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ORIGINAL ARTICLE

1% Versus 2% Lignocaine for Airway Anaesthesia in Flexible Bronchoscopy

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ABSTRACT

Introduction: Flexible bronchoscopy is one of the most widely performed procedures for diagnosis of various bronchopulmonary diseases. Most patients tolerate the procedure well although cough is often reported as a distressing symptom.

Objectives: The main objective of the study is to find the comparison of 1% versus 2% lignocaine for airway anaesthesia in flexible bronchoscopy.

Material and methods: This randomized control trial was conducted in pulmonology department of DHQ Hospital Faisalabad and the duration of this study was from July 2018 to December 2018. The data was collected with the permission of ethical committee of hospital. Data was collected with the permission of ethical committee of hospital. The data was collected through random sampling technique. Demographic and baseline values of all the selected patients were collected. Before the start of the bronchoscopy procedure, blood pressure, heart rate, respiratory rate, and pulse oximetric saturation were recorded and monitoring continued during the procedure.

Results: The data was collected from 100 patients with mean age 44.56±2.45 years in group I and 46.78±2.34 years in group II. The demographic and baseline values were similar in both groups. Table 01 explains all the basic parameters of both groups. Fifty subjects each were randomized to 1% and 2% groups, and all randomized subjects completed the study protocol. The cumulative dose of lignocaine administered in 2% lignocaine group was significantly greater than in 1%. The doses of midazolam in 1% and 2% lignocaine groups administered were similar

Practical implications: After this trial we may apply this procedure for airway anaesthesia in flexible bronchoscopy

Conclusion: It is concluded that there was no significant difference in operator-rated overall procedure satisfaction or cough in between the two groups.

Keywords: Lignocaine, Patients, Significant, Efficacy, Satisfaction, Anaesthesia

INTRODUCTION

Flexible bronchoscopy is one of the most widely performed procedures for diagnosis of various bronchopulmonary diseases. Most patients tolerate the procedure well although cough is often reported as a distressing symptom. It is likely that the acceptance of bronchoscopy would be significantly improved with control of cough[1]. Use of sedation during bronchoscopy has been reported to improve procedure tolerance. However, awake (no sedation) bronchoscopy is routinely performed at many centres. Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a firmly established modality for the evaluation of mediastinal lymphadenopathy. It has evolved into the initial investigation modality of choice for histologic sampling of the mediastinum in lung cancer staging[2].

Flexible bronchoscopy is an essential procedure for diagnostic work-up and management of patients with various pulmonary diseases. This procedure is usually conducted under sedation to achieve patient tolerance to procedure. There is no clear recommendation favoring one sedation regimen over another; however, the combination of a short-acting benzodiazepine (e.g., midazolam (with propofol or an opioid has been found safe and effective[3]. It is essential to effectively anesthetize the upper airway and suppress the gag, swallow, and cough reflexes prior to diagnostic fiberoptic bronchoscopy to ensure patient tolerance. This can be achieved via either topical administration of a local anesthetic (LA) or airway nerve block[4].

Despite the availability of these numerous methods for airway anesthesia, few studies have compared them. Airway nerve blocks are frequently used for awake fiberoptic intubation because they provide rapid and deep anesthesia[5]. Nebulization of local anesthetics is another promising technique, in which the airway is anesthetized completely without the need for multiple painful injections. Therefore, we compared nerve block, which is considered the standard technique for achieving rapid and effective airway anesthesia, with lignocaine nebulization, which constitutes a simple, painless, and comfortable alternative for anesthetizing the airway, before awake fiberoptic bronchoscopy-guided intubation. When carried out under minimal sedation, these techniques help to allay anxiety so that the patient is more cooperative during the procedure[6].

To reduce coughing and to keep the dosage of sedative drugs as low as possible, local anaesthetics such as lidocaine are administered topically to the upper airways and to the tracheobronchial tree through the working channel of the bronchoscope using a syringe. However, this method may make it difficult to achieve even distribution of lidocaine in the bronchial system, resulting in incomplete anaesthesia of the airway walls[7]. Extensive clinical experience would indicate that lidocaine is an effective topical anesthetic for bronchoscopy and studies have documented the effectiveness of lidocaine for inducing airway anesthesia[8].

Lidocaine can be delivered to the upper airways by spraying via an atomizer, by ultrasonic or jet nebulization, and by the use of lidocaine as a jelly or viscous solution. Anesthesia of the lower airways is generally induced via injection of lidocaine through the bronchoscope channel. Interestingly, systemic administration of lidocaine can also induce some degree of airway anesthesia. The duration of airway anesthesia induced by topical lidocaine is approximately 20-40 minutes and, in our experience, inhalation of lidocaine aerosol can achieve airway anesthesia down to the level of the mid-trachea[9].

Lidocaine is present in many bronchoscopic specimens and therefore might alter the results of in vitro studies on these specimens, especially microbiologic studies. Although lidocaine (even without preservative) can inhibit the growth of aerobic and anaerobic bacteria, fungi, and mycobacteria in vitro,the concentrations of lidocaine measured in bronchoalveolar lavage (BAL) fluid and protected brush catheter specimens are generally well below the reported minimal inhibitory concentrations for these organisms[10].

Objectives: The main objective of the study is to find the comparison of 1% versus 2% lignocaine for airway anaesthesia in flexible bronchoscopy.

MATERIAL AND METHODS

This randomized control trial was conducted pulmonology department of DHQ Hospital Faisalabad and the duration of this study was from July 2018 to December 2018. The data was collected with the permission of ethical committee of hospital.

Inclusion criteria

- All the patients undergone flexible bronchoscopy.
- Both male and female patients.
- Age > 18 years.

Exclusion criteria

- Patients with the history of hypersensitivity.
- Pregnant females
- Those who do not want to participate in the study.

Data collection: Data was collected with the permission of ethical committee of hospital. The data was collected through random sampling technique. Data was collected into two groups:

Group I: 1% lignocaine

Group II: 2% lignocaine

Demographic and baseline values of all the selected patients were collected. Before the start of the bronchoscopy procedure, blood pressure, heart rate, respiratory rate, and pulse oximetric saturation were recorded and monitoring continued during the procedure. Electrocardiographic monitoring was not routine and was considered on basis of underlying cardiac disease. All the procedures were performed under moderate sedation as per the protocol. During the procedure, 1 ml aliquots of 1% or 2% lignocaine solution were delivered through the bronchoscope using spray. Any sign of toxicity was noted and treated accordingly. Data was collected for both primary and secondary outcomes.

Statistical analysis: The data was analyzed using SPSS version 20. A P-value of <0.05 was considered statistically significant.

RESULTS

The data was collected from 100 patients with mean age 44.56±2.45 years in group I and 46.78±2.34 years in group II. The demographic and baseline values were similar in both groups. Table 01 explains all the basic parameters of both groups. Fifty subjects each were randomized to 1% and 2% groups, and all randomized subjects completed the study protocol.

Table 1: Baseline values of both groups

Variable	Group I	Group II	P-value
Mean age (years)	44.56±2.45	46.78±2.34	0.71
Heart rate (beats per min)	92.89±16.78	93.1±15.89	0.43
Oxygen saturation (%)	97.51±1.32	96.89±1.78	0.32
Respiratory rate (per min)	17.89±3.11	18.91±2.98	0.29
Systolic blood pressure (mmHg)	122.98±2.56	123.45±2.01	0.20
Diastolic blood pressure (mmHg)	77±9.01	80±10.1	0.19
Duration of procedure (min)	23.41±1.98	22.46±2.01	0.67

Table 2: Primary and secondary outcome measures in both groups

Outcomes	Group I	Group II	P-value
Patients' satisfaction with overall procedure	65.67±4.56	68.12±4.56	0.31
Total dose of lignocaine (mg)	176.54±5.67	251.09±4.71	<0.001
Patients receiving >8.2mg/Kg dose	1	0	0.005
Midazolam dose (mg)	2.61±2.34	2.71±3.01	0.001
Pain score < 4	29	31	0.21
Complications	0	0	0.000

The cumulative dose of lignocaine administered in 2% lignocaine group was significantly greater than in 1%. The doses of midazolam in 1% and 2% lignocaine groups administered were similar. Only one patient in 1% group received lignocaine dose >8.2 mg/kg of body weight. There was no significant difference in the faces pain scale scores between the two groups. The overall procedure duration between the groups was similar.

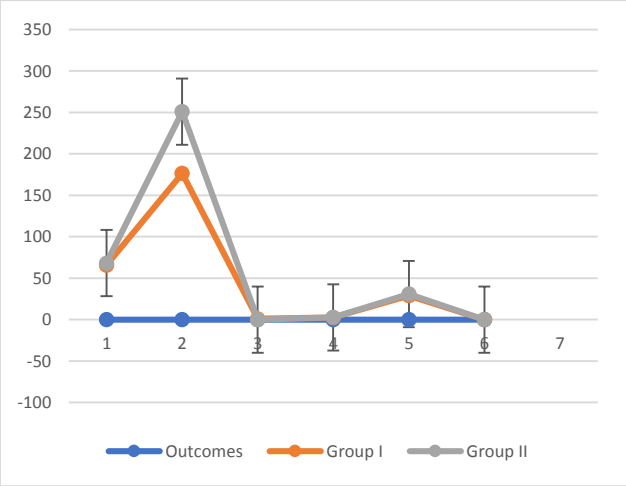

Figure 1: Primary outcome measures in patients

DISCUSSION

The goal of any flexible bronchoscopy examination is a safe and comfortable procedure field that allows efficient performance of the procedure with minimization of patient experienced cough and lignocaine dose administered[11]. Spray as you go method is one of the most commonly used and accepted techniques for delivering topical anesthetic to the vocal cords and the airways. The ideal route of administration and dose of lignocaine for bronchoscopy is still a matter of considerable debate and various centers have their own practices and dose regimens for lignocaine use. There is also no consensus among the various published bronchoscopy guidelines[12-13].

As there is no absolute method to determine which patients will have greater lignocaine absorption and therefore be at greater risk for life threatening toxicity, published guidelines favor the smallest lignocaine dose possible[14]. In this study, the mean total dose of lignocaine administered in 1% group was significantly lower than that in 2% group. Only one patient in the 1% group as compared with 20 patients in the 2% group exceeded the >8.2 mg/kg dose limit[15].

Nebulization of local anesthetics and nerve block regional anesthesia are among several anesthesia techniques used to facilitate diagnostic flexible bronchoscopy. In this study, we assessed the safety and effectiveness of LA nebulization versus airway nerve block for upper airway anesthesia during diagnostic fiberoptic bronchoscopy under moderate sedation. Flexible bronchoscopy is usually conducted under sedation to facilitate the procedure and improve patient comfort and cooperation. Sedation with two or even three different drugs is safe and superior to sedation with a single drug[16]. The procedures in our study were performed under moderate sedation using propofol boluses as needed[17].

Lignocaine nebulization for anesthesia of upper airway and larynx has also been studied. Cullen et al[18]. found that lignocaine nebulization decreased the discomfort of nasogastric tube insertion. Similarly, lignocaine nebulization added to topical nasal cocaine produced adequate upper airway anesthesia with for fiberoptic nasotracheal techniques[19-20].

CONCLUSION

It is concluded that there was no significant difference in operator-rated overall procedure satisfaction or cough in between the two groups. 1% lignocaine is equally efficacious as 2% lignocaine at a significantly lower dose of lignocaine does administered, using the spray as you go method without administration of nebulized lignocaine.

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