ORIGINAL ARTICLE

ASSOCIATION OF BRONCHIECTASIS IN MODERATE TO SEVERE COPD PATIENTS ATTENDING KATURI MEDICAL COLLEGE HOSPITAL, GUNTUR FROM 2011-2013

R. Ramakrishna[1], A. Ambica[2]

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ABSTRACT: 50 patients of COPD having moderate to severe COPD were analysed with clinical, chest x-ray, CT scan, serum c reactive protein and albumin levels and microbiological study by sputum microscopy for culture and sensitivity and gram stain. Mean age of the patients was 63±7.87 years. Out of 50 Patients 45 were men (90%) and the remaining were women (10%). Bronchiectasis was present in 30 patients (60%). H. influenza was the commonest organism isolated from sputum. Patients with bronchiectasis had significantly more exacerbations (p=0.0001), severe airway obstruction (p=0.037), higher crp levels (p=0.0001) and low album In levels (p=0.007). Nine patients (30%) died in bronchiectasis group and only one patient (3.33%) died in patients without bronchiectasis. Our study showed an elevated prevalence of bronchiectasis in patients with moderate to severe COPD and was associated with severe airway obstruction. Increased exacerbations, inflammation, malnutrition and mortality in Indian patients.

KEYWORDS AND ABBREVIATIONS: COPD: Chronic Obstructive Pulmonary disease, Bronchiectasis (Brx), Patients (pts.), Comorbidity, exacerbations, airway obstruction, GOLD: Global Initiative for Obstructive Lung Disease, PPM: Potentially Pathogenic Microorganism, LABA: Long acting beta2 agonist, ICS: inhaled cortocosterois, .ACH: Anticholinergic Drug, ICS: Inhaled Corticosteroid.

INTRODUCTION: The data regarding the association of bronchiectasis in COPD is sparse. Because of exposure to tobacco from childhood, environmental factors, exposure to biological fuels the prevalence of COPD is high in India making it a serious cause of considerable morbidity and mortality. Post tubercular COPD is common in India as tuberculosis is still rampant. Post tubercular bronchiectasis is common because of pulmonary fibrosis because of delayed anti tuberculosis chemotherapy or irregular chemotherapy. As per GOLD guidelines the progression of COPD depends upon comorbidities and exacerbations. Associated bronchiectasis is responsible for recurrent infections and should be regarded as a comorbidity which enhances the rate of secondary infection and progression of COPD. Thus bronchiectasis in COPD patients contributes to considerable mortality and morbidity. We have made an attempt to study the prevalence of bronchiectasis among patients diagnosed as having moderate to severe COPD by having FEV1/FVC of <0.7 and FEV1 of <70% predicted

MATERIALS AND METHODS: Fifty consecutive patients having 51-70% of predicted FEV1 (Moderate) and 50% or less of FEV1 (Severe COPD) were included prospectively between September 2011 and July 2013. Spirometry was performed in all the patients. HRCT scan of the

chest was used to diagnose bronchiectasis. Peripheral blood samples were obtained for measurement of C-reactive protein and serum albumin. The subjects were analyzed about their clinical symptoms and exacerbations by a clinical questionnaire. Three sputum samples from each patient were collected for microbiological analysis on monthly basis for three months. All the tests were done in clinically stable phase for at least 6 weeks.

AIM OF THE STUDY:

1. To study the association of bronchiectasis in moderate to severe COPD patients and assessing the severity of disease, exacerbations, morbidity and mortality.
2. To study the type and distribution of bronchiectasis on HRCT.
3. To study the factors associated with bronchiectasis.

OBJECTIVE: Data regarding the association of bronchiectasis in COPD patients is sparse. But the association is frequently seen. COPD is seen in bronchiectasis patients with airflow limitation causing considerable breathlessness apart from recurrent secondary infections with potentially pathogenic microorganisms. Bronchiectasis is observed by radiological examination in patients of COPD by chest x-ray and HRCT. We studied this problem because of frequent association of both increasing the complications.

RESULTS:

Parameter	Whole group
Subjects included in the study	50
Gender (male: Female ratio)	49:1
Age in years	63.84±7.87
Pack years smoked	55.9±8.41
Smoking in numbers Current Former	 20 (40%) 30 (60%)
Onset of symptoms in years	16.06±2.63
Daily sputum production	29 (58%)

Table 1

Parameter	Whole group (50)
Quantity of Sputum Production/day in No. <10ml 10-30ml >30ml	 20 (40%) 16 (32%) 14 (28%)
Sputum type in Nos: Mucoid Mucopurulent	 35 (70%) 10 (20%)

Purulent	04 (8%)
Haemoptotic	01 (2%)

Table 2

Parameter	Number
Dyspnoea (MRC Grade)	2.16± 0.65
Past history of wheezing	28 (56%)
Past history of tuberculosis	09 (18%)
Previous history of Pneumonia	08 (16%)
Exacerbations during follow up	1.92±1.30
Daily treatment in numbers	30 (60%)
Anticholinergic (Ach)+LABA+ICS	10 (20%)
Ach1+LABA+ICS+PDI	10 (20%)
Ach1+LABA	

Table 3: Symptoms and treatment

Parameter	Values in 50 COPD
FEV1/FVC%	44.52±9.37
FEV1% predicted	47.84±10.24
Post Bronchodilator FEV1 (in ml)	1286±338.57
Post Bronchodilator FVC (in ml)	2534.9±379.30
CRP mg/L	8.24±2.35
Patients with one PPM isolate (in Numbers)	22 (44%)
Patients with chronic colonization by PPM	11 (22%)

Table 4: Pulmonary function and microbiological analysis of patients with COPD

HRCT Analysis of CT Chest

	Moderate COPD (n=20)	Severe COPD N=30	P value
Bronchiectasis	8 (40%)	22 (73.3%)	0.02

Table 5: Incidence of Bronchiectasis in moderate and severe COPD

The incidence of bronchiectasis was significantly higher in severe COPD patients when compared to moderate COPD patients and is statistically significant (p value <0.05).

Lobar involvement of Bronchiectasis in COPD patients: Lower lobe was affected in 64% of the cases, middle and upper lobes were affected in 23% and 13% of the cases respectively

Side of Bronchiectasis: The disease is bilateral in 67% of cases. In 23% of cases only right side was involved and 10% of cases left side was involved.

Type of Bronchiectasis: Majority (77%) of the bronchiectasis cases were of cylindrical type. Mixed (13%) and cystic (10%) varieties contributed to remaining proportion of cases.

The effect of age, sex and duration of symptoms in COPD patients with and without bronchiectasis is not statistically significant in our study.

Smoking pattern I n COPD patients with and without bronchiectasis: The incidence of bronchiectasis was 2.31 times more in the current smokers when compared with the former smoker, but not statistically significant. Mean pack years of smoking was 5.3 years higher in COPD with bronchiectasis patients compared to patients without bronchiectasis and was statistically significant (p value <0.05).

Parameter	Patients with Bronchiectasis	Patients without Bornchiectasis	Mean difference by odds ratio	p-value	95% CI	
					Lower	Upper
Smoking status	Current smoke n (%)	11 (73.34%)	2.31	0.21	0.61	8.70
	Former Smoker n %)	19 (54.28%)				
Pack year of smoking (Mean)	58.0	52.7	5.3	0.03	0.4	10.2

Table 6: Smoking patterns in COPD patients

Past clinical history of COPD patients with and without bronchiectasis:

Past History	No. of Pts. With Brx	No. of Patients without Brx	Odds Ratio	p-value	95% CI Lower	955 CI upper
TB - yes	7 (77.8%)	2 (22.2%)	2.7	0.2 (NS)	0.5	14.8
TB- No	23 (56.1%)	18 (43.9%)	2.7	0.2 (NS)	0.5	14.8
Pneumonia-Yes	5 (62.5%)	3 (37.5%)	1.1	0.87 (NS)	0.24	5.38
Pneumonia-No	25 (59.5%)	17 (40.5%)	1.1	0.87 (NS)	0.24	5.38

Table 7: Past clinical history of COPD patients with and without Bronchiectasis

Past history of Tuberculosis increased risk of bronchiectasis in COPD patients by 2.7 times but the finding was not statistically significant. Past history of pneumonia had no influence on bronchiectsis in COPD patients.

Drug prescribing pattern of COPD patients with and without bronchiectasis: In the present study Patients were divided into three groups of drug combinations.

I. Anticholinergics (Ach1)+ Long acting beta 2 agonists (LABA)
II. Ach1+LABA+Inhalation steroids (ICS)
III. Ach1+LABA+ICS+PDI (Phosphodiesterase Inhibitors)

Majority of patients required ACH1+LABA+ICS. There is no statitistically significant difference in the requirement of drugs in COPD patients with or without bronchiectasis.

Evaluation of Pulmonary functions with and without Bronchiectasis: The mean percentage of FEV1 was significantly lower in COPD patients with bronchiectasis when compared to COPD patients without bronchiectsis. The mean percentage of FEV1/FVC was significantly lower (p value <0.001) in COPD patients without bronchiectasis. Post bronchodilator.

In the present study, the combination drug therapy strategy encompasses 1. Ach1+LABA, 2. AchI+LABA+ICS+PDI, 3.Ach1+LABA+ICS. Most widely used combination was AchI+LABA+ICS and there is no statistically significant difference in the drug requirement for COPD patients with and without bronchiectasis was not statistically significant.

Evaluation of Pulmonary functions in COPD patients with and without Bronchiectsis: The mean percentage of FEV=1 was significantly lower (11.1%) and was statistically significant (pvalue= 0.001). The mean percentage of FEV1 /FVC was significantly lower (9, 63%) in COPD patients with bronchiectsis when compared to patients without bronchiectasis. The post bronchodilator FEV1 and FVC were 312ml and 265ml lower and in COPD patients with bronchiectsis compared to COPD patients without bronchiectasis (Statistically significant)

Parameter	Mean		Mean Difference	p-value	95% confidence interval	
	With Brx	Without Brx			Lower	Upper
FEV1% predicted	43.4	54.5	-11.10	<0.05		
FEV1/FVC predicted %	40.66	50.3	-9.63	<0.05	-14.6	-4.89
Post BD FEV1 (ml)	1161	1473.5	-3012.50	0.001	489.12	135.87
Post BD FVC	2428.8	2694	-265.2	0.014	-473.87	-56.46

Table 8: Evaluation of Pulmonary functions in COPD patients with and without Bronchiectsis

Evaluation of Serum Biochemical parameters in COPD patients with and without Bronchiectasis: In the present study, mean C-reactive protein (CRP) level was 2.7g/dl higher in COPD patients with bronchiectasis compared to patients without bronchiectasis. Which was statistically significant (pvalue <0.05).

The mean albumin levels were 0.35g/dl lower in COPD patients with bronchiectasis, when compared to COPD patients without bronchiectasis and this parameter was also statistically significant.

Parameter	Mean		Mean Difference	p-value	Confidence Levels	
	With Brx	Without Brx			Lower	Upper
CRP (mg/dl)	9.3	6.6	2.7	<0.05*	1.57	3.83
Serum albumin (g/dl)	3.49	3.84	-0.35	0.05*	-0.54	-0.16

Table 9: Evaluation of Serum Biochemical parameters in COPD patients with and without Bronchiectasis

Sputum PPM (Potentially pathogenic Microorganism isolates in COPD patients with and without bronchiectasis

In the present study COPD patients with bronchiectasis displayed more number of PPM isolates (56.6%) and chronic colonization (33.3%) compared to COPD patients without bronchiectsis displaying 25% and 5% respectively. The most prevalent isolate sputum sample was H.influenzae, 41% of single positive cultures and 45.5% of chronic PPM colonization.

PPM isolates	No. of COPD patients with BX		No. of COPD without Bronchiectasis	
	Isolation (17)	Chronic colonization	Isolation (5)	Chronic Colonization (1)
Haemophilus influenzae	7	4	2	1
Streptococcus pneumoniae	3	1	1	0
Klebsiella pneumonia	3	1	0	0
Pseudomonas aerugunosa	2	1	1	0
Coliforms	1	1	0	0
Betahaemolytic streptococcus	1	1	0	0
Moraxella catarrhalis	1	1	1	0

Table 10: Isolation of PPM in COPD patients with and without Bronchiectasis

Status of PPM isolation and PPM colonization in COPD patients with and without Bronchiectasis:

The odds of PPM isolates in the sputum were 3.92 times higher in COPD patients with bronchiectasis compared to those without Bronchiectsis. The odds of PPM colonization were higher in COPD patients with Bronchiectasis with the odds ratio of 9.50. Both these findings were statistically significant (p value <0.05)

Nature of Sputum isolates	COPD patients with Bronchiectasis (N=30)	COPD patients without Bronchiectasis (N=20)	Odds ratio	p-Value
Patients with at least one PPM isolatesin No.s	17(56.66%)	5(25%)	3.92	0.03
Patients with chronic colonization with PPM	10(34.4%)	1(5%)	9.50	0.04

Table 11: PPM isolation colonization COPD patients with and without Bronchiectasis

Bivariate logistic regression analysis of clinical factors influencing Bronchiectsis: Bivariate logistic regression analysis was performed using the presence or absence of bronchiectasis as a dependent variable and various clinical parameters as independent variables. Production of daily sputum, sputum quantity more than 30 ml/day, three or more exacerbations per year, severe reduction In FEV1 values, and presence of PPM in sputum elicited significantly influence on the presence of bronchiectasis. Variables like presence of wheezing and character of sputum had no significant influence on presence of Bronchiectasis.

Parameter		Patients with Brx	Patients without Brx	Odds ratio	p-value	95%CI Lower	95%CI upper
Wheezing	Yes	19(67.85%)	9(32.15%)	2.11	0.20	0.66	6.68
Wheezing	No						

Parameter	Patients with Brx	Patients without Brx	Odds Ration	p-value	95%CI Lower	95% CI upper
MRC Dyspnea Grade 1	4(80%)	1(20%)	1.0			
MRC Dyspnea Grade 2	20(58.8%)	14(41.2%)	0.35	0.37	0.03	3.5
MRC Dyspnea Grade 3 or more	6(54.45%)	5(45.5%)	0.30	0.34	0.02	2.6

Parameter	Patients with Brx	Patients without Brx	Odds ratio	p-value	95% CI lower	95% CI upper
Daily sputum Yes	21(72.4%)	8(27.6%)	3.5	0.039	1.06	11.4
Daily Sputum No	9(42.9%)	12(57.1%)	3.5	0.039	1.06	11.4

Parameter	Patients with Brx	Pts. without Brx	Odds ratio	p-value	95% Lower	95% CI upper
Sputum Qty <10 ml/day	8(40%)	12(60%)	1			

Sputum Qty 10-30ml	10 (62.5%)	6(37.5%)	2.5	0.18	0.6	9.6
Sputum Qty >30ml	12 (85.7%)	2(14.3%)	9.0	0.01	1.57	51.4

Parameter	Pts. with Brx	Pts. without Brx	Odds ratio	p-value	95%CI lower	95% CI upper
Character of sputum (Haemorrhagic)	1.0(100%)	0(0%)	-	-	-	-
Mucoid	20(57.1%)	15(42.9%)	0.4	0.5	0.04	4.7
Mucopurulent	6(60%)	4(40%)	0.5	0.6	0.03	6.6
Purulent	3(75%)	1(25%	1	-	-	-

Parameter	Parameter	Pts. with Brx	Pts. without Brx	Odds ratio	p-value	95% CI lower	95%CI upper
Exacerbations in 1yr	0	2(28.6%)	5(71.4%)	1.0			
Exacerbations in 1yr	1	6(440%)	9(60%)	1.6	0.6	0.24	11.5
Exacerbations in 1yr	2	6(54.5%	5(45.5%)	3.0	0.28	0.39	22.7
Exacerbations in 1yr	3 or more	16(94.1%)	1(5.9%)	40	0.005*	2.9	539.6

Parameter	Pts. With Brx	Pts. without Brx	Odds ratio	p-value	95% CI Lower	95% CI Upper
FEV1 Moderate	8(40%)	12(60%)	1	-	-	-
FEV1 Severe to Very Severe	22(73.3%)	8(26.7%)	4.1	0.02	1.2	13,7

Parameter	Pts. With Brx	Pts. without Brx	Odds ratio	p-value	95%CI Lower	95%CI Upper
PPM present	27(75%)	9(25%)	11	0.002*	2.5	48.5
PPM absent	3(21.4%)	11(78.6%)	11	0.002*	2.5	48.5

Multivariate regression analysis of variables significantly associated with bronchiectasis: Multivariate regression analysis as performed to develop a predictive model for

bronchiectasis by including all the variables, which had statistically significant influence in bivariate regression analysis. The presence of severe airflow obstruction (FEV1<50%;p-value 0.003), CRP levels (p-0.01), daily sputum production (p-0.034), the isolation of a PPM in at least one sputum sample (p-0.04), and the need for at least on hospitalization for acute exacerbation of COPD (p-0.01) were independently associated with bronchiectasis

Independent variables	Coefficient	Std. error	T	p-value
Constant	-0.3292			
Daily Sputum	0.041	0.019	-2.238	0.034
Sputum Quantity	0.224	0.121	11.851	0.072
Exacerbatiuons	0.204	0.075	2.704	0.010
Pack years	0.008	0.008	0.989	0.329
Serum Albumin	0.018	0.137	0.131	0.896
CRP levels	0.087	0.032	2.708	0.010
PPM isolates	0.315	0.190	2.121	0.040
FEV1% Predicted	0.859	0.271	-3.167	0.003
FEV1/FVC % Predicted	0.015	0.035	0.442	O.661
Post BD FEV1 (in Leters)	0.165	0.431	0.384	0.703
Post BD FVC (in Leters)	0.349	0.291	1.202	0.236

Table 12:Multivarate regression analysis of variables significantly associated with bronchiectasis

Kaplan Meier Analysis showing the hazard function in COPD patients with and without Bronchiectasis

There were a total of six events of death at the end of 12 months of follow up. All the events have occurred in the bronchiectasis group. The differences in the hazard function between both the study groups are studied. Even though this difference was not statistically significant, either by log rank test or by Breslow (Generalized Wilcoxon) test (p-value=0.09), there was a trend towards increased mortality in the bronchiectasis group

	Chi-Square	df	Sig
Log Rank (Mantel-Cox)	2.811	1	0.094
Breslow (Generalized Wilcoxon)	2.807	1	0.094
Tarone-Ware	2.809	1	0.094

Table 14

SUMMARY: The present study concludes that chronic sputum production, isolation of pathogenic microorganisms in sputum sample, increased number of disease exacerbations per year is associated with increased prevalence of Bronchiectasis among COPD patients. Patient variables like presence of wheezing and characteristics of sputum had no significant influence on the presence of Bronchiectasis.

The present study shows significantly elevated C - reactive protein levels found in patients of COPD with Bronchiectasis indicate significant systemic inflammation.

The present study shows significantly low levels of albumin in patients of COPD with bronchiectsis when compared to COPD without Bronchiectasis.

The present study shows COPD with Bronchiectsis patients had poorer pulmonary functions when compared to patients without Bronchiectasis. FEV1% predicted is the most important independent predictor of bronchiectasis in COPD.

Associated Bronchiectasis in COPD patients increases the risk of secondary infections with lethal organisms and should be regarded as a comorbidity and the comorbidities and exacerbations direct the ultimate prognosis of COPD patients (G0LD Guidelines). Association of Bronchiectasis may lead to poor prognosis with recurrent exacerbations and there is a definite need for early identification with the help of HRCT chest to initiate early treatment in this group.

DISCUSSION: The study group consisted of 50 moderate to severe COPD patients with a mean age of 63.84±7.87 years and mean pack years of 55.9±8.41 years. The study population consist of males predominantly (98%).

The present study used prospective method for detection bronchiectasis by HRC T and found that out of 50 subjects (60%) had bronchiectasis. This is comparable to study by Martinez Garcia et al. 2011.[1] who studied 92 patients with a mean age of 72 years and found significant bronchiectasis i9n 53 (57.6%) patients. In a similar study, Patel et al (2004) showed mean age of the patients to be 69 years and that bronchiectasis was prevalent in 50% patients.[2]

Martinez-Garcia et al. (2011) showed that patients with both COPD and severe functional impairment (FEV1≤50%) had a greater prevalence of bronchiectasis (>70%).[1] in a similar study E.O. Arram et al. (2012) showed that the incidence of bronchiectasis in moderate COPD was 31.3% while 62.2% in severe COPD.[3] In concordance with these studies, the incidence of bronchiectasis was 40% in moderate COPD and 73.3% in severe COPD.

In the present study, the most common finding on HRCT was cylindrical bronchiectsis (77%), followed by mixed (13%), cystic bronchiectsis (10%) with a frequency distribution very similar to that found in Patel et al. (2004).[2] These findings confirm the presence of an association with these disorders.

The present study showed bronchiectasis in lower lobes in 64% of subjects, in upper lobes (13%) subjects. Martinez Garcia et al. 2011 showed 60.4% lower lobe distribution, upper lobe distribution in 11.3%, middle lobe and lingular distribution in 28.3%.[1]

E.O. Arram et al. (2012) in a similar study concluded higher prevalence (47.8%) of bronchiectasis among moderate to severe copd and also higher percentage of distribution of bronchiectasis in lower lobes (66.6%).[3] the present study showed COPD with bronchiectasis to be associated with severe airflow limitation compared to COPD without bronchiectasis. The observation is similar to previous studies.

Author	Yr of Study	No. of Patients	Mean age	Mean Peak year	% of Bronchiectasis	Cyllindrical	Cystic	Varicose	LL Involvement	ML and Lingular	UL Involv-ement
Martiz	201	92	71.3	65	57.6%	90.6%	18.6	-	60.4%	28.3%	11.3%

et al	1						%				
Aaram et al	2012	69	63.79±5.41	-	47.8%	81.8%	-	21.2%	66.6%	-	15.1%
Patel et al.	2004	54	69.4	50.5%	50%	-	-	-	66.7%	29.6%	-
O'brien et al	2000	110	66.5	45	29%	72%	15.5%	12.5%	-	-	-
Present Study	2011-2013	50	63.84	55.9±8.41	60%	77%	10%	13% (Mixed)	64%	23%	13%

In the present study COPD patients with bronchiectasis displayed much decline in lung functions when compared to those without bronchiectasis which might be due to pulmonary extension of the disease.[4,5] greater thickening of the bronchial wall.[6] chronic colonization of the bronchial epithelium by PPMs.[7] or high concentrations of pro-inflammatory markers in sputum or serum, such as neutrophilic elastase or several adhesion molecules.[8]

Effect of age, Sex, Symptoms, past history, of tuberculosis and Pneumonia in COPD patients with and without Bronchiectsis:

In the present study, we found there was no statistically significant difference between the age, sex, duration of symptoms, past history of TB and pneumonia in COPD patients with and without Bronchiectasis. We also found that patients with bronchiectasis had significantly high incidence of daily sputum production, high quantity of sputum and more number of exacerbations than patients without bronchiectasis. Logistic regression analysis revealed that daily sputum production and number of exacerbations independently predicted the association of bronchiectasis in these patients. These results were comparable to that study done by Martinez-Garcia et. Al.[1] In contrast Patel et al.[2] observed that even though the number of exacerbations was not related to bronchiectasis in their study, patients with bronchiectasis did experience longer exacerbations. The discordance between these studies can be explained by the fact that, in our study, only data from exacerbations that required medical consultation were included, and these were therefore more severe, whereas Patel et al[2] in their study collected information from a 'symptom dairy' covering the full severity range of exacerbations.

Smoking Pattern in COPD patients with and without Bronchiectasis: In the present study, COPD patients with bronchiectsis displayed high pack years when compared to those without bronchiectsis (58 years versus 52.7 years). Similar results were observed by Martinex-Garcia et al. study (69.8 years versus 60.6 years).[1]

Sputum PPM isolates in COPD patients with and without bronchiectasis in the present study, COPD patients with bronchiectsis displayed more number of PPM isolates in 56.6% and chronic colonization with PPM is present in 33.3%. COPD patients without bronchiectasis showed isolates in 25% and chronic colonization in 5%. Further, the most prevalent isolate in the sputum sample was H.influenzae, 41% of single sputum cultures and 45.5% of chronic PPM colonization and the same was also evidenced by Patel et al, Martinex-Garcia et al and Angril et al studies[1, 2,9]

Amitani R et al (1991) and Heimstra PSet al (1998) [10,11] reported that increased bronchial inflammation induced by the presence of PPMs in the airway cause epithelial cell damage which, in the small airways contribute to the respiratory bronchilitis and progressive airway obstruction seen in COPD.[12]

Patel et al[2,13] revealed that the presence of bacterial colonization in the stable state was associated with increased exacerbation frequency, increased sputum purulence at exacerbation, severe exacerbations and longer times to recovery of the peak flow after exacerbation.

In the present study mean C - reactive protein (CRP) level was 2.7/dl higher in COPD patients with bronchiectasis which was statistically significant.

There are two major studies that exposed the relationship between CRP level and the mortality in COPD. Man SF et al [14] concluded that CRP measurements provide incremental prognostic information beyond that achieved by traditional markers of prognosis in patients with mild to moderate COPD and may enable more accurate detection of patients of patients at high risk of mortality.

The second study, Copenhagen city Heart Study.[15] conducted on 1302 patients with airway obstruction concluded after a median follow up of 8 years that CRP is a strong independent predictor of future COPD outcomes in individuals with airway obstruction.

In a study by Martinez-Garcia et al.[1] showed that higher levels of CRP were seen in patients with bronchiectasis.

In our study moderate to severe COPD patients with bronchiectasis had significantly lower levels of serum albumin when compared to patients without bronchiectsis. These results concur with those reported by Martinez-Garcia et al.[1] who observed that there were statistically significant lower serum albumin levels in COPD patients with bronchiectasis when compared to patients without bronchiectsis.

Several studies also reported the reduced albumin levels in patients with COPD.[16,17] These lower mean values of albumin may be due to malnutrition or inflammation.[18,19]

Bivariate logistic regression analysis of clinical factors influencing bronchiectsis: In the present study, production of daily sputum, sputum quantity more than 30ml, three or more exacerbations per year, severe reduction in FEV1 values and presence of PPM in sputum elicited significant influence on presence of bronchiectasis.

Chronic sputum production was also a risk factor for bronchiectsis on bivariate regression analysis. An association with between chronic expectoration, colonization by PPM and the existence an intense inflammatory response in the airways has recently been reported.[20] This inflammatory reaction, characterized by neutrophil migration within the airways and secondary secretion of a variety of tissue damaging mediators, seems to be of importance in the pathogenesis of bronchiectasis.

Multi variate regression analysis of variables significantly associated with bronchiectsis: In the present study, multivariate regression analysis revealed that severe airflow obstruction, CRP levels, daily sputum production, the isolation of PPM in at least one sputum sample and the need for atleast one hospital admission for acute exacerbation of COPD were

independently associated with presence of bronchiectasis. Martinex-Garcia et al observed similar results in accordance with the present study.[1]

Kaplan Meier analysis showing the hazard function in COPD patients with and without Bronchiectasis: In a multicenter prospective observational study conducted by Martinez-Garcia et al.[21] concluded that a high prevalence of bronchiectasis was seen in moderate to severe COPD patients and suggest that bronchiectsis is independently associated with increased risk of all-cause mortality in these patients. In the current study, COPD patients with bronchiectasis have trend toward increased mortality than those without bronchiectsis after a follow up of I year.

Use of bronchiectasis as a new factor for prognosis would have a major clinical impact. Bronchiectasis is associated with severe airway obstruction, increased exacerbations, malnutrition and mortality. Detection of bronchiectasis with high resolution computed tomography scans is reliable and once identified patients can be treated with effective therapy to combat chronic bronchia inflammation and infection.[22]

CONCLUSION: Our study shows significantly high prevalence of bronchiectasis in patients with moderate to severe COPD and was associated with severe airway obstruction, increased exacerbations, inflammation, malnutrition, and mortality in the patients having the combination of COPD and Bronchiectasis.

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AUTHORS:

1. R. Ramakrishna
2. A. Ambica

PARTICULARS OF CONTRIBUTORS:

1. Professor, Department of Pulmonary Medicine, Katuri Medical College.
2. Post Graduate, Department of Department of Pulmonary Medicine, Katuri Medical College.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. R. Ramakrishna,
A2, Raghavas Vista,
Krishna Nagar Park Road,
Guntur.
E-mail: ramakrishna45@yahoo.com

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