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High-flow nasal cannula oxygenation in comparison with apnoeic oxygenation during foreign body removal by rigid bronchoscopy: A randomised controlled trial

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Abstract---Introduction: Main aim is to study efficacy of high low nasal cannula oxygenation in comparison with apnoeic oxygenation during foreign body removal by rapid bronchoscopy. Material & Methods: A prospective, blinded, randomized, controlled trial was conducted on subjects planned foreign body removal by a rigid bronchoscope. Patients under Inclusion criteria were selected for the study. Were male and female patients aged between 20 and 40 years. Results: Study was carried out in 100 subjects and divided into two subgroups 50 patients in group A HFNC and 50 patients in group B Apnoeic Oxygenation. The study was carried out in 20 to 40 years. Majority of the patients were in the age group of 31 – 40 years there were 56 % followed by 41 – 50 years there were 31% and 20 – 30 years 13%. Total male were 70 patients and 30 females (p 0.428). There were 36 patients having bronchospasm (p 0.512). Study was also carried for monitoring invasive ventilation in two subgroups but in

subgroup A among 50 patients 08 patients having invasive ventilation and in group B 14 patient's ($p > 0.520$) which is statically in significant. But in number of attempt in group A).(mean $\pm$ SD) were 6.8 ± 1.32 and group B 7.4 ± 1.86 ($p < 0.052$) and in procedure duration in group A 22.04 ± 4.2 and in group B 36.4 ± 6.2 (p value < 0.023). in both the subgroups the blood pressure and heart rate was show insignificant in mean reduction. ($p > 0.05$). Conclusion: HFNC showing better than apnoeic oxygenation technique in maintaining oxygenation status in patients undergoing rigid bronchoscopy for foreign body removal.

Keywords---HFNC, Apnoeic Oxygenation, Anaesthesia.

Introduction

Many patients having the spasm of lungs called as bronchospasm oxygen is required during bronchoscopy in patients with pre-existing hypoxemia. If there is no sufficient oxygen resulting in respiratory failure that requires endotracheal tube intubation.^[1] Bronchoscopy is useful toll to detect abnormality in pulmonary lesions in such condition it causes hypoxemia. Oxygen supplementation is required during bronchoscopy in pre-existing hypoxemia. If a sufficient oxygen is provided to the patients in termination of procedure and as such result in termination of procedure ^[2, 3]. In some of the studies they suggested that in NIV patients with hypoxemic respiratory failure a new oxygen supply should be provided with high gas flow rate that converts low flow oxygen system.^[4-7]

Aim & Objective

High-flow nasal cannula oxygenation in comparison with apnoeic oxygenation during foreign body removal by rigid bronchoscopy: a randomized controlled trial.

Material & Methods

The present study was carried out on 100 subjects in GSVM medical college during July 2021 to Dec 2021. These subjects were again subdivided into two sub groups. Group 1: High-Flow Nasal Cannula Oxygenation and group B: Apnoeic Oxygenation. The present study was prospective, blinded; randomized, controlled trial was conducted on subjects planned foreign body removal by a rigid bronchoscope. Patients under Inclusion criteria were selected for the study. Were male and female patients aged between 20 and 40 years. Patients were monitored with Invasive ventilation (n), Attempt Number, Procedure duration, blood pressure and heart rate.

Results

Table No 01 Tabular column represent the gender, age and branchospasm in group A and B

Variables	HFNC (50 Patients)		Apnoeic Oxygenation (50 Patients)		Total No of patients		p value
Age							
20 – 30	08 (16.00 %)		05 (10.00%)		13 (13.00%)		0.254
31 – 40	27 (54.00 %)		29 (58.00 %)		56 (56.00%)		
41 – 50	15 (30.00 %)		16 (32.00%)		31(31.00%)		
Gender	Male	Female	Male	Female	Male	Female	0.428
	32	18	38	12	70	30	
Branchospasm	14		22		36		0.512

Table No: 02 Tabular columns represent Invasive ventilation, Attempt Number and Procedure duration in group A and B

Variability	HFNC (50 Patients)	Apnoeic Oxygenation (50 Patients)	p value
Invasive ventilation (n)	08	14	0.520
Attempt Number (mean $\pm$ SD)	6.8 $\pm$ 1.32	7.4 $\pm$ 1.86	<0.052
Procedure duration	22.04 $\pm$ 4.2	36.4 $\pm$ 6.2	<0.023

Table No: 03 Tabular columns represent blood pressure and heart rate in group A and B

		HFNC	Apnoeic Oxygenation	p value
Blood Pressure	Baseline	86.1 $\pm$ 4.9	86.5 $\pm$ 4.8	0.58
	5 Minutes	93.0 $\pm$ 5.0	93.6 $\pm$ 4.9	0.54
	10 minutes	91.2 $\pm$ 4.8	91.5 $\pm$ 4.2	0.46
	15 minutes	89.4 $\pm$ 5.2	89 $\pm$ 5.6	0.44
	20 minutes	88.5 $\pm$ 4.2	88.6 $\pm$ 3.6	0.38
	Baseline	93.2 $\pm$ 2.9	92.9 $\pm$ 2.8	0.62
Heart Rate	5 Minutes	101.2 $\pm$ 3.4	101.1 $\pm$ 3.0	0.58
	10 minutes	99.2 $\pm$ 3.1	99.1 $\pm$ 3.0	0.54
	15 minutes	96.2 $\pm$ 3.3	96.9 $\pm$ 3.1	0.48
	20 minutes	92.7 $\pm$ 3.3	93.9 $\pm$ 3.0	0.42

Discussion

The present study was carried out in 100 subjects and there divided into two subgroups 50 patients in group A HFNC and 50 patients in group B Apnoeic Oxygenation. The study was carried out in 20 to 40 years. In group A in age group of 20 – 30 years 16 %, 31 – 40 years 54 % and 41 – 50 years 15 % and in group B 20 – 30 years 10 %, 31 – 40 years 58 % and 41 – 50 years 16 %. In the majority of the patients were in the age group of 31 – 40 years there were 56 % followed by 41

– 50 years there were 31% and 20 – 30 years 13%. On gender in group A in male were 32 and female 18 and in group B male were 38 and female 12 and total male were 70 patients and 30 females (p 0.428). On bronchospasm in group A were 14 patients and group B were 22 patients. Total there were 36 patients having bronchospasm (p 0.512). Study was also carried for monitoring invasive ventilation in two subgroups but in subgroup A among 50 patients 08 patients having invasive ventilation and in group B 14 patient's (p > 0.520) which is statically in significant. But in number of attempt in group A (mean $\pm$ SD) were 6.8 ± 1.32 and group B 7.4 ± 1.86 (p < 0.052) and in procedure duration in group A 22.04 ± 4.2 and in group B 36.4 ± 6.2 (p value <0.023). Our study coincides with the study of Abdel Twab, et al (2022) ^[8] in his study he concludes that HFNC was superior to apnoeic oxygenation in patients undergoing rigid bronchoscopy. On monitoring of blood pressure in group A and group B at baseline 86.1 ± 4.9 & 86.5 ± 4.8 (p 0.58) after 5 minutes 92.0 ± 5.0 & 90.6 ± 4.9 (p 0.54), at 10 minutes 91.2 ± 4.8 & 91.5 ± 4.2 (p 0.46), 15 minutes 89.4 ± 5.2 & 89.0 ± 5.6 (p 0.44) and 20 minutes 88.5 ± 4.2 & 88.6 ± 3.6 (p 0.38). On heart rate in group A & B at baseline 93.2 ± 2.9 & 92.9 ± 2.8 (p 0.62), 5 minutes 101.2 ± 3.4 & 101.1 ± 3.0 (p 0.58), 10 minutes 99.2 ± 3.1 & 99.1 ± 3.0 (p 0.54), 15 minutes 96.2 ± 3.3 & 96.9 ± 3.1 (p 0.48), 15 minutes 96.2 ± 3.3 & 96.9 ± 3.1 (p 0.48) and at 20 minutes 92.7 ± 3.3 & 93.9 ± 3.0 (p 0.42). N Douglas et al (2018) ^[9] in his study he concluded that high-flow nasal oxygen may prevent desaturation due to some causes; it does not protect against hypoxemia in all circumstances. Federico Longhini et al (2021)^[10] in his study he concluded that improvement of gas exchange, avoiding loss of end-expiratory lung volume and preventing increase in diaphragm activation.

Conclusion

HFNC showing better than apnoeic oxygenation technique in maintaining oxygenation status in patients undergoing rigid bronchoscopy for foreign body removal.

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