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Original Research Article

The coexistence of bronchial asthma in patients with bronchiectasis: A cross sectional study

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ABSTRACT

Background: To determine the co-existence of bronchial asthma in patients of bronchiectasis, and to compare the clinico-radiological profile between patients having only bronchiectasis and both bronchiectasis and bronchial asthma.

Materials and Methods: 67 patients who presented as Bronchiectasis (Clinical and radiological) to Respiratory Medicine Department at VIMS & RC, Bangalore from January 2020 to June 2021, were subjected to baseline investigations and spirometry/PEFR after informed consent. Statistical analysis was performed using SPSS 22 version software.The clinical and radiological profile were compared between the group having only bronchiectasis and those with bronchiectasis and asthma.

Results: Out of the 67 study patients, 55(82.08%) had only bronchiectasis and 12(17.91%) had bronchiectasis with bronchial asthma. In the bronchiectasis only group, majority of the patients were male 40(72.72%) and in the in bronchiectasis with bronchial asthma group majority of the patients were female 7(58.33%) which was statistically significant (P value <0.05). Patients with bronchiectasis and coexisting asthma had statistically significant increased symptoms of breathlessness, wheeze, running nose, sneezing, itching (P value <0.05). Similarly exposure to dust, fumes, pets was found to be more common in bronchiectasis with bronchial asthma group (P value >0.05). The mean age for onset of symptoms was found to be lower in the bronchiectasis with bronchial asthma group. Patients in the bronchiectasis with bronchial asthma group had a lower mean FEV1 value. Hyperinflation on chest radiograph was found to be 10.90% in bronchiectasis group, and 8.33 % in bronchiectasis with bronchial asthma group. Bilateral bronchiectasis on CT thorax was common in both groups.

Conclusions: 17.91% of bronchiectasis patients had coexisting bronchial asthma. Hence, a proper diagnosis can reduce the burden of patients suffering from more frequent exacerbations, with better optimized treatment options.

1. Introduction

Bronchiectasis a chronic lung condition, defined as the abnormal, irreversible dilatation of the bronchi and bronchioles, where the elastic and muscular tissue is destroyed by acute or chronic inflammation and infection. [1,2] This anatomical definition has been evolved from the original description of ectatic bronchi found in pathological specimens in the year 1819. [1] Bronchi, mostly medium sized, are abnormally dilated and bronchial wall shows inflammatory changes. Such changes result from disordered anatomy of bronchial tree, bacterial colonization and chronic host inflammatory response. [1–3]

Its characterised by chronic sputum production, recurrent chest infections, and airflow obstruction. Patients suffer from frequent exacerbations and often have significant

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limitation of activity.[1–6]

It was found that bronchiectasis is a relatively common disease among US, European and Australian cohorts, with the mean disease prevalence being approximately 701 per 100,000 population, with the average age group affected being 60-70 years, hence an increasing trend with higher age groups was also noted.[7]

In India the following features were noted;

1. Younger age group
2. P. aeruginosa was the most common organism isolated in sputum culture
3. Cystic changes was the most common Bronchiectatic pattern was noted in on CT films.
4. Patients were also found to have severe form of the disease, and suffer from more severe exacerbations.
5. Patients were poorly evaluated and did not follow a proper treatment regimen.

Therefore there is an increasing need to improve the of care for patients with [WU3] bronchiectasis in India.[8]

Several etiologies for the occurrence of bronchiectasis have been identified and studied, among which asthma and ABPA have been included.

50 percent of the bronchiectasis cases are idiopathic and for which the aetiology has to be ascertained.

Bronchial asthma is a heterogeneous chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, characterized by recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, these episodes vary in time and intensity and have variable expiratory airflow limitation that is often reversible either spontaneously or with treatment.[9]

Multiple number of guidelines exist on the treatment of asthma, However significant differences exist across countries.[9] A large proportion of patients with asthma have been found to have poor control and inadequate treatment, this is evident among Indian asthmatics who are found to have a higher frequency of exacerbations, poor quality of life and limitation of activity and this results in socioeconomic burden due to poor work force performance and absenteeism from school and work.[9–11]

In a resource limited settings like in our country; patient's lack of awareness about the disease, use of alternative forms of therapy without any proven efficacy, physicians not following step-wise standard guidelines in the management of patients, and lack of affordability of inhalers/medications, affects patients survival with the disease and more prone to suffer from exacerbations. One of the important components for the treatment of asthma includes identification and avoiding of precipitating factors along with addition of medications in a step-wise manner.

If left untreated patients could develop complications such as airway remodeling, bronchiectasis, allergic bronchopulmonary aspergillosis (ABPA), etc.[9–14]

Studies have been performed to ascertain the relationship between the 2 conditions, and they have found certain features among patients having coexistent bronchiectasis and bronchial asthma, they include:

1. Lower FEV1 values on
2. More severe radio logical involvement, with lower lobe involvement, presence of cylindrical bronchiectasis.
3. More severe and frequent exacerbations, with poor symptom control.
4. Poor prognosis
5. Higher airway hyper-responsiveness.
6. Symptoms of
7. Upper airway involvement.
8. Heterogeneous presentation in terms of clinical features and outcome.
9. Higher FeNo values.[15–20]

2. Aims and Objectives of the study

The purpose of the study conducted was to estimate the coexistence of bronchial asthma among patients with bronchiectasis, to compare clinical and radiological profile of patients of bronchiectasis with or without bronchial asthma.

3. Materials and Methods

It is a cross sectional study done among atients diagnosed with bronchiectasis (diagnosed clinical and radiologically) presenting to department of respiratory medicine at Vydehi Institute of Medical Sciences and Research Centre.

Patients were examined and investigated to see if they have coexisting ronchial asthma or not.

The total number of subjects included are 67 according to inclusion and exclusion criteria.

3.1. Inclusion criteria

1. Patients with features consistent with bronchiectasis:
   (a) Chest symptoms –Cough with sputum production, breathlessness, with or without hemoptysis.
   (b) Radiological features of bronchiectasis on HRCT;
      i. Broncho-arterial ratio>1,
      ii. Lack of tapering,
      iii. Airway visibility within 1 cm within costal pleural surface or touching mediastinal pleura.
      iv. Other CT findings(indirect) :
         A. Bronchial wall thickening
         B. Mucus impaction
         C. Mosaic perfusion / air trapping on expiratory CT.(21).

2. Patients who have given written informed consent for the study.
3. Patients above the age of 18 years.

3.2. Exclusion criteria

1. Patients with Allergic Broncho-Pulmonary aspergillosis (ABPA)
2. Patients with Chronic Obstructive Pulmonary disease (COPD)
3. Asthma mimics: Examples including foreign body, largyngeal edema/vocal cord dysfunction, L
4. Patients having Active TB infection.

3.3. Methods of data collection

1. Patients who visited department of Respiratory Medicine at Vydehi Institute of Medical Sciences and Research Centre, were diagnosed with bronchiectasis (as per BTS guidelines 2019) and included in the study after taking informed written consent.
2. Detailed clinical history was taken and clinical examination was done.
3. Routine investigations were done.
4. Patients were subjected to PFT or PEFR (If patients were unable to understand/perform PFT) after treating the active infection/exacerbation. Diagnosis of bronchial asthma was made as per GINA 2021 guidelines.

FEV1 change of >12% and 200ml post bronchodilator, or PEFR variability of >10%

If ronchial asthma was diagnosed after performing spirometry/PEFR, The following tests to Rule out ABPA were performed:

1. Serum IgE
2. Serum Aspergillus specific IgE and IgG
3. Skin prick test

(Serum precipitins testing is not available in our hospital and could not be included).

Demographic data, clinical symptoms and signs in detail, all investigations were recorded in case record form.

Occurrence of bronchial asthma in bronchiectasis patients was calculated and the symptomatology and radiological features were compared between the 2 groups (i.e., patients with only bronchiectasis and patients with both bronchiectasis with Bronchial asthma).

3.4. Statistical analysis

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square test or Fischer's exact test was used as test of significance for qualitative data.

Continuous data was represented as mean and standard deviation. Independent t test was used as test of significance to identify the mean difference between two quantitative variables.

3.5. Graphical representation of data

MS Excel and MS word was used to obtain various types of graphs

P value (Probability that the result is true) of <0.05 was considered as statistically significant after assuming all the rules of statistical tests.

3.6. Statistical software

MS Excel**,** SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data.

3.7. Investigation or interventions conducted in study

1. Chest X- Ray PA view
2. CT Scan- High resolution Thorax
3. Pulmonary function Test
4. Blood Investigations: Routine
5. Sputum for microbiology investigation: Grams stain, automated culture sensitivity, Sputum for AFB etc.

4. Results and Discussion

This study includes a total of 67 patients who were diagnosed to have bronchiectasis clinically and radiologically.

Table 1: Distribution of subjects according to bronchialasthma

	N	%
bronchiectasis Only	55	82.08
bronchiectasis + bronchial asthma	12	17.91

In the study out of the 67 patients included, 55 (82.08 %) were found to have bronchiectasis only, and 12 (17.91 %) were found to have bronchiectasis with bronchial asthma.Table 1

4.1. Comparison of clinical profile between 2 groups

4.1.1. Age distribution

The above table shows the age distribution of the patients in the study,

In the bronchiectasis group, majority of the patients were found to belong to the age group 31-40 years, I.e. 16 patients (29.09%)

In the Bronchiectasis with bronchial asthma group, majority of the patients were found to belong to the age group 41-50 years, I.e. 5 patients (41.66%).

The P value 0.488 (Chi square value 4.440, df 5), there was no statistically significant difference found between two groups with respect to age group.

Table 2: Distribution of subjects according to age groupbetween two group

	Bronchiectasis only (55 Patients)		**Bronchiectasis with bronchial asthma (12 patients)**	
	N	%	N	%
<20yrs	3	5.45	1	8.33
21-30yrs	7	12.72	2	16.66
31-40yrs	16	29.09	3	25
41-50yrs	11	20	5	41.66
51-60yrs	13	23.63	1	8.33
>60yrs	5	9.09	0	0

The mean age for onset of symptoms in the bronchiectasis group was 35.89 years, and 24.83 % in the bronchiectasis with bronchial asthma group. Which was significantly lower in the bronchiectasis with bronchial asthma group.Table 2

In the bronchiectasis group the age of onset of symptoms were as follows:

1. 8 patients belonged to the age group < 20 years (14.54%)
2. 27 patients belonged to the age group 21-40 years (49%)
3. 17 patients belonged to the age group 41-60 years (30.90 %)
4. 3 patients belonged to the age group >60 years (5.45%)

In the bronchiectasis and asthma group the age of onset of symptoms were as follows:

1. 4 patients belonged to the age group < 20 years (33.33%)
2. 8 patients belonged to the age group 21-40 years (66.66%)
3. 0 patients belonged to the age group 41-60 years (0 %)
4. 0 patients belonged to the age group >60 years (0%)

Maximum patients in both groups had onset of symptoms at 21-40 years of age.

4.1.2. Gender distribution

In the Bronchiectasis only group, majority of the patients were males (40 patients,72.72 %).Table 3

In the Bronchiectasis with bronchial asthma group, majority of the patients were Females (7 patients, 58.33%).

The P value 0.049 (Chi square value 4.309, df 1), there was a statistically significant difference found between two groups with respect to sex.

4.1.3. Cardinal symptoms

In the bronchiectasis only group, majority of the patients had cough as a cardinal symptom (total 54 patients, 98.18%). Other symptoms like sputum production (Total 46 patients 83.63%), chest pain (24 patients 43.63 %) and hemoptysis (29 patients, 52.72%) were more common in the bronchiectasis group.Table 4

In the bronchiectasis with bronchial asthma group, 12 patients (100%) had breathlessness as a cardinal symptom, and 12 patients (100%) had sputum production as a cardinal symptom. Symptom of Wheeze (8 patients, 66.66%) was more common in this group.

P value was significant only on comparing symptom of breathlessness and wheezing between 2 groups, I.e. 0.013 and 0.001 respectively, which was more predominant in the bronchiectasis with bronchial asthma group.

4.1.4. Constitutional symptoms

In the bronchiectasis only group, majority of the patients had fever (i.e. 18 patients, 37.72%).Table 5

In the bronchiectasis with bronchial asthma group majority of the patients had weight loss as a cardinal symptom (i.e. 6 patients, 50%).

There is no statistical significant difference on comparing the constitutional symptoms between the 2 groups.

4.1.5. Atopy symptoms

In the bronchiectasis group, majority of the patients had running nose as a symptom of atopy (I.e. 9 patients 16.36 %).Table 6

In the bronchiectasis with bronchial asthma group, majority of the patients also had running nose as a symptom of atopy (i.e. 8 patients 66.66 %)

There is a statistical difference between 2 groups, while comparing the symptoms of running nose, sneezing and itching. The P value being 0.001, 0.003, 0.001 respectively, which were more commonly found to occur amongst the patients belonging to bronchiectasis with bronchial asthma group.

4.1.6. Exposure history

In the bronchiectasis group majority of the patients had exposure to smoke and dust (16 patients in each group, 29.09% in each group).Table 7

In the bronchiectasis with bronchial asthma group majority of the patients had exposure to dust (9 patients 75 %).

Table 3: Distribution of subjects according to genderbetween two group

	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)	
	N	%	N	%
Female	15	27.27	7	58.33
Male	40	72.72	5	41.66

Table 4: Comparison of cardinal symptom between two groups.

Cardinal symptoms	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		P value
	N	%	N	%	
Breathlessness	35	63.63	12	100	0.013
Cough	54	98.18	11	91.66	0.328
Sputum	46	83.63	12	100	0.196
Wheezing	9	16.36	8	66.66	0.001
chest pain	24	43.63	3	25	0.335
hemoptysis	29	52.72	5	41.66	0.539

*Participantsare not mutually exclusive

Table 5: Comparison of Constitutional symptoms between two groups

Constitutional symptoms	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		Chi Square	P value
	N	%	N	%		
Fever	18	32.72	4	33.33	0.002	0.968
Decreased appetite	17	30.90	5	41.66	0.517	0.510
Weight loss	13	23.63	6	50	3.370	0.084

*Participantsare not mutually exclusive

Table 6: Comparison of atopy symptoms betweentwo groups Avoid unnecessary capital letters

Atopy symptoms	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		Chi square	P value
		%	N	%	N	
Running nose	9	16.36	8	66.66	13.164	0.001
Sneezing	8	14.54	7	58.33	10.870	0.003
Itching	2	3.63	5	41.66	15.228	0.001
Watering of eyes	1	1.81	1	8.33	1.44	0.328
Gastroenteritis	2	3.63	0	0	0.450	1.00

*Participantsare not mutually exclusive

Table 7: Comparison of exposure history between two groups.

	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		chi square	P value
		%		%		
Smoke	16	29.09	7	58.33	3.736	0.090
Fumes	6	10.90	6	50	9.981	0.005
Dust	16	29.09	9	75	8.876	0.006
Pollen	1	1.81	2	16.66	5.078	0.080
Pets/birds/insects	10	18.18	5	41.66	3.127	0.121
Paints	1	1.81	2	16.66	5.078	0.080
Moulds	1	1.81	1	8.33	1.44	0.328

*Participantsare not mutually exclusive

While comparing the exposure history between 2 groups, only exposure to fumes and dust was found to be statistically significant, i.e. P value being: 0.005 and 0.006 respectively. Which was found to be more common among the patients belonging to the bronchiectasis with asthma group.

4.1.7. Co morbidities

History of old TB was found to be in majority, I.e. 26 patients (47.27%) in the bronchiectasis group.Table 8

H/o Pneumonia was found to be in majority in the bronchiectasis with bronchial asthma group i.e. 5 patients (41.66%)

On comparison of comorbidities between the 2 groups, There was a significant difference in Past history of pneumonia between the 2 groups (P value being 0.007). With history of pneumonia being more common in the bronchiectasis with bronchial asthma group.

In the bronchiectasis group, 7 patients (i.e.12.72%) had history of use of ICS.

In the bronchiectasis with bronchial asthma group, 2 patients (i.e. 16.66%) had history of use of ICS.

There is no statistical significant difference on comparing the percentage of use of ICS between the 2 groups.

4.1.8. Vitals and respiratory system findings

In the bronchiectasis group, majority of the patients had a mean SpO_2 of 95.78 (SD 3.8) and mean respiratory rate of 20.2 (SD 1.01).Table 9

In the bronchiectasis with bronchial asthma group, majority of the patients had a mean Spo2 of 94.33 (SD 6.1) and mean Respiratory rate of 19.9 (SD 1.5)

In both the groups majority of the patients had crackles as a respiratory system finding I.e. 26 patients, 47.27% in the bronchiectasis group, and 9 patients 75 % in the bronchiectasis with bronchial asthma group.Table 10

While comparing the respiratory system findings between the 2 groups, there was no significant statistical difference.

4.1.9. Sputum culture sensitivity

In both groups, majority of the patients did not have any growth in the sputum culture (I.e 38 patients, 69.09% in bronchiectasis group, and 10 patients, 83.33% in bronchiectasis with bronchial asthma group).Table 11

There was also no statistical significance in sputum culture sensitivity between the 2 groups.

4.1.10. Comparison of spirometry and PEFR variability between two groups

Spirometry was done in 46 subjects and PEFR was done in 21 subjects.

In both the groups majority of the patients had obstruction in spirometry (32 patients in bronchiectasis group- 58.18%, and 7 patients in the Bronchiectasis with bronchial asthma group- 58.33%)

PEFR variability was found to be present in 5 patients in the bronchiectasis with bronchial asthma group.Table 13

In both the groups majority of the patients had obstruction in spirometry (32 patients in bronchiectasis group- 58.18%, and 7 patients in the bronchiectasis with bronchial asthma group- 58.33%). Patients the bronchiectasis with bronchial asthma group had a positive BDR in spirometry and PEFR variability.

4.1.11. Etiology

In the bronchiectasis only group, Post TB sequelae was found to be the major etiology (I.e. 27 patients 49.09 %).Table 14

In the bronchiectasis with bronchial asthma group, Post Infection sequelae was found to be the major etiology (I.e. 6 patients 50 %)

On Comparison of etiology between two groups, there was no significant statistical difference between the 2 groups, P value 0.658.

4.1.12. Radiological profile

In the bronchiectasis group the following findings were identified:Table 15

1. 15 patients (27.27%) had a normal chest radiograph.
2. 24 patients (43.63 %) had unilateral involvement.
3. The most common pattern of bronchiectasis noted was cystic type (31 patients, 56.36 %)
4. 24 patients, 43.63 %, had other specific features present on chest radiograph.
5. 12 patients, 21.81 % had signs of infection present on chest radiograph.
6. 6 patients (10.9 %) had features of hyperinflation on chest radiograph.

In the bronchiectasis with asthma group the following findings were identified:

1. 0 patients (0%) had a normal chest radiograph.
2. Majority of the patients had unilateral involvement (8 patients, 66.66 %)
3. The most common pattern of bronchiectasis noted was cystic type (11 patients, 91.66%)
4. 4 patients, 33.3%, had other specific features present on chest radiograph.
5. 5 patients, 41.66 % had signs of infection present on chest radiograph.
6. 1 patient, 8.33 % had features on hyperinflation on chest x-ray.

On comparing X-ray findings between the 2 groups, there was found to be no statistical difference in terms of side of involvement, type of bronchiectasis, presence of signs

Table 8:

	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		chi square	P value
		%		%		
DM	9	16.36	0	0	2.26	0.196
Hypertension	4	7.27	0	0	0.928	1.00
Old TB	26	47.27	4	33.33	0.774	0.525
Pneumonia	4	7.27	5	41.66	0.002	0.007
others	4	7.27	0	0	0.335	1.00
Use of ICS	7	12.72	2	12	0.13	0.13

*Participantsare not mutually exclusive

Table 9: Comparison of SpO_2 and RR between twogroup

	Bronchiectasis only		Bronchiectasis with bronchial asthma		P value
	Mean	SD	Mean	SD	
SpO2	95.78	3.8	94.33	6.1	0.293
RR	20.2	1.01	19.9	1.5	0.403

Table 10: Comparison of Respiratory System finding betweentwo group

	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		chi square	P value
		%		%		
Normal	20	36.36	1	8.33	3.597	0.086
Decreased	4	7.27	1	8.33	0.16	1.00
Crackles	26	47.27	9	75	3.03	0.114
Bronchial sounds	2	3.63	2	16.66	2.979	0.144
Ronchi	11	20	5	41.66	2.544	0.140
Clubbing	3	5.45	2	16.66	1.793	0.216

*Participantsare not mutually exclusive

Table 11: Comparison of Sputum culture between two group

	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		P value
	N	%	N	%	
No growth	38	69.09	10	83.33	
Acinetobacter baumanii	1	1.82	0	0	
E.coli	0	0	1	8.33	
Enterbacter cloacae	1	1.82	0	0	0.418
Klebsiella pneumonia	4	7.27	0	0	
Klebsiella pneumonia and Pseudomonas aeruginosa	2	3.63	0	0	
Pseudomonas aeruginosa	8	14.54	1	8.33	
Streptococcus species	1	1.82	0	0	

*Participants are not mutually exclusive

Table 12: Comparison of spirometry and PEFR between twogroups

	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		P value
	N	%	N	%	
Obstruction	32	58.18	7	58.33	0.363
Restriction	1	1.82	0	0	0.642
Mixed	2	3.63	0	0	0.591
BDR	0	0	7	58.33	<0.001
Normal	5	9.09	0	0	0.448
PEFR variability	0	0	5	41.66	<0.001

Table 13: Comparison of FEV 1 % between two groups

FEV 1 Percentage spirometry	Bronchiectasis only (55 patients)	Bronchiectasis with bronchial asthma (12 patients)
FEV1 %		
>80%	10 (18.18%)	0 (0%)
50-79%	16 (29.09%)	2 (16.67%)
30-49%	10 (18.18%)	4 (33.33%)
<30%	3 (5.45%)	1 (8.33%)

*Participantsare not mutually exclusive

Table 14: Comparison of etiology between two groups

	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		P value
	N	%	N	%	
Not known	8	14.54	2	16.66	0.658
Congenital bronchiectasis	3	5.45	0	0	
Kartageners syndrome	1	1.82	0	0	
Post Infection sequelae	15	27.27	6	50	
Post TB sequelae	27	49.09	4	33.33	
Wegeners granulomatosis	1	1.82	0	0	

Table 15: Comparison of X-ray between two groups

X-ray	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		Chi square	P value
	N	%	N	%		
Normal	15	27.27	0	0%	4.217	0.055
Bilateral	19	34.54	4	33.33	3.716	0.156
Unilateral	24	43.63	8	66.66		
Cystic type	31	56.36	11	91.66	5.595	0.061
Tractional type	10	18.18	1	8.33		
Other features present	24	43.63	4	33.33	0.070	0.068
Sign of infection present	12	21.81	5	41.66	5.391	0.156
Hyperinflation	5	10.90	1	8.33	3.716	0.070

*Participantsare not mutually exclusive

Table 16: Comparison of CT between two group

CT	Bronchiectasis only (55 patients)		Bronchiectasis with bronchial asthma (12 patients)		Chi square	P value
	N	%	N	%		
Bilateral	28	50.90	11	91.66	6.727	0.010
Unilateral	27	49.09	1	8.33		
Cylindrical	6	10.90	0	0		
Cystic	22	40	8	14.54		
Cystic, Cylindrical	3	5.45	1	8.33	6.504	0.260
Cystic, Tractional	4	7.27	2	16.66		
Cystic,Varicoid	3	5.45	0	0		
Tractional	17	30.90	1	8.33		
Other features present	30	54.54	9	75	1.694	0.333
Sign of infection present	29	52.72	3	18.75	3.035	0.114

*Participantsare not mutually exclusive

of infection, presence of hyperinflation, presence of other additional features.

In the bronchiectasis group the following findings were identified:Table 16

1. Majority of the patients had bilateral involvement (28 patients, 50.90 %)
2. The most common pattern of bronchiectasis noted was cystic type (22 patients, 40 %)
3. 30 patients, 54.54 %, had other specific features present on CT thorax.
4. 29 patients, 52.72 % had signs of infection present on CT thorax.

In the bronchiectasis with asthma group the following findings were identified:

1. Majority of the patients had bilateral involvement (11 patients, 91.66 %)
2. The most common pattern of bronchiectasis noted was cystic type (8 patients, 14.54 %)
3. 9 patients, 75 %, had other specific features present on CT thorax.
4. 3 patients, 18.75 % had signs of infection present on CT thorax.

On Comparing CT thorax findings between the 2 groups, There was found to be a statistical difference only in terms of side of involvement (P value being 0.010), There was found to be no statistical difference in terms type of bronchiectasis, presence of signs of infection or presence of other features on CT. Both groups had predominant bilateral involvement.

5. Conclusion

The study conducted concludes that the prevalence of bronchial asthma in cases of bronchiectasis is significant found be 17.91%. Early suspicion and diagnosis such cases reduces the morbidity and mortality of patients suffering from frequent and severe bronchiectasis exacerbations, associated complications and sequelae, and better treatment options can also be provided.

6. Study Limitations

1. In the bronchiectasis and bronchial asthma group, ABPA could not be ruled out due to the following factors:
2. Non availability of tests Serum IgE, Aspergillus specific IgE and IgG, Serum precipitins.
3. Loss during follow up.

7. Acknowledgement

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8. Conflicts of Interest

The author declares no potential conflicts of interest with respect to research, authorship, and/or publication of this article.

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