

# Frequency of Airway Complications with Modified Recovery Position versus Conventional Recovery position for Extubation after General Anaesthesia

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## ABSTRACT

**Objective:** To compare the frequency of respiratory complications encountered in two different positions used for extubation i.e. conventional recovery position versus the modified recovery position (recovery position with 10-degree left tilt and head-down).

**Study Design:** Comparative study.

**Place and Duration of the Study:** Department of Anaesthesia, Combine Military Hospital, Kohat, Pakistan, from April 2022 to March 2023.

**Methodology:** Two hundred patients scheduled for elective nose and throat surgeries were equally divided into two groups (Group C and Group M). Patients with history of bronchial asthma, chronic obstructive pulmonary disease (COPD), recent respiratory infection, and gastro-oesophageal reflux disease (GERD) were excluded from this study. Patients with more than two intubation attempts were also excluded. Group C patients were extubated in a conventional left lateral recovery position, whereas Group M patients were extubated in a modified recovery position with patient in a left lateral position with 10-degree head-down and 10-degree left tilt. All patients were observed for persistent coughing (coughing that lasted for at least 2 minutes after extubation), breath holding for 20 seconds or more, desaturation (oxygen saturation less than 90%), laryngospasm, need for reintubation, vomiting, and regurgitation.

**Results:** Frequency of airway complications was significantly higher in Group C as compared to Group M. In Group C, 18 (18%) out of hundred patients had complications compared to 6 (6%) patients only in Group M ( $p = 0.009$ ).

**Conclusion:** Extubation in a modified recovery position is associated with reduced frequency of airway complications as compared to the conventional recovery position.

**Key Words:** Airway complications, Extubation, Cough, Laryngospasm, Recovery position.

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## INTRODUCTION

Over the last few decades, anaesthesia has become ever safer, thanks to new gadgets, monitoring and newer techniques, and manoeuvres that have helped in this cause.<sup>1-3</sup> Nonetheless, during the conduct of anaesthesia, complications are still common. Airway complications are still quite common, especially in children.<sup>4</sup> These include sore throat, laryngospasm, bronchospasm, hypoxia, trauma, and aspiration etc.<sup>5</sup> The frequency of these complications dramatically rises where the surgical field involves the manipulation of the airway.<sup>6,7</sup>

ENT surgeries often involve working in close proximity to the airway. This makes it more likely that the airway will be affected during the surgery. ENT surgeries can be associated with irritation of airways and resultantly increased secretions. Bleeding and oozing from the surgical field is another reason that results in airway irritation. Swelling and inflammation of the airways as a result of surgical trauma can also result in difficulty in breathing.<sup>8</sup>

Various positions have been tried for extubation after the ENT surgeries including the supine position with or without head-up and left lateral position or recovery position. All these positions have their advantages and disadvantages. Supine position makes airway manipulation easier and supine position with slight head-up improves respiratory dynamics, however, the tongue tends to fall down into oropharynx and may compromise the patency of airway. Another disadvantage of these positions is a risk of aspiration and accumulation of blood or secretions in the airway. On the other hand, the left lateral position or the recovery position is less favourable as far as the respiratory dynamics or

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airway manipulation is concerned but this position has lower risk of aspiration.<sup>9</sup>

If slight modification is adopted in the conventional recovery position by tilting the operation table around 10 degrees to left with the same degree of head-down tilt, this may help drain the accumulated secretions and bleeding from the mouth and throat thus, there will be less chances of airway complications such as breath holding, laryngospasm, and coughing, and this may help in smooth extubation. However, this position may increase the risk of regurgitation due to slight head-down position.

Extubation is a very crucial step for general anaesthesia and is associated with many life-threatening airway complications. The rationale of this study was to test a new technique to extubate patients which will eliminate or at least lessen these complications. Results of this study will help to determine the better extubation position for extubation and help reduce various airway complications. The objective of this study was to compare the frequency of respiratory complications encountered in two different positions used for extubation i.e. conventional recovery position *versus* the modified recovery position (recovery position with 10-degree left tilt and head-down).

## METHODOLOGY

This prospective comparative study was carried out from April 2022 to March 2023 at the Department of Anaesthesia, Combined Military Hospital, Kohat, Pakistan. Approval from the Ethical Review Board was taken before conducting the study (ERB no: E-2022/A/09). Patients of either gender with age range from 4 to 70 years belonging to American Society of Anaesthesiologists (ASA) Status I and II, scheduled for elective nose and throat surgeries, were recruited for this study after signing the consent to participate in this study. Patients with history of bronchial asthma, chronic obstructive pulmonary disease (COPD), recent respiratory infection, and gastro-oesophageal reflux disease (GERD) were excluded from this study. Patients with more than two intubation attempts were also excluded. A total of two hundred patients were selected for this study and were randomly divided following the lottery method into two equal groups. Sample size was calculated with the help of online sample size calculator<sup>10</sup> with a confidence level of 95%, the margin of error of 5%, and population proportion of 1.5%.<sup>11</sup> Sample size came out to be 40, but to increase the strength of the study it was increased to 200. All patients were extubated fully awake at the end of the surgery. Group C patients were extubated in the conventional recovery position, whereas Group M patients were extubated in the left lateral position with a 10-degree head down and 10-degree left tilt. All patients were observed for persistent coughing (cough bout that lasted for at least 2 minutes after extubation), breath holding for 20 seconds or more, desaturation (oxygen saturation less than 90%), laryngospasm, need for reintubation, vomiting, and regurgitation in the immediate post-extubation period.

Data were computed with the help of SPSS version 23 for windows. Continuous variables such as age, body mass index (BMI), duration of surgery were presented as mean and standard deviation, whereas categorical variables such as gender, type of surgery, ASA grade, post-extubation complications

including cough, breath holding, laryngospasm, desaturation, and need for reintubation were presented as frequency and percentage. Two groups were compared using independent t-test and Chi-squared test. A p-value of 0.05 or less was considered as significant.

## RESULTS

Age range of the patients selected for this study was from 4 to 70 years. Both groups in terms of age, BMI, and duration of surgery were comparable. Detailed comparison is shown in Table I.

In Group C, there were 46 (46%) males and 54 (54%) females with male-to-female ratio of 0.85:1; whereas in Group M, 57 (57%) patients were male and 43 (43%) patients were female with male-to-female ratio of 1.32:1. The gender difference between the two groups was statistically insignificant with p-value of 0.12. In Group C, 83 (83%) patients were ASA I and 17 (17%) patients were ASA II; whereas in Group M, 88 (88%) patients were ASA I and 12 (12%) patients were ASA II. Difference between the two groups in terms of ASA status was not significant with p-value of 0.315. Comparison of the type of surgeries performed in both groups is shown in Table II below.

Frequency of airway complications was significantly higher in Group C as compared to Group M. In Group C, out of 100, 18 (18%) patients had airway complications after the extubation; whereas in Group M, airway complications were seen in 6 (6%) patients only. The difference between the two groups in terms of airway complications was significant with a p-value of 0.009. Detailed comparison is shown in Table III below.

**Table I: Comparison of demographical data and duration of surgery.**

	Group	Mean $\pm$ SD	p-value
Age (years)	Conventional	22.58 $\pm$ 15.78	0.188
	Modified	19.78 $\pm$ 14.36	
BMI (kg/m <sup>2</sup> )	Conventional	23.94 $\pm$ 2.93	0.062
	Modified	24.69 $\pm$ 2.73	
Duration of surgery (minutes)	Conventional	59.83 $\pm$ 29.59	0.604
	Modified	62.06 $\pm$ 31.02	

Independent t-test; \*Statistically significant ( $p < 0.05$ ).

**Table II: Comparison of different surgeries performed in both groups.**

Surgery	Group		Total
	Conventional	Modified	
Adenoidectomy	2	0	2
Adenotonsillectomy	0	6	6
FESS	18	19	37
Rhinoplasty	0	3	3
Septoplasty	18	18	36
Tonsillectomy	54	47	101
Turbinoectomy / turbinectomy	8	10	18

**Table III: Comparison of frequency of airway complications.**

Complication	Group		p-value
	Conventional	Modified	
Cough	13 (13%)	4 (4%)	0.022
Breath holding	7 (7%)	2 (2%)	0.088
Laryngospasm	9 (9%)	1 (1%)	0.009
Desaturation	3 (3%)	0 (0%)	0.081
Reintubation	0 (0%)	0 (0%)	---
Vomiting / regurgitation	3 (3%)	1 (1%)	0.312
Aspiration	0 (0%)	0 (0%)	---

Chi-square test; \*Statistically significant ( $p < 0.05$ ).

## DISCUSSION

Extubation at the end of surgery is a routine procedure but it can lead to many complications. Minor complications such as cough and sore throat are quite common, especially when surgery involves the airway. But some of the complications such as laryngospasm, bronchospasm, vomiting, and aspiration, if not treated promptly may lead to severe morbidity and even mortality.<sup>12,13</sup>

In this study, it was observed that 18% patients in Group C and 6% patients in Group M encountered airway complications after extubation. Group M patients had clear edge with significantly reduced incidence of airway complications. In international literature, the incidence of airway complications after extubation ranges from 6 to 25%.<sup>14,15</sup>

In this study, the most common complication observed after extubation was cough. The authors observed that the incidence of cough was significantly less in Group M (4%) as compared to the Group C (13%). Reported incidence of cough after extubation greatly varies in international literature and ranges from 1.5 to 76%.<sup>5,16</sup>

In this study, the incidence of laryngospasm was significantly reduced in Group M (1%) as compared to Group C (9%). A study conducted by Birlie *et al.* concluded that the incidence of laryngospasm in paediatric patients is 18.4% after general anaesthesia which is quite high as compared to the present study.<sup>17</sup> In a similar study conducted by Jung *et al.* the incidence of airway complications in supine *versus* lateral position was compared, and they reached to the conclusion that extubation in lateral position improves oxygen saturation and reduces the incidence of stridor and laryngospasm.<sup>18</sup> So, it can be deduced that the left lateral position has an edge over the supine position.

Most of the anaesthesiologists prefer extubation in either a supine or conventional recovery position. Though many researchers have tried the head-down with conventional recovery position<sup>19,20</sup> but not many have tried the left lateral position combined with the leftward tilt and head-down. Extubation in a modified recovery position may increase the chances of regurgitation and vomiting due to a slight head-down tilt, however, in this study the authors did not observe this effect. Vomiting / regurgitation was seen in 3% in the conventional recovery position, whereas in Group M it was seen in only 1% and this difference was statistically insignificant. It is worth noting that patients in the present study were on empty stomachs and all patients with history of GERD and with a risk of regurgitation and vomiting were excluded; so, the results might not depict the true picture of this risk. It is suggested that another study may be conducted which should also include the patients with a risk of regurgitation and vomiting to find out if the results are different from this study.

## CONCLUSION

Extubation in a modified recovery position is associated with a reduced frequency of airway complications as compared to the conventional recovery position.

## ETHICAL APPROVAL:

Approval from the Ethical Review Board was taken before conducting the study (ERB No: E-2022/A/09).

## PATIENTS' CONSENT:

Patients' consent was taken from all the patients.

## COMPETING INTEREST:

The authors declared no conflict of interest.

## AUTHORS' CONTRIBUTION:

AH: Concept, study design, data collection, analysis of the data, drafting, and critical analysis.

FW: Concept, study design, analysis of the data, drafting, and critical analysis.

RF, MW: Study design, analysis of the data, drafting, and critical analysis.

SR: Concept, study design, and analysis of the data.

AAM: Analysis of the data and drafting.

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