

Intraoperative Anesthetic Management of Patients with COPD at a Tertiary Care Hospital

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ABSTRACT

Background: Reduced lung function leads to an elevated risk of postoperative pulmonary complications in subjects with COPD. Postoperative pulmonary complications are general complications that augment morbidity and mortality rates after surgery, chiefly amongst subjects with pulmonary conditions. The present study was conducted with the aim to determine the intraoperative anesthetic management of patients with COPD.

Materials and methods: The present study included patients that were admitted over a period of 1 year. All preoperative and postoperative data (including the presence or type of PPCs) were collected by respiratory physicians in a PPC database before the commencement of this study. PPCs were known as a mix of respiratory failure, pleural effusion, respiratory infection, and bronchospasm within seven postoperative days postoperatively. All the data was arranged in a tabulated form and analysed using SPSS software. The p value of less than 0.05 was considered as significant.

Results: The mean BMI was 23.6 amongst subjects without PPCs and 23.2 amongst subjects with PPCs. The mean Creatinine level was 0.8 amongst subjects without PPCs and

4.1 amongst subjects with PPCs. It also was a significant difference amongst the groups. There were 30 subjects without PPCs and 7 subjects with PPCs that had difficulty in intubation.

Conclusion: In the present study 28.5% subject's experienced postoperative complications. Therefore, the anaesthesiologists should be cautious while performing mechanical ventilations and fluid therapy amongst patients with COPD.

Keywords: Anesthetic, Creatinine, Respiratory.


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INTRODUCTION

COPD is defined by limitation in airflow due to the tightening of small airways and damage to the lung parenchyma¹. Reduced lung function leads to an elevated risk of postoperative pulmonary complications in subjects with COPD.^{1,2} Even mild complications like atelectasis or pleural effusion can deteriorate the clinical outcome and increase the chances of long hospital stay; so, leads to admission to ICU, as well as readmission to hospital³⁻⁵, anesthesiologists use different strategies like mechanical ventilation⁶⁻⁸, neuromuscular blockade, fluid therapy⁹, and its reversal^{10,11} to reduce these complications. We tried to evaluate the chances of reducing complications with different strategies based on clinical confirmation from subjects who did not had COPD and who responded in a different way from patients with COPD due to the changes in the lung physiology. Postoperative pulmonary complications are general complications that augment

morbidity and mortality rates after surgery, chiefly amongst subjects with pulmonary conditions.¹ The present study was conducted with the aim to determine the intraoperative anesthetic management of patients with COPD.

MATERIALS AND METHODS

The present study included patients that were admitted over a period of 1 year. The study was approved by the ethical board and all the subjects were informed about the study and a written consent was obtained from them in their vernacular language. The study included 300 subjects without PPCs and 120 subjects with PPCs.

All preoperative and postoperative data (including the presence or type of PPCs) were collected by respiratory physicians in a PPC database before the commencement of this study. PPCs were

known as a mix of respiratory failure, pleural effusion, respiratory infection, and bronchospasm within seven postoperative days postoperatively. Intraoperative variables for this study were collected from electronic medical records included intubation

difficulty, mechanical ventilation parameters, hemodynamics, blood loss etc. All the data was arranged in a tabulated form and analysed using SPSS software. The p value of less than 0.05 was considered as significant.

Table 1: Preoperative variables of the patients

Variables	Without PPCs (n=300)	With PPCs (n=120)	p
Age > 70 years	136	66	>0.05
Male gender	250	98	>0.05
BMI	23.6 (21.5–25.3)	23.2 (22.0–25.2)	>0.05
Diabetes	80	30	>0.05
Hypertension	154	72	>0.05
Albumin (g/dL)	4.2 (4.0–4.5)	1.8 (1.4–2.6)	>0.05
Creatinine (mg/dL)	0.8 (0.8–1.1)	4.1 (4.0–4.5)	<0.05
Smoking history			
Never smoker	110	32	>0.05
Previous smoker	152	66	>0.05
Current smoker	50	28	>0.05

Table 2: Intraoperative variables of the patients

Variables	Without PPCs (n=300)	With PPCs (n=120)	p
Intubation grade moderate to difficult	30	7	>0.05
Respiratory rate (bpm)	10 (9–12)	10 (8–11)	>0.05
Fluid therapy			
Crystalloid infusion (mL/kg/h)	5.7 (4.2–6.8)	6.3 (5.0–7.6)	<0.05
Colloid infusion	72	55	<0.05
Red blood cell transfusion	21	18	>0.05
Estimated blood loss (mL)	100 (50–210)	200 (100–460)	<0.05

RESULTS

Table 1 shows the preoperative variables amongst the patients. There was no significant difference in the age amongst the groups. Also, the male gender showed no significant predominance in any of the group. The mean BMI was 23.6 amongst subjects without PPCs and 23.2 amongst subjects with PPCs. There was no significant difference in the subjects with diabetes and hypertension amongst the groups. The mean albumin level was 4.2 amongst subjects without PPCs and 1.8 amongst subjects with PPCs. It also showed no significant difference amongst the groups. The mean Creatinine level was 0.8 amongst subjects without PPCs and 4.1 amongst subjects with PPCs. It also was a significant difference amongst the groups.

Table 2 shows Intraoperative variables of the patients. There were 30 subjects without PPCs and 7 subjects with PPCs that had difficulty in intubation. There was no significant difference in between the groups. The respiratory rate was 10 amongst subjects without PPCs and with PPCs. Crystalloid infusion therapy was provided at 5.7 mL/kg/h amongst subjects without PPCs and at 6.3 mL/kg/h amongst subjects with PPCs. There was a significant difference amongst the groups.

DISCUSSION

The significant protective action of the low tidal ventilation amongst subjects with COPD can be elaborated by the information that the chief pathophysiology of COPD is hyperinflation lung, which is due to loss of elastic recoil because of destruction of lung parenchyma destruction as well as limitation of airflow due to destruction of small airway destruction.^{12,13} Lung hyperinflation leads to the lung relaxation volume to an increased level than those in healthy patients; thus, the increase in end-expiratory lung volume and residual volume, while leads to decrease in the inspiratory reserve volume¹⁴, leading in a decreased capacity to further expand the tidal volume. In our study, there was no significant difference in the age amongst the groups. Also, the male gender showed no significant predominance in any of the group. The mean BMI was 23.6 amongst subjects without PPCs and 23.2 amongst subjects with PPCs. There was no significant difference in the subjects with diabetes and hypertension amongst the groups. The mean albumin level was 4.2 amongst subjects without PPCs and 1.8 amongst subjects with PPCs. It also showed no significant difference amongst the groups. The mean Creatinine level was 0.8 amongst subjects without PPCs and 4.1 amongst subjects

with PPCs. It also was a significant difference amongst the groups. There were 30 subjects without PPCs and 7 subjects with PPCs that had difficulty in intubation. There was no significant difference in between the groups. The respiratory rate was 10 amongst subjects without PPCs and with PPCs. Crystalloid infusion therapy was provided at 5.7 mL/kg/h amongst subjects without PPCs and at 6.3 mL/kg/h amongst subjects with PPCs. There was a significant difference amongst the groups.

Amongst subjects undergoing non-cardiothoracic surgery, the overall frequency of PPCs differs from 2% to 19%, due to variation in the definition of PPCs.^{15,16} Around 10%–30% of subjects that encounter general anesthesia experience PPCs, can have more serious thromboembolic, cardiovascular, or infectious difficulties.^{17,18}

PPCs can be divided as major or minor on the basis of their tendency for mortality. Especially, up to 90% of the subjects develop some degree of atelectasis during the time anesthesia because of patient positioning and loss of FRC. Although the overall danger for serious PPCs, like acute respiratory distress syndrome, is low, it is more amongst subjects with renal failure, chronic obstructive pulmonary disease, or those that receive several anesthetic agents. The most troublesome PPC is failure of respiratory function, that is seen as impaired pulmonary gaseous exchange. Respiratory failure mostly leads to enhanced mechanical ventilation, long intensive care unit stays and related complications, and increased morbidity and mortality.¹⁵ Various researchers have tried to look into the postoperative respiratory failure.¹⁹⁻²²

Smoking elevates hemoglobin levels and platelet aggregation, that increases the risk for thrombosis. A recent study of 9354 studies found that smoking is related with an increased risk for morbidity, wound healing complications, infections, pulmonary and neurological difficulties after surgery.²³

CONCLUSION

In the present study 28.5% subject's experienced postoperative complications. The study showed that fluid infusion had significant impact on the incidence of the complications. Therefore, the anaesthesiologists should be cautious while performing mechanical ventilations and fluid therapy amongst patients with COPD.

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