Journal of Population Therapeutics & Clinical Pharmacology

A PHYSIOPSYCHOLOGICAL INTERVENTION TO PROMOTE ACCEPTANCE AND ADHERENCE TO NON-INVASIVE VENTILATION IN SEMICONSCIOUS PATIENTS ADMITTED TO ICU FOR HIGHER PCO2 LEVELS; A RANDOMISED CONTROLLED STUDY

Dr Sorabh Sharma[3], Dr Sangeeta Meena[2], Dr Jigyasa Shahani[3]

1. Assistant Professor, Department of Anesthesia, SJP Medical College, Bharatpur, Rajasthan
2. Assistant Professor, Department of Anesthesia, SJP Medical College, Bharatpur, Rajasthan
3. Professor, Department of Anesthesia, SJP Medical College, Bharatpur, Rajasthan

Abstract

Background – COPD and Asthma patients who develop raised PCO2 levels causing decreased consciousness are frequently admitted in ICU for respiratory support.NonInvasive Ventilation is the latest technology used by intensivists to bring the PCO2 level of such patients to a physiologically acceptable value.This technique by passes the adverse effects of Invasive Ventilation along with sedation and muscle paralysis.Patients admitted to ICU are already anxious and irritable and unwilling to accept NIV mask because of claustrophobia. Rapid improvement in such patients' consciousness level can improve their cognitive factors such as perception, memory, attention, learning, visuospatial and construction abilities and language skills along with emotional and social capabilities leading to overall improvement in their quality of life.NIV mask tolerance can be improved by proper psychological counseling of such patients and by teaching them the Heartfulness relaxation method.Heartfulness relaxation method is a self learningheart based technique using the concept of auto suggestion and imagination. A cooperative patient is made to listen the heartfulness relaxation method audio and by self suggesting he/she relaxes his/her body and mind to get properly accustomed to NIV mask wearing .

OBJECTIVES - the primary objective of this study is to evaluate the effects of proper NIV mask adherence and acceptance by relaxation and psychological guidance leading to improved cognitive functions in drowsy COPD and Asthmatic patients admitted in ICU.The secondary objectives are to study the improvement in physiology along with SPO2% values in such patients.

Statistical Analysis-Data analysis was performed using SPSS 20 (IBM SPSS Statistics) for windows. The Addenbrooke's Cognitive Examination Score was compared between the two groups by repeated measure of analysis of variance. P value of <0.05 was considered statistically significant.

Result and Conclusion-Patients in the Cases group (group A) showed better cognition and acceptability of NIV mask voluntarily as compared to the control group (group B).

Keywords-NIV mask, COPD, Addenbrooke's Cognitive Examination Score, Systolic Blood Pressure, Diastolic Blood Pressure, Pulse Rate, SPO2%.

INTRODUCTION-

COPD and Asthma patients who develop raised PCO2 levels causing decreased consciousness are frequently admitted in ICU for respiratory support.Non Invasive Ventilation is the latest technology used by intensivists to bring the PCO2 level of such patients to a physiologically acceptable value.

This technique by passes the adverse effects of Invasive Ventilation along with sedation and muscle paralysis.

Patients admitted to ICU are already anxious and irritable and unwilling to accept NIV mask because of claustrophobia. Rapid improvement in such patients' consciousness level can improve their cognitive factors such as perception, memory, attention, learning, visuospatial and construction abilities and language skills along with emotional and social capabilities leading to overall improvement in their quality of life.

NIV mask tolerance can be improved by proper psychological counseling of such patients and by teaching them the Heartfulness relaxation method.

Heartfulness relaxation method is a self learningheart based technique using the concept of auto suggestion and imagination. A cooperative patient is made to listen the heartfulness relaxation method audio and by self suggesting he/she relaxes his/her body and mind to get properly accustomed to NIV mask wearing .

METHODOLOGY-

This study was carried out in SJPMC Medical college and attached RBM Hospital (Bharatpur) Medical ICU, where after proper approval from the Ethical committee of this institution and after obtaining proper informed consent by the patients relatives, all COPD and Asthma patients who were admitted due to a raised PCO2 level and decreased consciousness, were admitted and the Non Invasive Ventilation treatment using Bi PAP level of 14 cm H2O/ 6 cm H2O of the IPAP / EPAP level and the treatment was started.

All the multipara monitors including NIBP, SPO2, ECG along with heart rate monitoring were applied to the patients.

The medical treatment was carried out by the medical team.

These patients were randomly divided into cases group and controls group (Group A and Group B respectively).

In the group A after the patients regained improvement in consciousness level were made to listen to heartfulness relaxation audio along with their proper psychological counseling .

In the group B, no such activity was carried out.

These patients were treated by NIV for 4 hours initially and then 4 hours gap and then intermittently 2 hours treatment and 4 hours gap until their PCO2 level was brought down to 94 which is a physiologically acceptable level in such COPD, Asthma patients.

Throughout the whole treatment, patients of the groupA were counseled and taught to relax their mind to accept the NIV mask properly.

The vital values were obtained during admission and every 12 hourly after thatThe Addenbrooke's Cognitive Examination score was taken at the time of admission and then every 24 hours thereafter.

All the vitals and SPO2 levels were also recorded at the same time intervals. Informed consent by obtained by the close relatives of patients.

All patients received regular nebulised bronchodilators including Salbutamol, Ipratropium Bromide and intravenous Steroids. All patients also received antibiotics. Spontaneously breathing patients were administered controlled oxygen therapy (5 to 10 Litres per minute) during NIV free period.

Endotracheal intubation was performed for standard indications like respiratory arrest, deteriorating level of consciousness, exhaustion, progressive hypoxemia, hypercapnea, and deteriorating academia despite maximal level of medical treatment.

Exclusion criteria-

patients who were to be taken on invasive ventilation, who were taken on vasomotor support, who were suffering with any other comorbid medical illness like Diabetes, Hypertension, Heart disease, previous stroke, etc. and patients on any kind of psychiatric treatement and who died during the study were excluded from it.

Patients with underlying COPD, Asthma admitted with another primary admitting diagnosis (Accident, Stroke, Acute Myocardial Infarction) were excluded from the study. Similarly patients with acute respiratory failure secondary to bronchiectasis, bronchial asthma, tuberculosis, pneumothorax, pulmonary embolism, pulmonary oedema and neurologic/myopathic causes were also excluded.

RESULTS –

During the study period of one year, total 60 patients were enrolled for clinical evaluation for study.

They were randomized into two groups.

Demographic variables (age, sex were comparable in both groups ($P>0.05$). Vital parameters were comparable in both groups with no statistically significant differences ($P> 0.05$).

DiastolicBloodPressure(mmHg)								
		Just after Admission	30minafter Admission	After12 Hour	After 24 Hours	After 36 Hours	After 72 Hours	After96 Hours
GroupA	N	30	*30*	*30*	*30*	*30*	*30*	*30*
	Mean	87.35	80.35	78.27	77.55	76.12	75.20	77.86
	Std. Deviation	10.562	998.641	6.254	5.962	6.146	4.996	7.217
GroupB	N	*30*	*30*	*30*	*30*	*30*	*30*	*30*
	Mean	91.00	79.00	77.00	77.30	76.40	77.50	76.40
	Std. Deviation	8.452	8.081	7.626	6.867	7.494	6.409	5.628
PValue		.060	.313	.369	.847	.841	.050	.265
Significance		NS	NS	NS	NS	NS	NS	NS
Diastolic Blood PressureatDifferentTime Interval								

Patients in the cases group showed better and faster cognitive improvement.

SBP (mmHg)								
Group		Just after Admission	30 min after Admission	After 12 Hour	After 24 Hours	After 36 Hours	After 72 Hours	After 96 Hours
Group A	N	30	30	30	30	30	30	30
	Mean	134.27	118.16	116.5	114.6	116.76	118.4	119.18
	SD	9.51	16.82	16.50	17.10	9.10	5.99	6.24
Group B	N	30	30	30	30	30	30	30
	Mean	134.10	121.70	118.30	118.3	118.40	118.6	120.00
	SD	7.19	9.88	7.40	8.61	8.23	7.22	6.70
P Value LS		0.92	0.20	0.49	0.18	0.35	0.86	0.53
		NS	NS	NS	NS	NS	NS	NS

Systolic Blood Pressure at Different Time Interval

Comparison of Addenbrooke's Cognitive Examination Score at different time interval

PulseRate(min.)								
Group		**Just after Admission**	**30minafter Admission**	**After12 Hour**	**After 24 Hours**	**After 36 Hours**	**After 72 Hours**	**After96 Hours**
GroupA	N	30	*30*	*30*	*30*	*30*	*30*	*30*
	Mean	95.31	82.14	79.90	77.57	78.27	78.67	79.82
	Std. Deviation	14.046	7.773	7.806	7.147	7.607	7.128	8.113
GroupB	N	*30*	*30*	*30*	*30*	*30*	*30*	*30*
	Mean	97.50	83.70	80.60	80.30	81.20	80.60	95.40
	Std. Deviation	10.797	8.678	7.188	7.31	7.461	6.51	114.82
PValue		.385	.350	.643	.064	.056	.164	.346
Significance		NS	NS	NS	NS	NS	NS	NS
PulseRateat DifferentTimeInterval								

		N	Mean	Standard Deviation	P Value
Day 1	Group A	30	75.50	5.918	<0.001
	Group B	30	58.17	5.052	
Day 2	Group A	30	92.83	7.467	<0.001
	Group B	30	70.47	6.404	
Day 3	Group A	30	97.73	4.093	<0.001
	Group B	30	84.47	9.822	

Discussion-

1. S. Kumar et.al. have shown the benefit of NIV/BIPAP to be beneficial in COPD patients.
2. E. Clini et.al. have demonstrated the improvement in quality of life of COPD patients who were on long term NIV therapy. According to them compared with long term oxygen therapy alone, the addition of Noninvasive Positive Pressure Ventilation to long term oxygen therapy in stable chronic obstructive pulmonary disease patients with chronic ventilator failure :1) slightly decreased the trend to carbondioxide retention in patients receiving oxygen. 2) improved dyspnoea and health related quality of life.
3. R. Rangappa et.al. have shown the importance of ABCDEF bundle as the solution for delirium in ventilated patients in the ICU. Regular family bonding and early mobilization are the key concepts in his study.
4. Gopi C. Khilnani et.al. show the importance of stepwise protocol for weaning patients from Non Invasive Ventilation in which early recovery of consciousness is the key factor.

REFERENCES-

1. Malik AK, Baidya DK, et.al. A new ICU delirium prevention bundle to reduce the incidence of delirium: A randomized parallel group trial. Indian J Crit Care Med 2021;25(7):754-760.
2. Morandi A et.al. Sedation, delirium and mechanical ventilation: the 'ABCDE' approach. Curr Opin Crit Care 2011;17(1):43-49. DOI: 10.1097/mcc.0b013e3283427243.
3. Barnes- Daly M, Philips G, Ely E. Improving hospital survival and reducing brain dysfunction at seven California community hospital. Crit Care Med 2017;45(2):171-178. DOI: 10.1097/CCM.0000000000002149.
4. Balas M, Burke W, Gannon D, Cohen M, Colburn L, Bevil C et.al. implementing the awakening and breathing coordination, delirium monitoring/management, and early exercise/mobility bundle into everyday care. Crit Care Med 2013;41:5116-S127.DOI: 10.1097/ccm.0b013e3182a17064.
5. Needham D, Korupolu R, Zanni J, Pradhan P et.al. Early physical medicine and rehabilitation for patients with acute respiratory failure: a quality improvement project. Arch Phys Med Rehabil 2010;91(4):536-542.DOI: 10.1016/j.apmr.2010.01.002
6. Thomas JW et.al. Intensive care unit delirium is an independent predictor of longer hospital stay: a prospective analysis of 261 non-ventilated patients. Crit Care 2005;9(4):R375-R381. DOI: 10.1186cc3729.
7. Adler D, Perig S et.al. Polysomnography in stable COPD under non-invasive ventilation to reduce patient ventilator asynchrony and morning breathlessness. Sleep Breath Schlaf Atm. 2012;16:1081-90.
8. Borel JC et.al. Long term adherence with non invasive ventilation improves prognosis in obese COPD patients. Respirol Carlton Vic. 2014;19:857-65.
9. Antonelli Incalzi R, Marra C, Giordano A, Calcagni ML, Cappa A, Basso S et.al. Cognitive impairment in chronic obstructive pulmonary disease- a neuropsychological and SPECT study. J Neurol. 2003;250:325-32.
10. Inouye SK, van Dyck CH, Alessi CA, et.al. Clarifying confusion: the confusion assessment method. A new method for detection of delirium. An Intern Med. 1990;113:941-8.
11. Gudmundsson G et.al. Depression, anxietyand health status after hospitalization for COPD: a multicenter study in the Nordic countries. Respir Med. 2006;100:87-93.
12. Incalzi RA et.al. Chronic obstructive pulmonary disease. An original model of cognitive decline. Am Rev Respir Dis. 1993;148:418-24.
13. Celli BR. Pulmonary rehabilitation in patients with COPD. Am J Respir Crit Care Med. 1995;152:861-4.
14. Dodd JW et.al. Cognitive function in COPD. Eur Respir J. 2010;35:913-22.