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General anaesthesia for patients with chronic obstructive pulmonary disease undergoing spinal surgery and postoperative respiratory failure: An observational study

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Abstract

Background: Patients with the chronic obstructive pulmonary disorder (COPD) are at risk of developing postoperative respiratory failure. That is the reason they may require artificial respiration for longer periods than others. However, being on mechanical ventilation for a long time leads to lung damage and infections.
Objective: The present study was undertaken to observe the relation between the severity of COPD in patients of spinal surgery and the prevalence of respiratory failure.
Materials and Methods: 40 patients with COPD who had undergone spinal surgery were part of the study. The data was collected from the medical records department including the demographics, spirometry results, blood gas analysis, comorbidities, postoperative and other variables. The important outcome is a respiratory failure within one week after the surgery.
Results: Data was presented in table 1 and table 2. Table 1 presents the demographic and clinical parameters of the participants. Table 2 presents the risk factors for respiratory failure of the participants. A longer duration of anesthesia was required for the mild COPD patients. Comorbidities were present in all levels of COPD patients. Table 2 presents the risk factors for respiratory failure of the participants. Length of stay was longer in patients with severe COPD. Extubating time, and endotracheal intubation after surgery were more in the severe COPD patients. Pulmonary infection is present in all groups of patients.
Conclusion: There is no significant relationship between the severities of COPD with postoperative respiratory failure. However, there is a strong need to conduct a prospective study with more defined parameters to understand better these relations. So that better and more effective treatment strategies can be developed.

Keywords: Chronic obstructive pulmonary disease, anaesthesia, spinal surgery, respiratory failure.

Introduction

Patients with the chronic obstructive pulmonary disorder (COPD) are at risk of developing postoperative respiratory failure [1]. That is the reason they may require artificial respiration

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for longer periods than others [2]. However, being on mechanical ventilation for a long time leads to lung damage and infections [3]. All of this is associated with a long stay in the hospital and higher treatment charges. Hence, this is a serious issue of consideration for both the surgeon as well as the anesthetist [4]. It is always advised to screen these COPD patients prior to the surgery. It is well known that COPD was classified into four groups based on the amount of air expired in the first second which is FEV1. It can be mild, moderate, severe, and very severe. The post-operative risks have to be assessed in COPD patients prior to the surgery. However, studies related to this area are sparse. Hence, the present study was undertaken to observe the relation between the severity of COPD in patients of spinal surgery and the prevalence of respiratory failure.

Materials and Methods

Study design: Observational study.
Study setting: The present study was conducted at.

Study participants

40 patients with COPD who had undergone spinal surgery were part of the study. The data was collected from the medical records department including the demographics, spirometry results, blood gas analysis, comorbidities, postoperative and other variables. Patients who required emergent surgery lacked pulmonary function reports or had other severe complications were excluded.

Diagnosis of COPD

COPD diagnosis was performed followed by the standard procedure of taking the percentage of FEV1 and FVC. When this percentage is less than seventy after taking the broncho dilator, the individual is considered as COPD [5]. Further, individuals were grouped into mild, moderate, severe and very severe based on their percentages as mentioned in the literature [5].

Outcome measures: The important outcome is a respiratory failure within one week after the surgery [6].

Ethical considerations: The study protocol was approved by the institutional human ethical committee. The confidentiality of data was maintained throughout the study.

Data analysis: Data was analyzed using SPSS 20.0. Data were represented as frequency and percentage.

Results

Data was presented in table 1 and table 2. Table 1 presents the demographic and clinical parameters of the participants. Table 2 presents the risk factors for respiratory failure of the participants. A longer duration of anesthesia was required for the mild COPD patients. Comorbidities were present in all levels of COPD patients. Table 2 presents the risk factors for respiratory failure of the participants. Length of stay was longer in patients with severe COPD. Extubating time, and endotracheal intubation after surgery were more in the severe COPD patients. Pulmonary infection is present in all groups of patients.

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Table 1: Demographic and clinical parameters of the participants

Parameter	Mild (n=5)	Moderate (n=10)	Severe (n=10)	Very severe (n=15)
Male	3 (60)	8 (80)	5 (50)	9 (60)
Female	2 (40)	2 (20)	5 (50)	6 (40)
Cervical surgery	4 (80)	7 (70)	6 (60)	11 (73.3)
Lumbar surgery	1 (20)	3 (30)	4 (40)	4 (26.6)
Hypertension	4 (80)	4 (40)	6 (60)	7 (46.6)
Diabetes	1 (20)	4 (40)	2 (20)	3 (20)
History of stroke	0 (0)	2 (20)	2 (20)	2 (13.33)
Current smoking	0 (0)	0 (0)	0 (0)	3 (20)
Duration of anesthesia (min)	224±84	214±96	183±78	174±44

Data were expressed as frequency and percentage.

Table 2: Risk factors for respiratory failure of the participants

Parameter	Mild (n=5)	Moderate (n=10)	Severe (n=10)	Very severe (n=15)
Extubating time	7±3	8±2	9±3	10±5
Endotracheal intubation after surgery	3 (60)	4 (40)	6 (60)	12 (80)
Respiratory failure	1 (20)	1 (10)	2 (20)	2 (13.33)
Pulmonary infection	1 (20)	1 (10)	2 (20)	1 (6.67)
Length of hospital stay	12±3	13±4	16±5	17±8

Data were expressed as frequency and percentage.

Discussion

The present study was undertaken to observe the relation between the severity of COPD in patients of spinal surgery and the prevalence of respiratory failure. A longer duration of anesthesia was required for the mild COPD patients. Comorbidities were present in all levels of COPD patients. Table 2 presents the risk factors for respiratory failure of the participants. Length of stay was longer in patients with severe COPD. Extubating time, and endotracheal intubation after surgery were more in the severe COPD patients. Pulmonary infection is present in all groups of patients. A pulmonary function test helps to determine the severity of COPD. This screening is mandatory before the surgery to analyze the chances of development of respiratory failure in these patients [7-9]. However, the accuracy of these tests depends on several factors like expert technical staff, instrument accuracy, and most important is subject cooperation [10-12]. Earlier studies recorded partial pressure of oxygen as well to better understand the relationship. However, the present study does not include partial pressure in the parameters. The limitations of the study are that we went back to the records and collected the data so there may be limited data availability. The study was also conducted at one center so the results cannot be generalized.

Conclusion

There is no significant relationship between the severities of COPD with postoperative respiratory failure. However, there is a strong need to conduct a prospective study with more defined parameters to understand better these relations. So that better and more effective treatment strategies can be developed.

Conflicts of interest: None declared.
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