

## HRCT Assessment of Bronchiectasis Patients Coming to Rural Tertiary Care Center

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- 1) **Dr. Arti D Shah**, Professor & Head Of The Department, Department Of Respiratory Medicine, Sbks Mi&Rc, Sumandeep Vidyapeeth Deemed To Be University, Vadodara, Gujarat, India.
- 2) **Dr. Medha Jain**, Resident, Department Of Respiratory Medicine, Sbks Mi&Rc, Sumandeep Vidyapeeth Deemed To Be University, Vadodara, Gujarat, India.
- 3) **Dr. Druma Patel**, Resident, Department Of Respiratory Medicine, Sbks Mi&Rc, Sumandeep Vidyapeeth Deemed To Be University, Vadodara, Gujarat, India.
- 4) **Dr. Sonal Goyal**, Senior Resident, Department Of Respiratory Medicine, Sbks Mi&Rc, Sumandeep Vidyapeeth Deemed To Be University, Vadodara, Gujarat, India.
- 5) **Dr. Ujwal Jain**, Senior Resident, Department Of Respiratory Medicine, Sbks Mi&Rc, Sumandeep Vidyapeeth Deemed To Be University, Vadodara, Gujarat, India.

### Name, Address, E-Mail Of The Corresponding Author:

**Dr. Sonal Goyal**, Senior Resident, Department Of Respiratory Medicine, Sbks Mi&Rc, Sumandeep Vidyapeeth Deemed To Be University, Vadodara, Gujarat, India.

Mail Id: Sonalgoyal2093@Gmail.Com

Ph No: 7062116855

Address: Sumandeep Vidyapeeth University, Vadodara, Gujarat, India

### Keywords

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### Abstract

**Introduction:** Bronchiectasis is one of the common chronic respiratory diseases and associated with respiratory morbidity and mortality. It is a chronic airway disease characterized by permanent abnormal dilatation of bronchi and destruction of bronchial walls. High resolution CT scan of the lung (HRCT) is proven to be highly sensitive noninvasive technique for delineating the bronchiectatic segments. **Aim:** To study HRCT pattern in patients of bronchiectasis. **Materials and Methods:** In this study 150 bronchiectasis patients coming to Dhiraj Hospital, Pipariya, Vadodara within a span of 18 months were included. All patients had undergone detailed history, clinical examination, chest X-ray and HRCT thorax & spirometry. **Results:** In our study, we had included total 150 patients. We had elicited that there was male predominance & among them 59% were never-smoker. Most common identified causes of bronchiectasis were tuberculosis (62%), recurrent pneumonia (13%) followed by ABPA in only 9%. Based on HRCT pattern, 62.67% had cystic, 18.67% had tubular, 12% had varicose while 6.66% found to be having multiple types. **Conclusions:** One of the major underlying pathological processes that has been identified in our region is tuberculosis. Cystic type on HRCT is found to be common in bronchiectasis patients in our region.

### Introduction

The morphological word "bronchiectasis" refers to aberrant, irreversible, dilated, and thick-walled bronchi. In Asian populations, it is most common. Because

acute lung infections are not adequately treated, its prevalence is still high in India. Many pathological disorders can lead to bronchiectasis. Bronchiectasis may result

from inherited or acquired diseases. Among the most common acquired causes include infections, recurrent or chronic aspiration, pulmonary fibrosis, stenosis or obstruction of airways by tumours, granulomatous disease, and asthma. Cystic fibrosis and abnormalities of cartilage development are two congenital diseases that lead to bronchiectasis. Many multi-systemic disorders, including rheumatoid arthritis, immune deficiencies, alpha 1-antitrypsin deficiency and inflammatory bowel diseases, particularly ulcerative colitis, may be associated with bronchiectasis.

Identifying the cause is advantageous because it aids in management decisions, reduces exacerbations, and changes the course of the disease by preserving lung function.

Due to clinical similarities bronchiectasis is often misdiagnosed as COPD and asthma. It is diagnosed clinically based on history of daily viscid profuse sputum production. Recurring infections can cause morbidity, and in extreme situations, extensive hemoptysis can cause mortality. The main differentiating factor is the appearance of computed tomography (HRCT) scan findings.

Bronchiectasis (permanent enlargement of the airways) is classified on HRCT as cylindrical, varicose or cystic.<sup>(1)</sup>

This study was done to know the type of findings seen in HRCT scan and to know the aetiology in bronchiectasis patients.

## Materials And Methods

An observational cross-sectional study was carried out after receiving approval from the ethics committee. This study included total 150 patients. They had presented to the department of respiratory medicine within a span of 18 months.

All patients had a thorough medical history obtained, including demographic information, bronchiectasis risk factors, initial symptoms at the time of presentation, length of symptoms, smoking history, occupation, and physical examination findings. In all patients radiological investigations like Chest Xray and HRCT thorax were done.

### Inclusion criteria

- : Cases with bronchiectasis in HRCT thorax

### Exclusion criteria

- Patients with active tuberculosis
- Cases with HRCT contraindications such as pregnancy

## Results

**Table 1: Gender Distribution (n=150)**

Gender	N	%
Female	64	42.67%
Male	86	57.33%
Total	150	100.00%

**Chart 1: Gender Distribution**

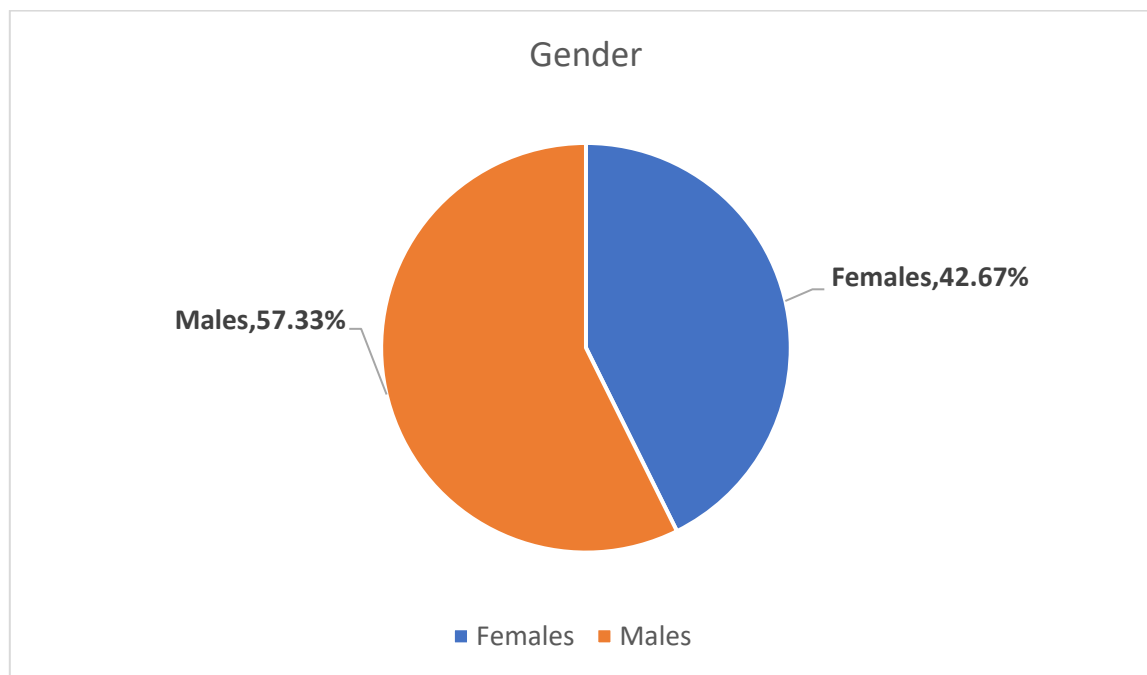


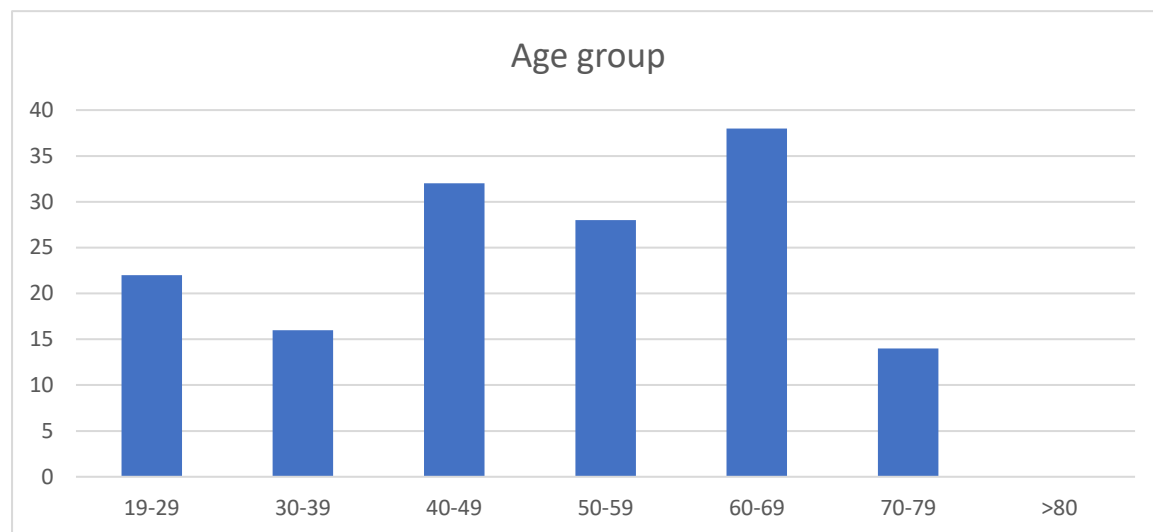
Table 1 and Chart 1 shows that out of 150 patients 64(42.67%) were females and 86(57.33%) were males. Disease was predominantly found in males.

**Table 2: Age distribution in 10- year increments of the 150 patients with bronchiectasis**

Age group	N	%
19-29	22	14.66%
30-39	16	10.66%
40-49	32	21.33%
50-59	28	18.66%
60-69	38	25.33%
70-79	14	9.33%
>80	0	0%
Total	150	100

**Graph 2: Age wise distribution**

Table 2 and chart 2 shows age distribution of 150 patients of bronchiectasis. Youngest patient

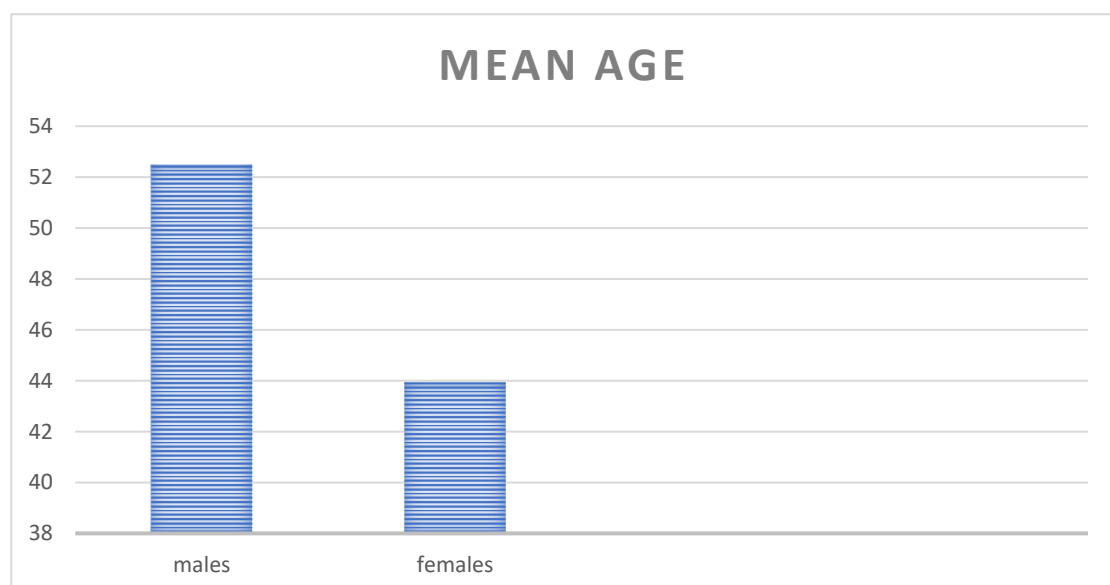


in this study was 19 years and oldest patient was of 77 years of age. Most of the patients were in the age group of 60-69(25.33%)

**Table 3: Mean age of males and females**

Gender	N	Mean Age	SD
Male	86	52.49	15.735
Female	64	43.94	13.875
Total	150	48.84	15.470

**Graph 3: Mean age of males and females**

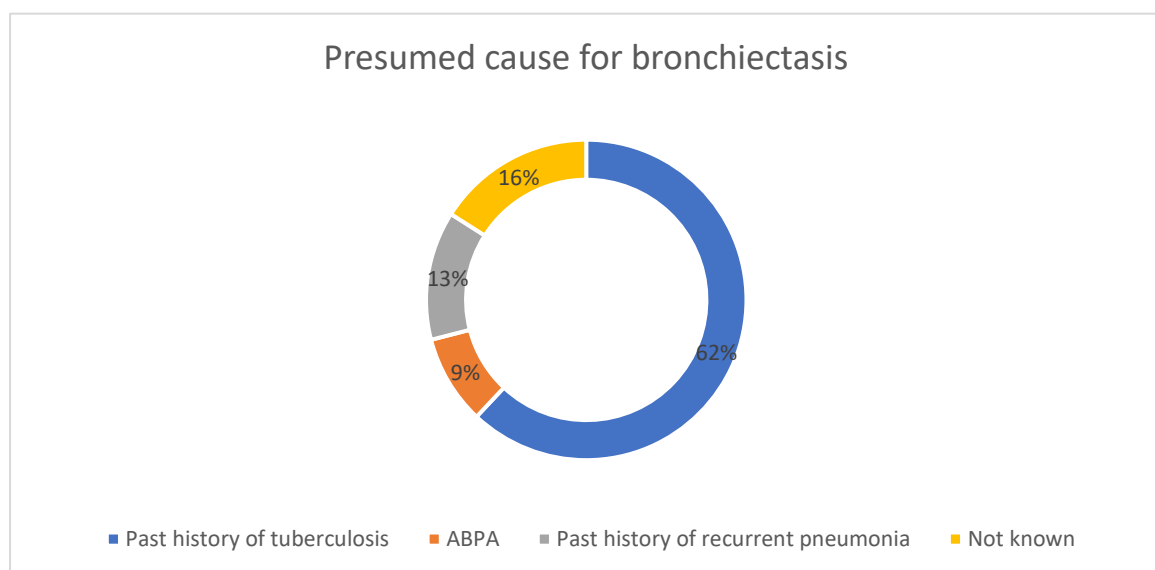


It was studied that mean age of presentation was 48.34 years among all cases. Above graphical presentation states that mean age in males was 52.49 years whereas in female it was 43.94 years.

**Table 4: Presumed cause for bronchiectasis**

Presumed cause for bronchiectasis	N	%
Past history of tuberculosis	92	62%
ABPA	14	9%
Past history of recurrent pneumonia	20	13%
Not known	24	16%
Total	150	100%

**Graph 4: Presumed causes of bronchiectasis**

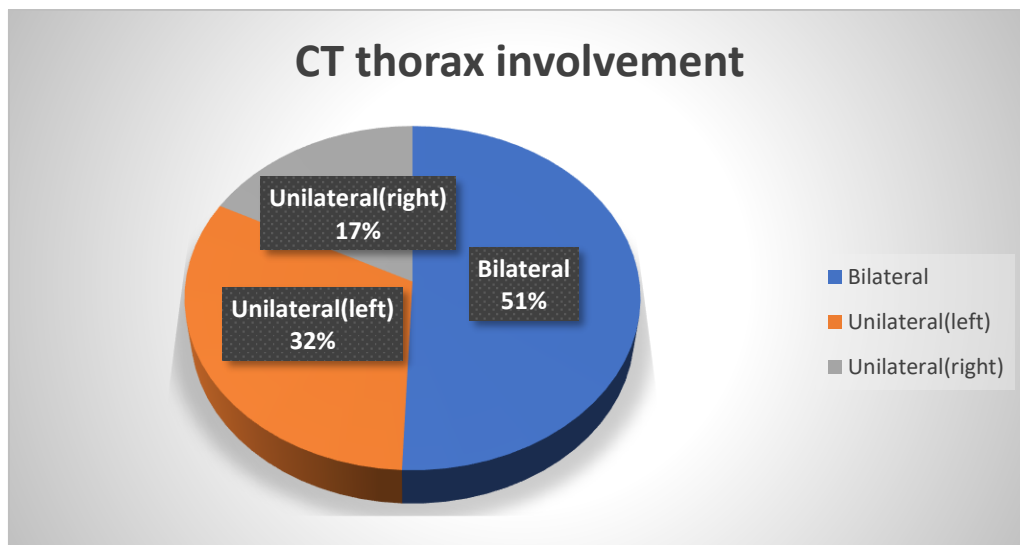


In this study, an underlying cause was found in 84% of the patients. Post Tuberculosis sequelae was the most common identified cause of bronchiectasis (62%).

**Table 5: Involvement on HRCT thorax**

CT Thorax involvement	N	%
Bilateral	76	50.67%
Unilateral(left)	48	32.00%
Unilateral(right)	26	17.33%
Total	150	100.00%

**Graph 5: Involvement on HRCT thorax**

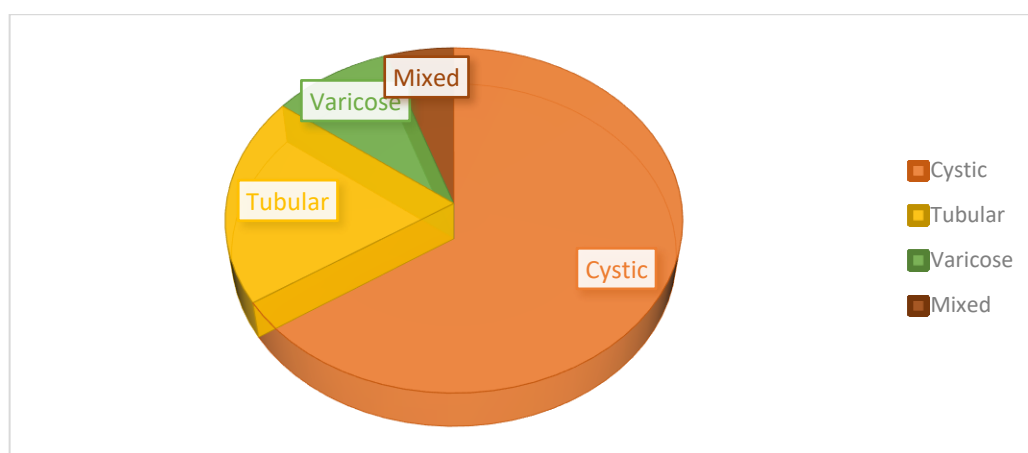


According to involvement on HRCT thorax, we found that 76(50.67%) had both lung involved. Among other total 74(49.33%) who were having unilateral involvement, 48 (32%) had left lung involved whereas in 26 (17.33%) right lung involvement was seen.

**Table 6: Type of bronchiectasis on HRCT thorax**

CT Thorax Type	N	%
Cystic	94	62.67%
Tubular	28	18.67%
Varicose	18	12.00%
Mixed	10	6.66%
Total	150	100.00%

**Graph 6: Type of bronchiectasis on HRCT thorax**



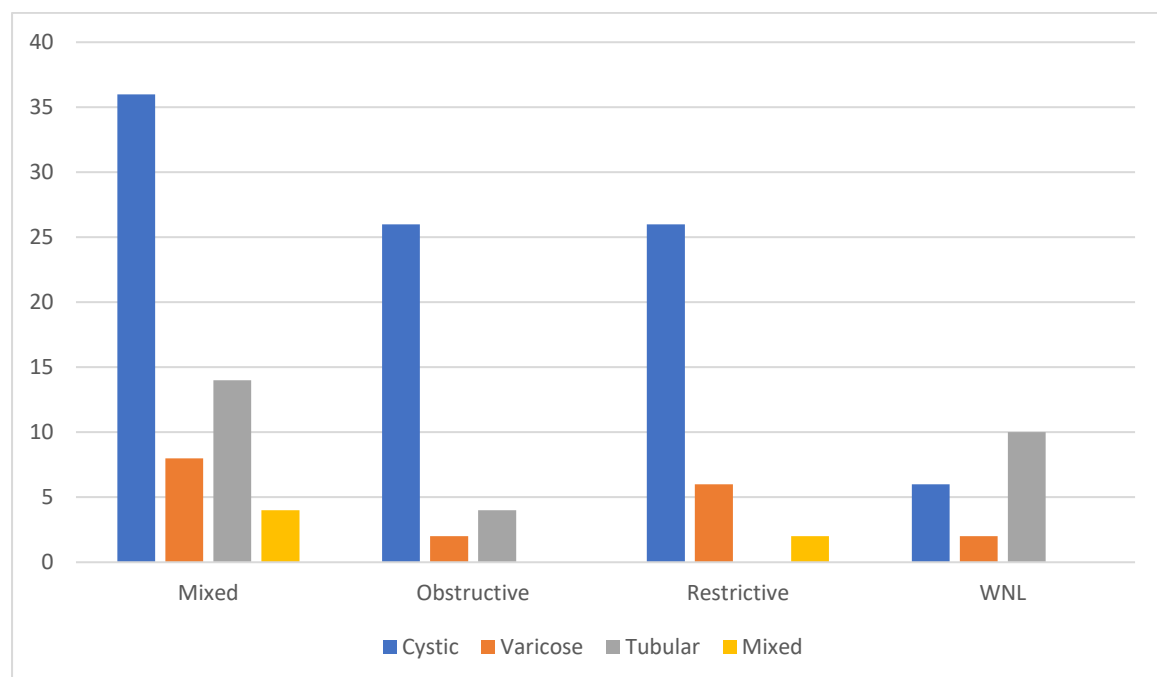


Based on HRCT finding, the predominant type of bronchiectasis found in our study was cystic in 94 cases (62.67%) and tubular in 28 (18.67%) followed by varicose in 18 (12%). Mixed (more than one type) type on HRCT was observed in 10 subjects (6.66%)

**Table 7: Association between type on HRCT and pattern on spirometry**

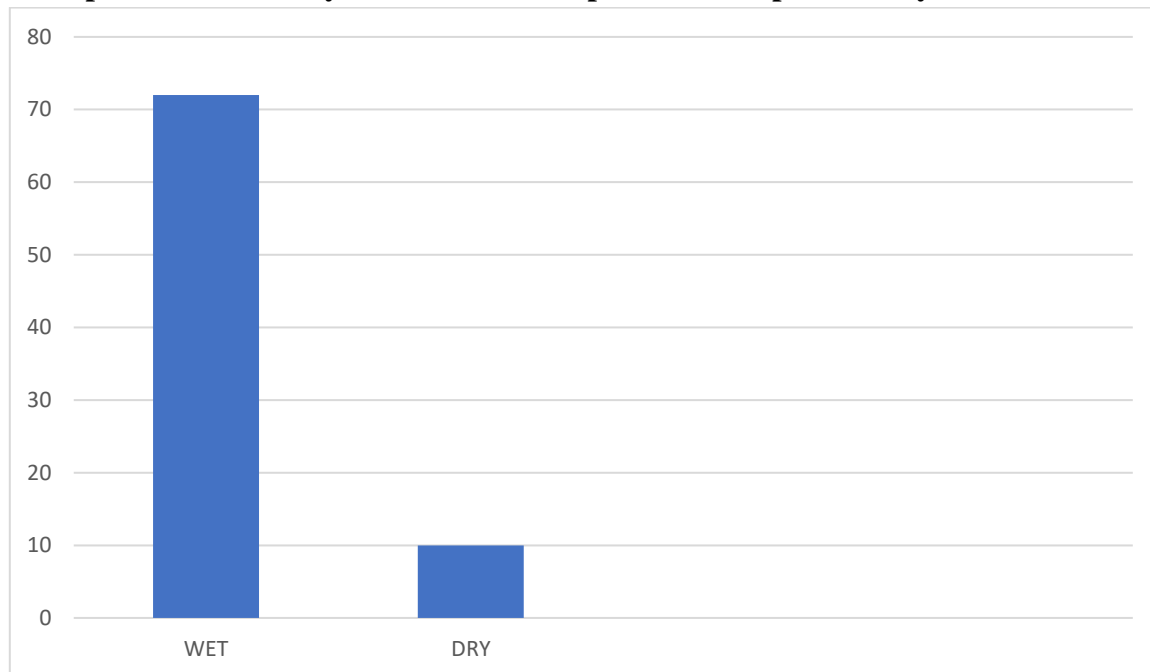
CT Type	Pattern				Total
	Mixed	Obstructive	Restrictive	WNL	
Cystic	36	26	26	6	94
Varicose	8	2	6	2	18
Tubular	14	4	0	10	28
Mixed	8	0	2	0	10
Total	66	32	34	18	150

**Graph 7: Association between type on HRCT and pattern on spirometry**



Here, we see that the cystic group had a higher prevalence of mixed type of pulmonary function abnormalities. Normal spirometry was more seen with tubular type on HRCT.

**Graph 8: Wet and Dry bronchiectasis in patients with past history of tuberculosis**



Here we see that most of the patients with past history of tuberculosis had wet bronchiectasis (78.2%)

## Discussion

We have reviewed 150 patients with bronchiectasis diagnosed on HRCT. The patients studied were evaluated for radiological findings and lung function.

In our study we found there was male predominance (57.33%) and most of the patients were between the age of 40-70 years. As compared with the study of Habesoglu, et al.<sup>(2)</sup> most of the patients are between 50-80 years of age but there was female predominance. The European Multicentre Bronchiectasis Audit and Research Collaboration (EMBARC) included 2195 patients in which mean age was 56 years and male predominance was present.<sup>(3)</sup>

In our study, we found that 62% patients had past history of tuberculosis. Prabhakar Rao PV et al showed that among tuberculosis patient 53% developed bronchiectasis.<sup>(4)</sup> K.Dimakou et al found

that 22.3% patients had past history of tuberculosis.<sup>(5)</sup>

ABPA was found in 9% of patients in our study which was similar to Indian registry results.<sup>(3)</sup>

In 16% of our patients cause for bronchiectasis was not known. According to some publications, the key etiologic cause could not be identified in 30–74% of patients.<sup>(2)</sup>

HRCT chest scanning has been the gold standard diagnostic tool in bronchiectasis. On basis of HRCT finding, the extent and type of disease can also be determined.<sup>(2)</sup> In our study most of the patients had cystic type of bronchiectasis on HRCT which is similar to results from The European Multicentre Bronchiectasis Audit and research Collaboration (EMBARC) and Alzeer et al<sup>(6)</sup>. But A. Sundrarajaperumal et al found cylindrical type as commonest type in his study.<sup>(7)</sup>



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We found mixed pattern on spirometry as most common pattern which was similar to results found in Lynch et al.<sup>(8)</sup> But the result of our study was contradictory with results of some other studies having obstructive pattern predominance in bronchiectasis patients like K.Dimakou et al.<sup>(9)</sup> In our study we found that most patients with past history of tuberculosis has wet bronchiectasis which was similar to the study done by Jyoti Bajpai et al.<sup>(10)</sup>

## Conclusions

According to our research, in more than half of the bronchiectasis patients tuberculosis was found to be the most common aetiology. Cystic type on HRCT and mixed pattern on spirometry is found to be common in bronchiectasis patients in our region. Post TB bronchiectasis is mostly wet bronchiectasis. HRCT plays an important role in diagnosing bronchiectasis.

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