



A COMPARATIVE EVALUATION OF PRE-OPERATIVE NEBULISATION WITH N-ACETYL CYSTINE AND LEVOSALBUTAMOL ON POST-OPERATIVE RESPIRATORY FUNCTION IN COPD PATIENT

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ABSTRACT **Introduction:** Chronic Obstructive Pulmonary Disease (COPD) is an umbrella term used to describe progressive lung diseases including emphysema, chronic bronchitis, refractory (non-reversible) asthma, and some forms of bronchiectasis. This disease is characterized by increasing breathlessness. Chronic obstructive pulmonary disease (COPD) is characterized by poorly reversible airway obstruction and is strongly related to smoking. This preview summarizes the epidemiology, diagnosis and management of COPD, and highlights the mechanisms operating in the airways that cause this disease.

Aim: To evaluate respiratory function before and after therapy with the study drugs. To assess any improvement in preoperative respiratory function following nebulization with N-acetyl cystine and levosalbutamol. To compare post operative respiratory function. Any per-operative systemic effects with either drug. Side effect and complication if any.

Material and methods: The present study will be, a prospective randomized controlled double blind clinical study that will include 200 ASA Grade-I and II patients of both sexes with in age group 60-80 years diagnosed with COPD and posted for elective surgeries under spinal anesthesia at Maharani Laxmi Bai Medical College, Jhansi (U.P.).

Result: In both group the patient divided into two age group of 60 to 70 years and 71 to 80 years. IN N-acetyl cystine between 60-70 years age group. Total 71 patient present and between 71 to 80 year age group 29 patient present in term of percentage 71.00% and 29.00% respectively. IN levosalbutamol 72 patient are between 60 to 70 year of age group (72.00%) and 28 patient between 71 to 80 years age group (28.00%). after comparison of both group in term of mean age distribution with standard deviation N-acetyl cystin group have 67.41±5.507 years and levosalbutamol group have 67.59±5.821 year with p value is 0.8225 and there is no significance mean age distribution. In group A the mean of MAP decreased from basal value 88.76±6.552 to 82.87±5.977 in 60 min duration (p<0.05). In group B the mean of MAP decreased from basal value 87.06±6.710 to 82.72±5.545 in 60 min duration (p<0.05). When both groups were compared for mean of MAP it was found that decrease in group A was much more than group B. In group A there was a decrease in mean heart rate from base value 81.02±10.615 to 72.18±7.244 (P<0.05). In group B the mean heart rate decreased from basal value 79.88±9.963 to 71.97±8.190 in 90 min duration (p<0.05).so group A patients in the study had a significant reduction in heart rate as compared with the group B. The mean of spo2 before block in group A and Group B were 96.54±1.314 and 96.24±1.120 respectively and there was no statistically significant difference in two group. The mean of spo2 in 15 min after study drugs in group A and group B were 98.3±0.845 and 98.08±0.631 respectively and there was no statistically significant in two group (p<0.05). There was no sign of respiratory depression in any patient after study drugs. The mean of pco2 and po2 before nebulization in group A and Group B were 43.62±3.396 & 44.43±3.207 and 71.88±12.303 & 73.40±8.805 respectively and there was no statistically significant difference in two group. but after nebulization the mean of pco2 and po2 in group A and group B were 37.66±2.903 & 38.33±2.089 and 84.13±7.290 & 83.22±6.004 respectively. the improvement of po2 level is more in group A as compare to group B.

Conclusion: The nebulized with 50 mg N-acetylcysteine in 3 ml of 0.9% of saline solution is more effective than 0.63 mg levosalbutamol in 3ml of 0.9% saline solution in hemodynamic response on post operative COPD patients. No adverse effects like hypotension, bradycardia, respiratory depression and vomiting occur in both study group during intraoperative and postoperative period. On the basis of improvement in clinical severity score and early discharge from the hospital N-acetylcysteine was found to be an effective therapy in COPD patient.

KEYWORDS : Anesthesia, Surgery, COPD.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is an umbrella term used to describe progressive lung diseases including emphysema, chronic bronchitis, refractory (non-reversible) asthma, and some forms of bronchiectasis. This disease is characterized by increasing breathlessness. Chronic obstructive pulmonary disease (COPD) is characterized by poorly reversible airway obstruction and is strongly related to smoking. This preview summarizes the epidemiology, diagnosis and management of COPD, and highlights the mechanisms operating in the airways that cause this disease.

Chronic obstructive pulmonary disease (COPD) is a common lung disease. Having COPD makes it hard to breathe.

There are two main forms of COPD:

- Chronic bronchitis, which involves a long-term cough with mucus
 - Emphysema, which involves damage to the lungs over time
- Most people with COPD have a combination of both conditions.

Globally, as of 2010, COPD affected approximately 329 million people (4.8% of the population). Between 1990 and 2014 the number of deaths from COPD decreased slightly from 3.1 million to 2.9 million and became the fourth leading cause of death. In 2013 it became the third leading cause as the number of deaths rose again to 3.1 million. The importance of the underlying local and systemic oxidative stress and inflammation in chronic obstructive pulmonary disease (COPD) has long been established. In view of the lack of therapy that might inhibit the progress of the disease, there is an urgent need for a successful therapeutic approach that, through affecting the pathological processes, will influence the subsequent issues in COPD management such as lung function, airway clearance, dyspnoea, exacerbation, and quality of life.

COPD is often associated with a number of coexisting diseases that may complicate the anaesthetic management of these patients. A high proportion of patients with COPD are smokers, hence the disease is associated with the development of lung cancer.

Pulmonary hypertension is prevalent in a third of patients with COPD and has been shown to be an indicator of poor long-term survival. Inflammatory processes in the lung not only cause pulmonary effects but also contribute to the extrapulmonary effects of the disease. The origin of this systemic inflammation is unclear and probably multifactorial, but results in weight loss, skeletal muscle dysfunction (with further adverse effects on respiratory muscle function), cardiovascular disease, depression, and osteoporosis. Weight loss occurs in 50% of patients with severe COPD and indicates a poor prognosis.

N-acetylcysteine (NAC) is a mucolytic and antioxidant drug that may also influence several inflammatory pathways.

Salbutamol is an effective treatment of acute exacerbation asthma but its use is associated with undesirable side effects like tachycardia and hypokalemia. Published studies have showed that levosaltamol improves pulmonary function more than racemic salbutamol without the known salbutamol side effects.

It has been estimated that 3 million people have COPD in the UK, two-thirds of these being undiagnosed. Diagnosis is most common in the sixth decade of life.

COPD confers increased risk of hospitalization in general, and in the critically ill it has been shown to increase mortality both in those with ventilator-associated pneumonia and in those with non-exacerbated disease. The long-term survival of patients with severe COPD undergoing surgery is poor, with postoperative pulmonary complications being common. A recent study identified COPD as an independent predictor of the development of hypoxaemia requiring intubation within 3 days of surgery. This unanticipated early intubation was identified as an independent predictor of 30-day mortality.

Inhaled therapy provides the mainstay of day-to-day treatment. Short-acting bronchodilators are used initially for the relief of breathlessness and exercise limitation. With persistent breathlessness, treatment should be stepped up to include either a long-acting muscarinic antagonist (LAMA), or a long-acting β_2 agonist (LABA), which may be combined with an inhaled corticosteroid (ICS). In more severe cases, patients may be maintained on a LABA and ICS in a combination inhaler plus a LAMA. The majority of patients will administer their medication via hand-held inhalers, with nebulizers being reserved for those with distressing or disabling breathlessness despite maximum therapy with inhalers.

What with the paucity of existing literature, on the uses of N-acetyl cystine and levosaltamol in surgical COPD patients, it was thought worthwhile to see how these drugs, with their preoperative use, affect the post operative respiratory outcome and recovery.

AIM AND OBJECTIVES

Aim:

- To evaluate respiratory function before and after therapy with the study drugs.
- To assess any improvement in preoperative respiratory function following nebulization with N-acetyl cystine and levosaltamol.
- To compare post operative respiratory function.
- Any per-operative systemic effects with either drug.
- Side effect and complication if any.

Objectives:

- To evaluate a method to improve respiratory function in COPD patients preoperatively as to minimize post-operative respiratory complication, morbidity and mortality.

MATERIAL AND METHODS

The present study will be, a prospective randomized controlled double blind clinical study that will include 200 ASA Grade-I and II patients of both sexes with in age group 60-80 years diagnosed with COPD and posted for elective surgeries under spinal anesthesia at Maharani Laxmi Bai Medical College, Jhansi (U.P.).

Exclusion criteria:

- < 60 yrs > 80 yrs patient.
- Comorbid condition like uncontrolled diabetes and

hypertension.

- Irreversible COPD
- Cor pulmonale
- I.H.D. or any other cardiac condition.
- Peripheral vascular disease.

Location And Period Of Study:

The study will be carried out in the Department of Anaesthesiology and Critical Care Medicine, M.L.B. Medical College, Jhansi (U.P.) from March 2018 to October 2019.

Study Design:

Patients selected for the study will be randomly allocated into two groups via chit in the box method :-

- Group I- N-acetyl cystine group n=100: 50 mg diluted to 3ml with 0.9% saline.
- Group II- Levosalbutamol group n=100: 0.63 mg diluted to 3ml with 0.9% saline.

Preoperative Evaluation And Medical Optimization:

The patient with COPD requires a comprehensive preoperative evaluation, which ideally should commence well in advance of the proposed surgical intervention to allow adequate time for additional investigations and treatment to be instigated.

Preoperative evaluation:

- All the selected patients shall be subjected to a through clinical and physical examination particular in relation to respiration and CNS systems and also for any other comorbid condition that may co-exist.
- All the routine and special investigation will be performed as required x-ray chest, P.A. view and ECG, FEV₁/FVC ratio and A.B.G. will be done in every patients.

Study:

- After obtaining well-informed and written consent
- Patients will be kept on following treatment as suitable antibiotic than nebulization began 48 hrs before surgery morning and evening twice a day and one time on the day of surgery in preoperative room.

Anesthetic Technique:

In the operation theatre:

- Fasting 6-8 hrs prior to surgery.
- I/V line will be started and monitor will be connected for vital records.
- Spinal anaesthesia will be administered in L₃ – L₄ interspinal space under all aseptic precaution using 10-12.5 ml, 0.5% heavy bupivacaine as a drug.
- Vital parameters monitor throughout surgery.

Post-operatively:

Patients will be followed up for 48 hrs

Data collection and evaluation:

FEV₁ and PEFR will be recorded as follows –

- Prenebulization
- Post nebulization in the operative room.
- Postoperative :
 - o8 hrs
 - o12 hrs
 - o24 hrs
 - o48 hrs
- During surgery oPulse, B.P., SpO₂ will be monitored as per 15, 30, 40,50, 60 minutes.
- Postoperative Pulse, B.P., SpO₂, FEV₁/FVC and A.B.G will be monitored

Statistics:

Same data will be measured after the post-operative. After completion of the study all collected data will be statistically analyzed as follows.

- Calculate Standard Deviation (SD) and mean of all data
- By using SPSS software, Student't' test and Pearson's correlation will be used.
- If the P* value is < 0.05 then it is considered to be statistically significant.

RESULT

Table 1: Age Distribution In Study Group

Age (in years)	Group A (N-ascetyl cystine)		Group B (Levosalbutamol)	
	No. of patients	Percentage	No. of patients	Percentage
60-70	71	71.00%	72	72.00%
70-80	29	29.00%	28	28.00%

Table 2: Mean Age Distribution In Study Group

Mean Age (in years)	Group A (N-ascetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD	67.41±5.507	67.59±5.821	0.8225

Table3: Sex Distribution In Study Group

Sex	Group A (N-ascetyl cystine)		Group B (Levosalbutamol)	
	No. of patients	Percentage	No. of patients	Percentage
Male	62	62.00%	61	61.00%
Female	38	38.00%	39	39.00%

Table 4: Diagnosis Distribution In Study Group

Diagnosis	Group A (N-ascetyl cystine)		Group B (Levosalbutamol)	
	No. of patients	Percentage	No. of patients	Percentage
Abdominal Surgery	60	60.00%	54	54.00%
Orthopaedic Surgery	22	22.00%	25	25.00%
Perineal Surgery	18	18.00%	20	20.00%
Other	0	0.00%	01	01.00%

Table 5: Type Of Surgery Distribution In Study Group

Type of Surgery	Group A (N-ascetyl cystine)		Group B (Levosalbutamol)	
	No. of patients	Percentage	No. of patients	Percentage
Appendectomy	08	08.00%	02	02.00%
C. Plating	01	01.00%	00	00.00%
Circumcision	01	01.00%	00	00.00%
Cystolithotomy	03	03.00%	02	02.00%
DHS	03	03.00%	01	01.00%
Fissurectomy	08	08.00%	13	13.00%
Grafting	0	0.00%	01	01.00%
Hernioplasty	09	09.00%	12	12.00%
HRA	05	05.00%	09	09.00%
Hysterectomy	07	07.00%	08	08.00%
Laparoscopic Cholecystectomy	11	11.00%	09	09.00%
MFP	14	14.00%	13	13.00%
Nephrolithotomy	07	07.00%	05	05.00%
PFN	08	08.00%	06	06.00%
Plating/Nailing	01	01.00%	02	02.00%
Pyelo-lithotomy	02	02.00%	00	00.00%
TBW	03	03.00%	07	07.00%
TURP	02	02.00%	03	03.00%
Vaginal Hysterectomy	07	07.00%	07	07.00%

Table 6: Mean Arterial Pressure In Study Group

Mean Arterial Pressure	Group A (N-ascetyl cystine)	Group B (Levosalbutamol)	p value
Basal	88.76±6.552	87.06±6.710	0.0714
Just after block	82.67±6.870	83.14±6.655	0.6237
5 minute	75.65±7.551	76.43±8.039	0.4803
10 minute	78.02±6.642	78.23±7.437	0.8334
15 minute	81.07±5.044	81.33±5.763	0.7346
30 minute	81.93±5.388	82.1±5.928	0.8322
45 minute	82.52±5.394	82.68±5.274	0.8323
60 minute	82.87±5.977	82.72±5.545	0.8542
75 minute	83.05±5.591	82.99±5.544	0.9393
90 minute	82.87±5.550	83.21±5.802	0.6724

Table 7: Mean Pulse Rate In Study Group

Mean Pulse Rate	Group A (N-ascetyl cystine)	Group B (Levosalbutamol)	p value
Basal	81.02±10.615	79.88±9.963	0.4345
Just after block	81.58±11.255	80.35±10.413	0.4234
5 minute	79.84±11.077	78.6±10.578	0.4191
10 minute	76.75±10.514	75.57±10.085	0.4189
15 minute	73.48±9.949	72.65±10.155	0.5600
30 minute	71.42±9.532	71.79±10.563	0.7951
45 minute	70.92±8.422	71.67±9.412	0.5533
60 minute	71.82±7.299	71.79±8.215	0.9782
75 minute	72.02±7.486	72.23±8.298	0.8511
90 minute	72.18±7.244	71.97±8.190	0.8479

Table 8: Mean Spo2 In Study Group

Mean SpO2	Group A (N-ascetyl cystine)	Group B (Levosalbutamol)	p value
Basal	96.54±1.314	96.24±1.120	0.0838
Just after block	97.36±1.210	97.09±1.083	0.0980
5 minute	98.02±1.073	98.08±0.706	0.0877

10 minute	98.3±1.070	98.42±0.572	0.3238
15 minute	98.3±0.845	98.08±0.631	0.0781
30 minute	98.34±0.831	98.1±0.618	0.1257
45 minute	98.21±0.946	98.07±0.555	0.2033
60 minute	98.14±1.015	97.95±0.845	0.1518
75 minute	97.84±1.002	97.64±0.871	0.1336
90 minute	96.63±0.950	96.79±0.686	0.1737

Table 8: Mean Abg Finding Pre Nebulization Before Surgery (pco2) In Study Group

ABG finding (Pre nebulization before surgery (PCO2))	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD (PCO2)	43.62±3.396	44.43±3.207	0.0845

Table 9: Mean Abg Finding Pre Nebulization Before Surgery (po2) In Study Group

ABG finding (Pre nebulization before surgery (PO2))	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD (PO2)	71.88±12.303	73.40±8.805	0.3163

Table10: Mean Abg Finding Post-op Nebulization (pco2) In Study Group

ABG finding (post-op nebulization)	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD (PO2)	37.66±2.903	38.33±2.089	0.0625

Table11: Mean Abg Finding Post-op Nebulization (po2) In Study Group

ABG finding (post-op nebulization)	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD (PO2)	84.13±7.290	83.22±6.004	0.3364

Table 13: Mean FEV1/fvc After Pre-nebulization In Study Group

Mean FEV1/FVC after pre-nebulization	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD	0.6228±0.36	0.6315±0.031	0.8100

Table14: Mean FEV1/fvc Post Nebulization In Study Group

Mean FEV1/FVC post nebulization	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD	0.6652±0.027	0.6641±0.031	0.7893

Table15: Mean FEV1/fvc Post-op. Ration In Study Group

Mean FEV1/FVC Post-Op. ration	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD	0.7227±0.027	0.7212±0.022	0.6672

Table16: Mean Pefr Pre-op Nebulization (before Surgery) In Study Group

Mean PEFR (Before Surgery)	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD	263.05±94.834	270.09±94.134	0.5989

Table17: Mean Pefr Post-op Nebulization (before Surgery) In Study Group

Mean PEFR (Before Surgery)	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD	334.61±90.927	323±88.155	0.3604

Table18: Mean Pefr (after Surgery) In Study Group

Mean PEFR (After Surgery)	Group A (N-acetyl cystine)	Group B (Levosalbutamol)	p value
Mean±SD	412.72±87.692	390.61±86.399	0.0740

DISCUSSION

Present study evaluates the comparison of pre operative N-acetyl cystine and levosalbutamol nebulisation on post operative outcome in COPD Patients and also evaluating health behavior change, self efficacy, health service utilization and patients recorded outcomes and incident of post operative respiratory complication in COPD patients.

My thesis, we take total 200 patients with ASA grade I & II between the age group of 60-80 yrs, suffering from COPD and posted for elective surgeries under spinal anaesthesia which randomly divided into two group of 100-100 patients. One group for N-acetyl cystin and one group for Levosalbutamol

I compare the results of both N-acetyl cystine and levosalbutamol group in following parameters.

Age:

In both group the patient divided into two age group of 60 to 70 years and 71 to 80 years.

IN N-acetyl cystine between 60-70 years age group. Total 71 patient present and between 71 to 80 year age group 29 patient present in term of percentage 71.00% and 29.00% respectively.

IN levosalbutamol 72 patient are between 60 to 70 year of age group (72.00%) and 28 patient between 71 to 80 years age group (28.00%). after comparison of both group in term of mean age distribution with standard deviation N-acetyl cystin group have 67.41±5.507 years and levosalbutamol group have 67.59±5.821 year with p value is 0.8225 and there is no significance mean age distribution.

Sex:

N-acetyl cystin group have 62 male (62.00%) and 38 females (38.00%) and levosalbutamol group have 61 male (61.00%) and 39 females (39.00%) respectively.

Diagnosis:

IN N-acetyl cystine group 60 patient for abdominal surgeries (60.00%), 22 patient for Orthopaedic Surgery (22.00%), 18 patients for Perineal Surgery (18.00%) and in levosalbutamol group have 54 patient for Abdominal Surgery (54.00%) and 25 patient for Orthopaedic Surgery (25.00%), 20 patients for Perineal Surgery (20.00%) and 1 patient for other (1.00%) respectively.

Type of Surgery Distribution:

IN N-acetyl cystine group 08 patients for Appendectomyis (08.00%), 01 patient for C. Plating (01.00%), 01 patient for Circumcision (01.00%), 03 patients for Cystolithotomy (03.00%), 03 patients for DHS (03.00%), 08 patients for Fissurectomy (08.00%), 09 patients for Hernioplasty (09.00%), 05 patients for HRA (05.00%), 07 patients for Hysterectomy (07.00%), 11 patients for Laparoscopic Cholecystectomy (11.00%), 14 patients for MFP (14.00%), 07 patients for Nephrolithotomy (07.00%), 08 patients for PFN (08.00%), 01 patient for Plating/Nailing (01.00%), 02 patients for Pyelo-lithotomy (02.00%), 03 patients for TBW (03.00%), 02 patient for TURP (02.00%), 07 patients for Vaginal Hysterectomy (07.00%).

IN Levosalbutamol group 02 patients for Appendectomyis (02.00%), 02 patients for Cystolithotomy (02.00%), 01 patients for DHS (01.00%), 13 patients for Fissurectomy (13.00%), 12 patients for Hernioplasty (12.00%), 09 patients for HRA (09.00%), 08 patients for Hysterectomy (08.00%), 09 patients for Laparoscopic Cholecystectomy (09.00%), 13 patients for MFP

(13.00%), 05 patients for Nephrolithotomy (05.00%), 06 patients for PFN (06.00%), 02 patient for Plating/Nailing (02.00%), 01 patient for grafting (01.00%), 07 patients for TBW (07.00%), 03 patient for TURP (03.00%), 07 patients for Vaginal Hysterectomy (07.00%) respectively.

Mean arterial pressure (MAP):

In group A the mean of MAP decreased from basal value 88.76 ± 6.552 to 82.87 ± 5.977 in 60 min duration ($p < 0.05$). In group B the mean of MAP decreased from basal value 87.06 ± 6.710 to 82.72 ± 5.545 in 60 min duration ($p < 0.05$).

When both groups were compared for mean of MAP it was found that decrease in group A was much more than group B.

Heart rate response:

In group A there was a decrease in mean heart rate from base value 81.02 ± 10.615 to 72.18 ± 7.244 ($P < 0.05$). In group B the mean heart rate decreased from basal value 79.88 ± 9.963 to 71.97 ± 8.190 in 90 min duration ($p < 0.05$). So group A patients in the study had a significant reduction in heart rate as compared with the group B.

Saturated partial pressure of oxygen (SpO₂):

The mean of SpO₂ before block in group A and Group B were 96.54 ± 1.314 and 96.24 ± 1.120 respectively and there was no statistically significant difference in two group.

The mean of SpO₂ in 15 min after study drugs in group A and group B were 98.3 ± 0.845 and 98.08 ± 0.631 respectively and there was no statistically significant in two group ($p < 0.05$). There was no sign of respiratory depression in any patient after study drugs.

ABG Analysis:

The mean of pCO₂ and PO₂ before nebulization in group A and Group B were 43.62 ± 3.396 & 44.43 ± 3.207 and 71.88 ± 12.303 & 73.40 ± 8.805 respectively and there was no statistically significant difference in two group. but after nebulization the mean of pCO₂ and PO₂ in group A and group B were 37.66 ± 2.903 & 38.33 ± 2.089 and 84.13 ± 7.290 & 83.22 ± 6.004 respectively. The improvement of PO₂ level is more in group A as compare to group B.

FEV₁/FVC ratio:

The mean of fev₁/fvc ratio before nebulization in group A and Group B were 0.6228 ± 0.36 and 0.6315 ± 0.031 respectively and there was no statistically significant difference in two group.

The mean of fev₁/fvc ratio after nebulization in post operative study drugs in group A and group B were 0.7227 ± 0.027 and 0.7212 ± 0.022 respectively and there was no statistically significant in two group ($p < 0.05$). There was no sign of respiratory depression in any patient after study drugs.

PEFR:

The mean of PEFr value before nebulization in group A and Group B were 263.05 ± 94.834 and 270.09 ± 94.134 respectively and there was no statistically significant difference in two group.

The mean of PEFr after nebulization in post operative study drugs in group A and group B were 412.72 ± 87.692 and 390.61 ± 86.399 respectively the value of PEFr is more improve in group A as compare to group B.

After analyzing SBP, DBP and mean blood pressure variation and pulse oximetry for pulse rate and arterial oxygen saturation, it was found that both of the study group did not show hemodynamic instability.

None of the patient developed any complication and hemodynamics remained fairly stable and comparable in both group.

No any sign of drug toxicity or drug reaction was reported in any patients.

CONCLUSION

- After completion of study and analysis of data following conclusion were derived at

- The nebulized with 50 mg N-acetylcysteine in 3 ml of 0.9% of saline solution is more effective than 0.63 mg levosalbutamol in 3ml of 0.9% saline solution in hemodynamic response on post operative COPD patients
- No adverse effects like hypotension, bradycardia, respiratory depression and vomiting occur in both study group during intraoperative and postoperative period.
- On the basis of improvement in clinical severity score and early discharge from the hospital N-acetylcysteine was found to be an effective therapy in COPD patient

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