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A STUDY ON CLINICAL EFFICACY OF N-ACETYL CYSTEINE IN ACUTE EXACERBATIONS OF COPD

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ABSTRACT

To assess the clinical efficacy of N-acetylcysteine (NAC) in COPD patients during their acute exacerbations in chronic bronchitis (AECB). controlled study in 200 patients experiencing an acute exacerbation of COPD. Patients are divided in two groups One group is given inhalation of salbutamol, ipratpium bromide, tid, Budensonide inhalation 400 microgram, levofloxacin 250mg.Other grup contain above treatment with NAC 300mg.BID, and patients called for alternative day follow up visits for 15 days. The primary objective was to assess the proportion of patients with normalized physical, laboratory and radiological examination and pulmonary Function test to know the improvement. (Cough intensity and frequency, volume, dysapnea, fever and lung auscultation) and the conclusion is Treatment with NAC 300 mg/TID, improved biological markers and clinical outcomes in patients with COPD exacerbations. It is speculated that the effect of NAC on inflammatory markers may be due to both mucolytic and antioxidant properties.

KEYWORDS. N-Acetyl-cysteine, COPD, exacerbations.

INTRODUCTION

Chronic obstructive pulmonary disease is one of the most common chronic disease and major causes of MORTALITY and MORBIDITY**.** But often forgotten that it is preventable largely. In less than 20 years it will be one of the 5th leading medicinal BURDENs on society world wide. it results in frequent consultation in primary care, accounts more than 10% of all medical admissions. Global burden of disease study under W.H.O and World Bank estimated prevalence of COPD 9.34/1000 men, 7.53 /100 women in 1990. But prevalence is steadily increasing during past decade

The lung function and consequently patient quality of life worsens as disease progresses (Seemungal et al 1998; Hogg 2004). The standard way of assessing the progression of COPD (Burrows and Earle 1969) is an annual decline in forced expiratory volume in one second (FEV_1), which is considered to be the best single correlate of mortality (Celli et al 2004) and is used as the main parameter in the evaluation of many other COPD aspects. In comparison with the normal subject where the FEV_1 decline reaches 20–30 mL/year, in COPD patients it reaches 60 mL/year (Anthonisen et al 1994.

MATERIAL AND METHODS

The objective of the study is to determine the clinical efficacy of N-acetyl-cystine in acute exacerbations of chronic obstructive pulmonary disease.

Inclusion criteria

Patients aged between 40 to 70 years are included in study, both male and female

1. having historical background of COPD, and breathlessness for three months for two consecutive years.
2. reduced FEV1 and reduced $FEV_{1/}$ FVC and no reversibility or minimal on bronchodilator inhalation and has got acute exacerbation.

Exclusion Criteria; Patients with.

1 Bronchiectasis
2 Bronchial asthma
3 Intestinal lung diseases
4 Congestive heart failure
5 Pulmonary eosinophilia

The trial was conducted at Govt chest hospital hanamkonda, Warangal under supervision of Dr.v. Narayana Reddy Chest physician and superindent of Govt. C.D. & TB hospital, Hanumkonda, Warangal.

STUDY DESIGN

This study was conducted on two groups of patients of COPD. Each group contains 25 patients. One group is is given inhalation of salbutamol, Ipratropium bromide, tid budesonide inhalation, 400 micrograms MDI levofloxacin 250mg BD. Other group contains above convential treatment with N Acetyl cystine 300mg BD.

All enrolled patients have base line physical, laboratory and radiological examination and plumnoary functional test to rule out exclusion criteria. X- Ray to rule out pneumonia and atelectesis. physical examination to rule out kyphosis scoliosis. Patens are called for alternative day follow up visits up to two weeks. At each visit patients were assessed for symptomatic relief and improvement

RESULTS AND OBSERVATIONS

STUDY GROUP PEFR values(Lt/Min.)

S.No	**Pre**	**Post**	
		(7TH day)	(8^{th} day)
1	200	205	230
2	210	215	245
3	250	265	280
4	260	265	290
5	280	284	320
6	220	226	250
7	220	226	260
8	210	216	250
9	222	228	250
10	210	214	245
11	220	226	255
12	218	222	248
13	210	216	240
14	216	220	246
15	220	224	260
16	210	216	250
17	240	250	280
18	215	219	245
19	225	235	265
20	300	310	340
21	300	315	335
22	280	300	320
23	290	306	330
24	300	310	336
25	310	315	340

Pre and post treatment values of PEFR (Lt/Min.) in study group showed improvement upto 30Lt/Min.

CONTROL GROUP PEFR values(Lt/Min.)

S.No	**Pre**	**Post**	
		(7 th day)	(8^{th} day)
1	203	209	213
2	220	225	230
3	240	245	249
4	280	286	292
5	300	308	312
6	240	246	252
7	260	266	272
8	278	280	286
9	296	300	306
10	310	313	319
11	320	324	330
12	280	384	300
13	290	296	299
14	312	316	320
15	316	320	324
16	250	256	266
17	265	266	269
18	279	282	290
19	250	254	260

20	310	314	322
21	306	310	315
22	300	306	310
23	295	300	306
24	310	316	320
25	306	312	318

Pre and post treatment values of PEFR (Lt/Min.) in control group showed improvement upto 10Lt/Min only.

PRE AND POST TREATMENT Hb LEVELS (IN GRAMS %) STUDY GROUP

S.No	Pre	Post
1	13.5	13.0
2	12.4	13.2
3	12.0	12.0
4	9.0	9.2
5	12.6	12.5
6	10.2	10.2
7	12.2	13.0
8	13.0	13.2
9	14.0	13.8
10	8.6	8.2
11	10.0	10.0
12	10.6	10.6
13	14.6	14.0
14	10.0	10.2
15	12.6	12.2
16	14.2	14.0
17	13.2	13.0
18	13.6	13.6
19	9.2	9.2
20	10.6	10.8
21	14.0	14.2
22	12.6	12.6
23	8.6	9.0
24	11.0	11.2
25	10.0	10.2

PRE AND POST TREATMENT Hb LEAVELS (IN GRAMS %) CONTROL GROUP

	Pre	Post
1	12.8	12.2
2	8.0	8.2
3	10.0	10.2
4	12.2	12.5
5	13.6	14.0
6	9.2	10.0
7	10.0	10.0
8	12.0	12.2
9	11.6	12.0
10	12.6	12.6
11	9.6	10.0
12	13.6	13.6
13	13.2	13.2
14	12.0	12.0
15	12.6	13.0
16	9.6	10.0
17	12.6	12.0
18	14.0	13.0
19	12.6	12.6

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20	11.6	11.6
21	10.4	10.2
22	9.6	10.0
23	10.6	10.6
24	11.6	11.2
25	10.8	10.8

There is no significant change in post treatment Haemoglobin values in both study group and control group.

DISCUSSION

The patients present with cough, increased volume of sputum of mucoid nature. 4 patients CLEARED by 7th day. Marked reduction of symptom otology. 2 patients shown improvement by the end of 9th day. And sputum thinning out by second visit where as Non –N- Acetyl cystine group all patients havening persistent of symptom otology, though reduced till 15th day. No thinning of sputum.

Patients presented with sputum purulence and dyspnoea has shown, in study group improvement in symptom otology by 7th day. Breathlessness came to base line by 10th day. this 2nd group responded quickly because of antibiotic action on secondary bacterial infection, when compared to patients presented with mucoid sputum persimable due to viral. Controlled group dyspnoea continued up to 2 weeks through purulent cleared equally with study group. This difference may be due to N-acetyl cysteine.

In study group, Patients presented with increased dyspnoea and purulent sputum and fever. They started respond from 2nd visit and fever subsided by 5th day purulence of symptom converted into mucoid and thinned at gradually and sputum production was absent by 11th day.

In controlled group dyspnoea persisted till the end of follow up(15 days) fever, sputum purulence responded as patients responded in study group.

Patients presented with fever and purulence sputum in both study and controlled groups responded equally during first 7 days of treatment, because both groups used antibiotic. But mucoid sputum till 15th in control group. Because NAC is having mucolytic action, study group improved well.

In observation the patients the patients who are in age group of 60 to 70 yrs has shown slow response in both groups may be due to age related immunodeficiency contrast patients who are in age group of 40 -60 shown recovery may be due to intact immunity.

The study group has shown improvement in lung function peak expiratory flow rate from 30 lit to 40lit/min. whereas controlled group 5-10 lit. Per minute improvement. This indicates improvement in lung function by N-acetyl-cystenine.

CONCLUSION

Chronic bronchitis is one of the prinicipal manifestations of COPD. overall 10 years mortality rate following diagnosis is 50%, with respiratory failure following an acute exacerbation being the most frequent terminal event. The gold standard treatment for COPD is BRONCHODILATORS in some cases corticosteroids can be given inhalation Form. Some timesin AECB it requires systemic administration of corticosteroids.

Now NAC which has shown remarkable efficacy in the study group.

1. Early recovery response in reduction of symptomatology.
2. It has shown increase lung function particularly the parameter PEFR
3. It has shown reduction in the frequency of exacerbation follow-up for period of 18 months

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