assistant was administer 5 sprays of 10% Lignocaine spray or 2.5 ml Lignocaine viscous made upto 5 ml using distilled water, based on the group allotted in the absence of the anaesthetist, who blinded to the group. Each pa-

tient will be premedicated with intravenous Midazolam (o.o3 mg/kg), Glycopyrrolate (0.01mg/kg) and Fentanyl (2mcg/kg). Five minutes after administration of premedication, superior laryngeal nerve block was performed bilaterally by injecting 4 ml of 2% Lignocaine with adrenaline 2 – 4 mm inferior to the greater cornu of the hyoid bone. Recurrent laryngeal nerve blocked using 4ml of 4% Lignocaine injected through the cricothyroid membrane during expiration after confirming needle position by aspiration of air.4,6,7 Vitals recorded after airway preparation which taken as baseline vitals. The anaesthetist will perform awake fibre-optic bronchoscopy with the aid of a mouth gag. The time taken to perform bronchoscopy considered as the period from entering the oral cavity to reaching the carina which was noted by an assistant blinded to the group to which the patient belongs. Discomfort scores recorded at the level of pharynx, glottis and carina. Intubation scores and time taken for intubation also recorded by the assistant. Time taken for intubation considered as the duration of time taken from the bronchoscope entering the oral cavity till the time the endotracheal tube is inserted and position is confirmed by capnography.5 Vital parameters: Heart rate, respiratory rate and saturation will be recorded every ten seconds and blood pressure recorded every sixty seconds till the time of intubation. Patient Satisfaction Score will be determined by interviewing each subject post-operatively. Any symptoms or signs of Lignocaine toxicity noted.

The scoring systems applied in the study are as follows:
Discomfort Score5
- 0-no discomfort
- 1-probable mild discomfort, no patient resistance
- 2-restless patient, minimal patient resistance
- 3-restless patient, severe patient resistance

Intubation Score5
- 0 - No discomfort
- 1 - Grimacing when tube in oral cavity
- 2 - Localising with one limb at any stage
- 3 - Localising with two limbs at any stage
- 4 - Coughing on entering trachea
- 5 - Prolonged Coughing

Patient Satisfaction Score5
- 1 - Excellent
- 2 - Good
- 3 - Reasonable
- 4 - Poor

vi. Dosages of drugs:
1. Glycopyrrolate: 0.01mg/kg
2. Midazolam: 0.03 mg/kg
3. Fentanyl: 2 mcg/kg
4. Lignocaine spray or Lignocaine viscous: 100 mg
5. Lignocaine for Superior Laryngeal Nerve Block: 160 mg
6. Lignocaine for Transtracheal injection: 160 mg

As per recommendation, total dose of 9 mg/kg of Lignocaine will not be exceeded.4, 8

Results

1. Patient characteristics in the two groups and Data are given as mean numbers:

		Group S	Group V
Number		**25**	**25**
Age(years)		**21**	**21**
Sex(M:F)		**1.5:1**	**1.08:1**
Weight(kg)		**52**	**52**
ASA	**1**	**23**	**22**
	2	**2**	**3**
Mallampatti	**1**	**14**	**16**
	2	**11**	**9**

In our study both groups most of patients belongs to the age group 16-25 years and male gender predominance seen.

2. Patient satisfaction score

	Group		Total
	Group S	Group V	
Excellent	**18**	**19**	**37**
	72.0%	**76.0%**	**74.0%**
Good	**5**	**6**	**11**
	20.0%	**24.0%**	**22.0%**
Reasonable	**2**	**0**	**2**
	8.0%	**0.0%**	**4.0%**

Maximum excellent score seen in the both groups but group V Patients shows better satisfaction than others.

3. Sore throat

	Group		Total
	Group S	Group V	
Yes	**13**	**6**	**18**
No	**12**	**19**	**31**

Incidence of sore throat seen more in the group S.

4. Independent Samples Test

	t-test for Equality of Means		
	t	df	p value
Time_to_reach_carina	**1.571**	**48**	**0.123**
Time_to_intubation	**2.635**	**48**	**0.011**
HR_Baseline	**0.878**	**48**	**0.384**
HR_pharynx	**0.563**	**48**	**0.576**
HR_carina	**0.227**	**48**	**0.821**
HR_at_intubation	**0.718**	**48**	**0.477**
Systolic_BP_Baseline	**1.214**	**48**	**0.231**
Systolic_BP_carina	**0.407**	**48**	**0.686**
Systolic_BP_post_intubation	**1.163**	**48**	**0.250**
Diastolic_BP_Baseline	**0.164**	**48**	**0.870**
Diastolic_BP_carina	**0.693**	**48**	**0.491**
Diastolic_BP_post_intubation	**1.241**	**48**	**0.221**

Time to intubation having P value of 0.011 is significant value.

DISCUSSION

Awake tracheal intubation with the aid of a fibreoptic device was first described by Murphy in 1967, 9 who used a choledochoscope to facilitate nasotracheal intubation in patients with difficult airway. Since then, numerous subsequent authors have described the anaesthetic techniques and experiences with awake FOB guided intubation. It offers several advantages over use of FOB after induction of general anaesthesia in patients with cervical spine instability:

Patient remains in a neutral position, minimizing the risk of neurological deterioration;

patient's neurological status can be assessed after intubation,

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and spontaneous ventilation is preserved.10

There are multiple ways of anesthetizing the airway to facilitate the performance of awake FOB guided intubation. Among them, topical anesthesia with nebulized LA, gargles, lozenges, sprays, airway blocks and LA through the working channel of FOB is commonly used. Although the above-mentioned techniques can be combined in various ways, we chose two mutually exclusive techniques to compare their efficacy and patient comfort.

Langmack *et al.*11 measured the serum lignocaine levels in 51 asthmatic volunteers undergoing FOB with topical lignocaine. The average total dose used was 600 mg (8.2 mg/kg), which was found to be safe in all patients as assessed by serum lignocaine concentrations. However, in 1993, Wu *et al.*12 have reported seizures in a patient after administration of a total dose of 300 mg of topical lignocaine during FOB. The serum lignocaine concentrations were found to be well above the acceptable toxic limits. Hence, a constant lookout for signs and symptoms of lignocaine toxicity is mandatory while using large doses. Furthermore, serum lignocaine levels were not measured due to nonavailability of this facility at our centre. More studies need to be performed to determine the amount of lignocaine, which can be used for topical anaesthesia with serum lignocaine levels.

Amornyotin S et al.13 reported female predominance and age group of 40 to 64 years, but In our study both groups most of patients belongs to the age group 16-25 years and male gender predominance seen.

Amornyotin S et al.13 reported topical lignocaine spray showed better satisfaction scores Maximum excellent satisfaction score seen in the both groups but group V patients shows better satisfaction than others.

In our study Time to intubation having P value of 0.011 is significant value means group S showing taking more mean time to intubate the patient.

Given the results of the study and the above discussion, the following conclusions may be drawn. The performance of bilateral superior laryngeal and transtracheal recurrent laryngeal nerve blocks provides adequate airway anesthesia to aid in awake FOB guided intubation However, Lignocaine Spray through the working channel of FOB might provide better airway anesthesia .

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