

Evaluation of Single Verses Multiple Doses of Suxamethonium in Rigid Bronchoscopy: A Tertiary Care Hospital Study in Bangladesh

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Abstract

Background: Rigid bronchoscopy is frequently required in the therapeutic therapy of a wide range of tracheobronchial diseases. Suxamethonium is a common neuromuscular blocking medication used for rapid sequence tracheal intubation because of its quick onset and recovery. **Objective:** The objective of the study was to evaluate the effects of single vs multiple doses of Suxamethonium in rigid bronchoscopy. **Methodology:** This randomized cross-sectional observational study was conducted from January 2019 to December 2020 among 180 patients in a tertiary care hospital of Bangladesh. Data on certain basic parameters were obtained on the basis of the clinical records and related changes. Collected data were displayed in tabular and graphical form in terms of different parameters, and statistical analysis was conducted to observe the statistical significance. **Results:** In this study, we divided patients into 2 groups (Group 1: Single dose Suxamethonium, Group 2: multiple-dose Suxamethonium). Among 180 patients, a maximum (34.4%) patients were more than 50 years of age. Also, 58% were male, and 42% were female patients. Here, maximum patients (33.8%) had a cough, while minimum patients (2.7%) had chest pain. Among group 1, maximum patients (39.1%) had mild fasciculation scores and minimum patients (7.4%) had zero scores. Among group 2 patients, maximum patients (24.3%) had zero fasciculation score, and minimum patients (6.3%) had vigorous scores. According to the Copenhagen scoring system, in group 1, 47.40% of patients had an excellent outcome, and 6.65% of patients had a poor outcome. And in group 2, 74.7% of patients had a good outcome and 13.50% of patients had an excellent outcome. In both groups, maximum patients had minor bleeding, vocal cord trauma, and hypoxia. **Conclusion:** The findings imply that single-dose Suxamethonium was more effective in improving patient satisfaction. The intubating settings would be more pleasant if single-dose Suxamethonium was used.

Keywords: Suxamethonium, Rigid Bronchoscopy, Tertiary Care Hospital.

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INTRODUCTION

Rigid bronchoscopy enables tracheobronchial tree examination, airway patency monitoring, and therapeutic intervention [1]. General anesthesia with intubation and the use of neuromuscular blocking agents (NMBAs) is advised for these procedures. It's crucial not to overlook the intubating conditions, as

they're the foundation of a successful evaluation. A short-acting NMBA should be used because rigid bronchoscopy frequently lasts less than 10 minutes. To present, the depolarizing NMBA Suxamethonium has been shown to have the quickest onset time (45-60 seconds), the best intubating conditions, and the shortest duration of muscle paralysis (i.e. 2-6 minutes

dose dependant) [2]. Despite its benefits, Suxamethonium has several negative side effects, including hyperkalemia and a higher risk of malignant hyperthermia [3]. However, so-called mild clinical side effects like fasciculations and myalgia significantly impact postoperative patients' comfort and breathing mechanics. Suxamethonium-induced myalgia affects 41 to 92 percent of people, with pain primarily felt in the shoulder, neck, back, and belly muscles [4]. Following the advent of the flexible bronchoscope, rigid bronchoscopy became much less common [5]. In reality, many pulmonologists have never been exposed to either the tools or the rigid bronchoscopy method in the last two decades [6]. Despite three decades of pulmonary medicine training, therapeutic rigid bronchoscopy has only lately become available. In many cases, the rigid bronchoscope outperforms the flexible bronchoscope [7]. The rigid bronchoscope gives improved airway control, particularly when there is severe airway hemorrhage or when foreign bodies need to be removed. Rigid bronchoscopy is the

preferred airway stabilization method for emergent central airway obstruction (CAO) [8]. Suxamethonium is still the standard neuromuscular blocking medication for rapid sequence tracheal intubation due to its quick start of the action and quick recovery. The use of high doses of a single agent combination of blockers or preceding the intubating dosage with a priming dose of blocker can all speed up the beginning of action of non-depolarizing neuromuscular blocking agents [9-12]. These procedures have not consistently produced the rapid onset of action of Suxamethonium or homogeneous intubating conditions comparable to those after Suxamethonium.

OBJECTIVE

The core objective of the study to evaluate the effects of single vs multiple doses of Suxamethonium in rigid bronchoscopy.

METHOD AND MATERIALS

Type of study	Cross-sectional observational study
Place of study	Tertiary Care Hospital of Bangladesh
Study period	January 2019 to December 2020
Study population	A total of 180 patients were included in the study
Sampling technique	Purposive sampling

We obtained the medical records and compiled data of 180 patients in this study. All data was received through the complete consent of the patients and hospital. Data were collected according to the predesigned structural data collection sheet on the basis of specific prefixed parameters. At first, all of the relevant collected data were edited and compiled on a master chart.

STATISTICAL ANALYSIS

Collected data was analyzed using the appropriate computer-based statistical tool SPSS (Statistical Program for Scientific Study) version 25.0. P-value <0.05 was considered significant in this study.

Grouping of the subjects

In this study total 180 patients had been divided into two groups. Group-1 130 & group-2 50. Group 1 was for patients with a single dose of Suxamethonium, and group 2 was for multiple doses of Suxamethonium.

RESULTS

The patient age distribution is shown in table 1. Among 180 patients, maximum (34.4%) patients were more than 50 years of age. Moreover, a minimum (7.2%) of patients were below 20 years of age. The following Table 1 showed the age distribution of the patients:

Table-1: Age distribution of the patients

Age (in years)	Frequency (n)	Percentage (%)
Less than 20years	13	7.2%
21 years- 30 years	29	16.1%
31 years- 40years	37	20.6%
41 years- 50 years	39	21.7%
More than 50 years	62	34.4%

In figure-1, gender distribution among patients is shown. Among all patients, 58% were male and 42%

were female patients. The figure is given below in detail:

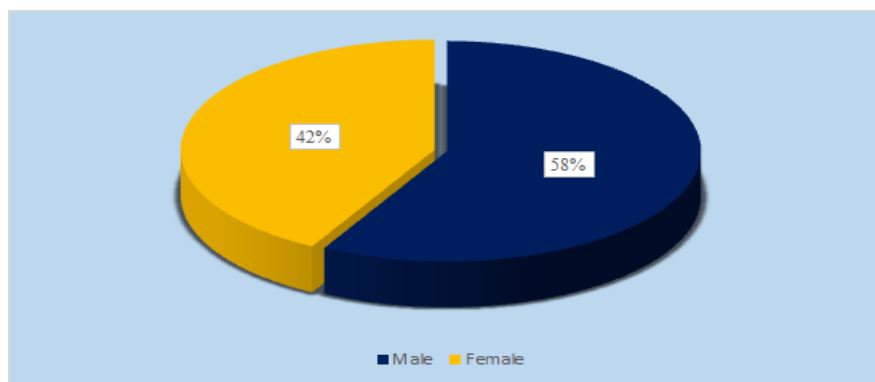


Fig-I: Gender wise patients

The symptoms presented in the patients is shown in table 2. Here, maximum patients (33.8%) had

cough, while minimum patients (2.7%) had chest pain. See table 2 below:

Table-2: Symptoms presented in patients (N =180)

Symptoms	Frequency (n)	Percentage (%)
History of foreign body inhalation	47	26.1%
Cough	61	33.8%
Breathlessness	37	20.6%
Fever	21	11.7%
Cyanotic spells	9	5%
Chest pain	5	2.8%

Table-3 showed the fasciculation scores of the patients; it was evident that among group 1, maximum patients (35.5%) had mild scores and minimum patients (11.5%) had zero scores. Among the group 2 patients,

maximum patients (38.0%) had zero scores, and minimum patients (16.0%) had vigorous scores. See below-

Table-3: Fasciculation scores of the patients

Fasciculation score	Group 1 (n= 130)	Group 2 (n= 50)
Absent (0)	11.5%	38.0%
Mild (1)	35.5%	26.0%
Moderate (2)	33.8%	20.0%
Vigorous (3)	19.2%	16.0%

Table-4 showed the fasciculation scores of the patients; it was evident that among group 1, maximum patients (47.7%) had excellent outcome and minimum patients (15.4%) had poor outcomes. Among the group

2 patients, maximum patients (72.0%) had good outcome, and minimum patients (12.0%) had excellent outcomes. See below-

Table-4: Intubating conditions (copenhagen scoring system) of the patients

Intubating conditions (Copenhagen scoring system)	Group 1 (n= 130)	Group 2 (n= 50)
Excellent	47.7%	12.0%
Good	36.9%	72.0%
Poor	15.4%	16.0%

Figure II showed the Copenhagen scoring System among the patients. Here, in group 1, 47.7% of patients had an excellent outcome, and 15.4% had poor

outcomes. In group 2, 72.0% of patients had a good outcome and 12.0% of patients had excellent outcomes. The following table is given below in detail:

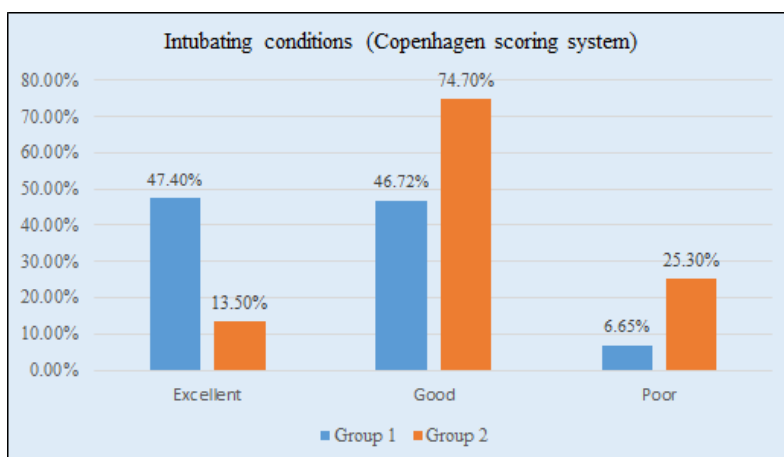


Fig-II: Intubating conditions (Copenhagen scoring system) of the patients

Figure-3 showed the number of complications encountered during rigid bronchoscopy of patients. In both groups, maximum patients had minor bleeding,

vocal cord trauma and hypoxia. The following figure is given below in detail:

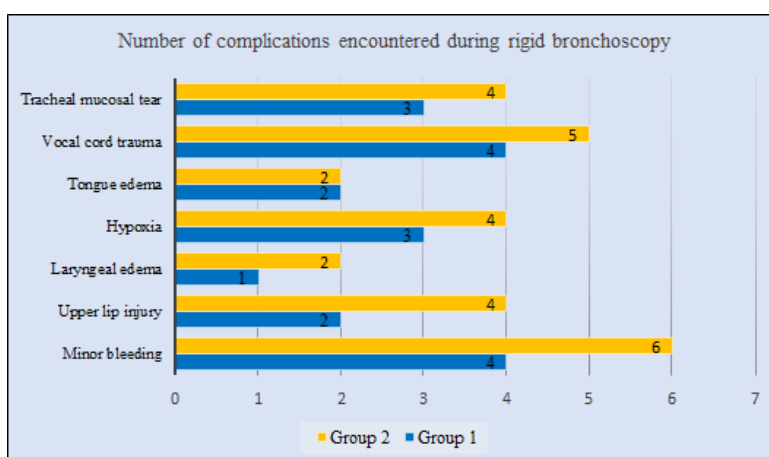


Fig-3: Number of complications encountered during rigid bronchoscopy in both groups

DISCUSSION

We tested their potential to examine the effects of different doses of Suxamethonium in rigid bronchoscopy. We kept track of how long it took to complete the procedure, how long it took to recover from anesthesia, how long it took to extubate, and any procedural difficulties. There was an improvement in dyspnea, cough, and general quality of life. To determine progress in the type of the lesion, routine radiographic studies and/or flexible bronchoscopy were conducted. This research was carried out in Bangladesh's largest tertiary care facilities. Throughout the trial, the rigid bronchoscope was used for most therapeutic bronchoscopy procedures. The most prevalent reason for rigid bronchoscopy in India is to remove foreign bodies. Rigid bronchoscopy provides quick results and has a low risk of complications [13]. While tumor excision has been done with a flexible bronchoscope, [14] it can be done more quickly and safely with a rigid bronchoscope. [15] In individuals whose performance status has been improved by a first-

line bronchoscopic intervention, radiation therapy can then consolidate the benefit of endoscopic therapy. Therapeutic rigid bronchoscopy necessitates collaboration, particularly between the interventionist and the anesthetist, who share the airway. For the procedure to be completed quickly and easily, at least three team members are required. This study compared patient satisfaction and intubating circumstances for rigid bronchoscopy using different dosages of Suxamethonium. We discovered that patients who received several Suxamethonium doses were less happy with their therapy than patients who received a single Suxamethonium dose. However, the majority of them had positive outcomes. On the other hand, good intubating conditions greatly improved when a single dosage of Suxamethonium was given. Suxamethonium is currently the gold standard for the neuromuscular block in ultra-short surgical procedures such as rigid bronchoscopy or electroconvulsive therapy (ECT) [14]. Despite this, no other anesthetic medicine is likely to be associated with many side effects or heated debates [12]. Suxamethonium causes fasciculation and myalgia,

which are modest yet common side effects. It is undeniable that Suxamethonium causes severe and rapid neuromuscular paralysis, resulting in ideal intubating conditions. It has a very brief duration of effect and is also reasonably priced [15]. Pretreatment with tiny dosages of nondepolarizing muscle relaxants partially avoids both fasciculations and myalgia, with the risk of impaired vision, diplopia, muscle weakness difficulty swallowing, and voice disturbance [16].

CONCLUSION

This article describes our experience with rigid bronchoscopy while using Suxamethonium. The flexible bronchoscope is currently used for the vast majority of diagnostic and therapeutic bronchoscopic operations. However, pulmonologists must be knowledgeable with rigid bronchoscopy, as it is the "Gold Standard" technique for therapeutic airway treatments. According to the data, single-dose Suxamethonium was more effective in increasing patient satisfaction. If single-dose Suxamethonium was employed, the intubating settings would be more pleasurable. For a better outcome, more research on the issue is required.

RECOMMENDATION

Further analysis is possible with a large sample size. This research should be carried out on a long-term basis. All the particular methods should be correctly performed; the technician should be qualified.

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