

## CT :

1

· · · · ·

:  
CT  
CT 93 ( -40 ,  
-53 )  
 , , , 가 CT  
가  
Chi-square test , 95%  
 : 가 ,  
가 (p<0.05). 4  
가  
가  
가 (p<0.05).  
가 가 CT ,  
 , ,  
(p<0.05).  
:

가  
(1).

CT , CT ( CT) 1995 9 1997 5 93  
CT  
가 (2-7).  
(n=12),  
(2, 3). CT  
(n=28)  
CT  
40 가 23 71 51.3  
18:22 . 53 가  
16 81 48.7 29:24 .  
1998 12 17 1999 3 17 . 8 , 2

, 8  
, 2 , 1  
(allergic bronchopulmonary aspergillosis)

CT HiSpeed Advanced System (General Electric Medical System, Milwaukee, Wisconsin, USA)

1mm 1cm 140kVp,  
200mA 1.0s, FOV 25-32cm, matrix 512 ×  
512 (high  
spatial frequency algorithm) CT  
(window width/level) 1500/-  
700HU, / 400/10HU  
가

Naidich (8)

1) , 2)  
, 3) , 4)

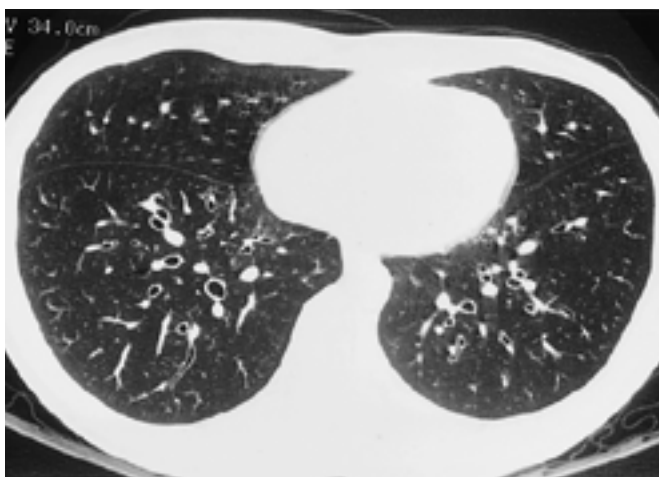
, 5)  
(paracatricial emphysema),  
(distortion of bronchovascular bundle),

(mo-  
saic pattern of lung attenuation) (lobular  
hyperlucency), (ill-defined low-attenua-  
tion), CT

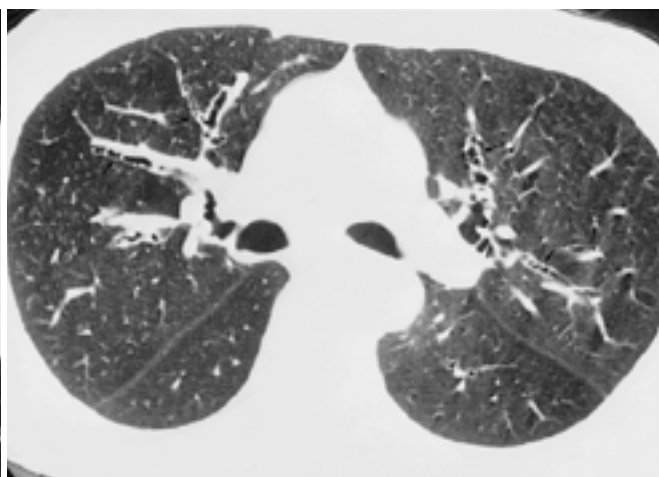
(cylindrical),  
(varicose), (cystic) (8, 9) (Fig. 1).  
CT 가

(tram-  
track) (signet-ring sign)

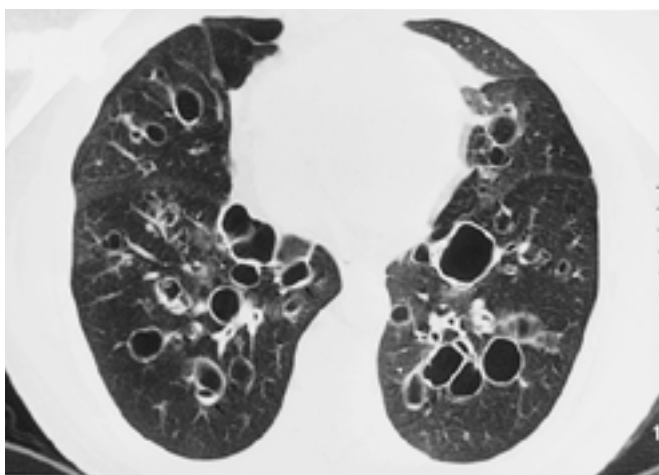
(string of  
pearls)  
가



A



B



C

Fig. 1. Nontuberculous bronchiectasis of various morphological patterns

A. Cylindrical bronchiectasis in a 20-year-old man with a history of sinusitis. HRCT scan shows multiple dilated bronchi in both lower lobes. The dilated bronchi lie adjacent to peripheral branches of pulmonary artery, causing a signet-ring appearance when sectioned tangentially (long arrow) or a tram-track appearance when sectioned horizontally (small arrow).

B. Varicose bronchiectasis in a 52-year-old woman with a history of measles. HRCT scan reveals widespread bronchial dilatation in all lobes. The dilatation of bronchi is not uniform but is characterized by numerous local constrictions that give the bronchi a configuration resembling varicose vein (arrows).

C. Cystic bronchiectasis in a 40-year-old man. HRCT scan through the lower lobe shows markedly dilated bronchi in both lungs, which is indicative of cystic bronchiectasis. Some bronchi show air-fluid level due to mucus secretion in the dilated airway (arrows). This patient has no identifiable cause of bronchiectasis.

(cluster of cysts),  
 (air-fluid level) (cluster  
 of grapes)  
 (bronchial lumen ratio, BLR) 가  
 , 가  
 (bronchus-artery ratio, BAR) 가  
 1/3 2/3 (segmental)  
 (subsegmental)  
 가  
 가  
 가 ,  
 가 (BLR 18 , BAR  
 38 )  
 CT  
 가  
 가  
 가  
 가  
 가  
 가  
 Chi-square test

95% .  
 가 (p<0.01) (Fig. 2, 3),  
 가 (p<0.05) (Table 1) (Fig. 1).  
 8 (20%),  
 10 (19%)  
 4  
 가 13 2  
 (p<0.01),  
 1  
 4  
 가 8  
 (p<0.05).  
 가  
 가 (mixed)  
 가 (varicose)  
 가 (cystic)

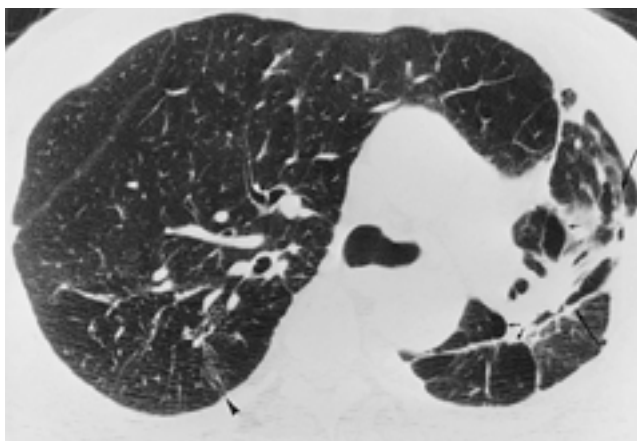


Fig. 2. Tuberculous bronchiectasis in 59-year-old man with a history of tuberculosis

HRCT scan through carina shows traction and varicose bronchiectasis (long arrows) with severe bronchovascular distortion and paracardiac emphysema (small arrow) and fibrotic bands in the left upper lobe. There is volume loss of left upper lobe with herniation of the right upper lobe to left side. And also, there are visible peripheral bronchi in subpleural portion of right upper lobe (arrowhead), which suggest bronchial dilatation and lack of normal bronchial tapering in the peripheral lung.

Table 1. Involved Lobe in Tuberculous and Nontuberculous Bronchiectasis

	RUL	RML	RLL	LUL	LLL
TBB (n= 40)	31	14	15	31	19
NTBB (n= 53)	19	29	32	27	41
p-value	0.001	0.059	0.029	0.009	0.003

Note. RUL = right upper lobe, RML = right middle lobe, RLL = right lower lobe, LUL = left upper lobe, LLL = left lower lobe, TBB = tuberculous bronchiectasis, NTBB = nontuberculous bronchiectasis. Numerics indicate number of patients. P-value denotes the significance of the difference in prevalence.

Table 2. CT patterns in Tuberculous and Nontuberculous Bronchiectasis

	Tubular	Varicose	Cystic	Mixed
TBB (n= 40)	31	22	8	20
NTBB (n= 53)	32	13	28	17
p-value	0.08	0.003	0.001	0.08

Note. TBB = tuberculous bronchiectasis, NTBB = nontuberculous bronchiectasis. Mixed category implies two or three patterns are present. Numerics indicate number of patients. P-value denotes the significance of the difference in prevalence.

( $p < 0.01$ ) (Table 2).  
 가 BLR  
 0.66 가 17 (52%)  
 가 0.8  
 BLR 가 13 (31%) 6  
 (18%) , 0.66 가 19  
 (45%)  
 ( $p > 0.05$ ) (Table 3). BAR  
 , 1.5  
 가 44% 가  
 ( $p > 0.05$ ) (Table 3).  
 CT  
 (mosaic pattern of lung attenuation)  
 (lobular hyperlucency),  
 (ill-defined low-attenuation),  
 ( $p > 0.05$ ),

regularity)

( $p < 0.05$ ) (Table 4).

Table 3. Bronchial Lumen Ratio (BLR) and Bronchus-artery Ratio (BAR) in Bronchiectasis

	BLR			BAR		
	> 0.8	0.8-0.66	< 0.66	< 1.3	1.3-1.5	> 1.5
TBB	6	10	17	9	10	8
NTBB	13	10	19	9	10	15
p-value			0.598			0.204

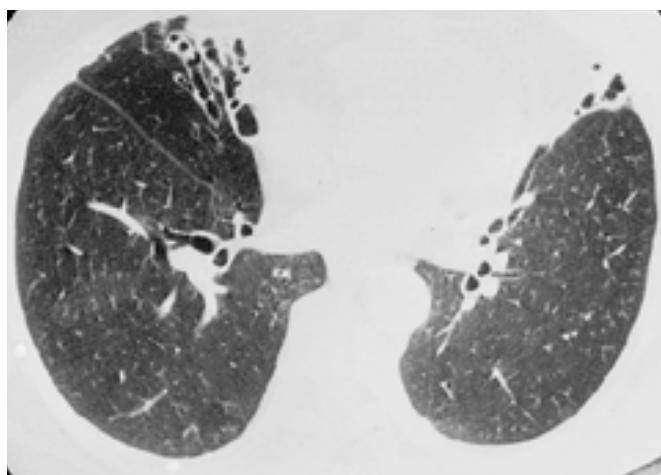
Note. BLR= the inner diameter of a bronchus divided by its outer diameter

BAR= the inner diameter of bronchus divided by the outer diameter of its accompanying pulmonary artery

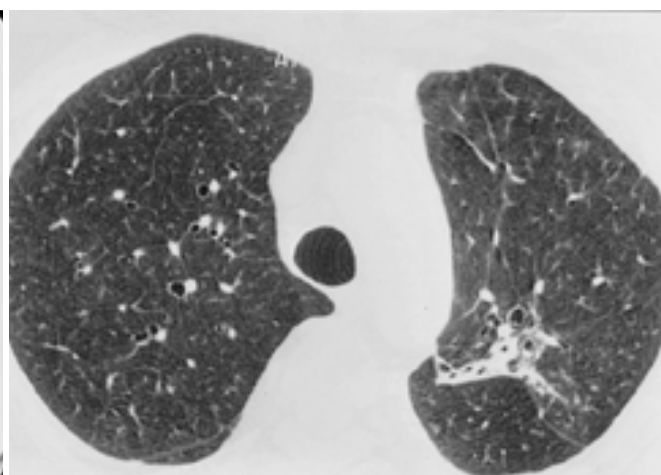
TBB = tuberculous bronchiectasis, NTBB = nontuberculous bronchiectasis

Numerics indicate number of patients.

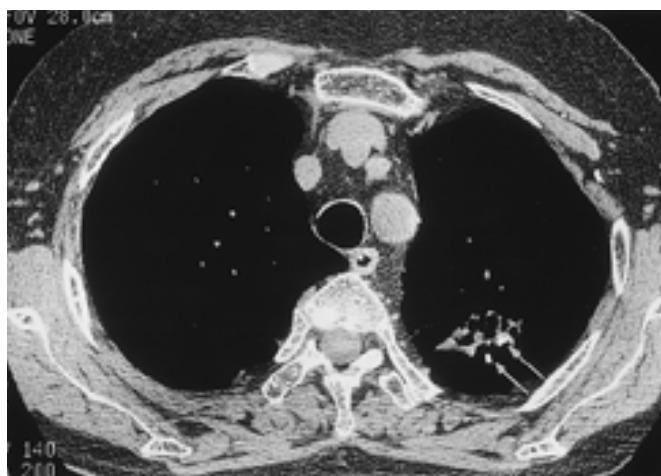
P-value denotes the significance of the difference in prevalence.



A



B



C

Fig. 3. Tuberculous bronchiectasis in 67-year-old woman with a previous sputum culture positive for acid-fast bacilli  
 HRCT scan shows multiple dilated bronchi in both upper lobes and right middle lobe, and volume loss or partial atelectasis in apicoposterior segment and lingular division of left upper lobe and right middle lobe (A, B). There are pleural changes with proliferation of extrapleural fat and calcified foci (C, white arrows), fibrotic band with multiple nodular lesions in left upper lobe. These associated findings may suggest the bronchiectasis which is subsequently resulted from previous tuberculosis with endobronchial spread.

**Table 4. Comparison of HRCT Findings between Tuberculous and Nontuberculous Bronchiectasis**

HRCT findings	TBB (n= 40)	NTBB (n= 53)	p-value
Fibrotic band	38	18	< 0.001
Pleural thickening	20	5	< 0.001
Paracicatricial emphysema	16	5	< 0.001
Calcification	26	4	< 0.001
Bronchovascular distorsion	24	8	< 0.001
Proximal airway narrowing/irregularity	9	3	0.019
Fluid or mucus filled bronchus	4	13	0.073
Volume loss	19	20	0.345
Mediastinal lymph node enlargement	4	8	0.468
Mosaic attenuation or lobular hyperlucency	8	9	0.709
Peribronchial infiltration	13	19	0.736
Ill-defined low attenuation	16	5	0.824

*Note.* Numerics indicate number of patients.

P-value denotes the significance of the difference in prevalence.

(10) 가 , 가 (p<0.05). Hessen 가 0.66 , (15), 가 BLR 가 0.66 BLR 가 (11). , 가 , , (12), , , 가 (air-trapping), (13) , 가 (16). (resolution), (fibrosis), (17). CT 가 가 (2) CT 가 가 (traction), (varicose) (3) 가 가 CT

(panacinar), (panlobular)  
(2)  
CT  
perfusion) CT (mosaic  
(lobular hyperlucency)  
가  
가  
(severity)  
가 (seg-  
ment)  
가

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## **High-resolution CT of Bronchiectasis: Tuberculous versus Nontuberculous<sup>1</sup>**

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**Purpose :** To compare high-resolution CT (HRCT) findings of bronchiectasis caused by tuberculosis and due to causes other than tuberculosis.

**Materials & Methods :** We retrospectively evaluated the HRCT findings of 93 patients with bronchiectasis (in 40 patients caused by tuberculosis, and in 53 due to nontuberculous causes). Diagnostic bases for tuberculous bronchiectasis were positive sputum AFB or the presence of radiological findings of pulmonary tuberculosis, plus a history of antituberculous chemotherapy. HRCT findings were analyzed and compared in terms of disease extent, site, type, distribution of bronchiectasis, severity of bronchial dilatation, and bronchial wall thickening.

**Results :** Compared with nontuberculous bronchiectasis, the tuberculous bronchiectasis group showed more frequent upper lobe involvement, varicose type bronchiectasis, fibrotic band and calcification, adjacent pleural thickening, bronchovascular distortion, and paracatricial emphysema ( $p < 0.05$ ). The nontuberculous bronchiectasis group more frequently involved the lower lobe and showed a higher frequency of cystic type bronchiectasis ( $p < 0.05$ ). The two groups showed no differences in the frequency of bilateral or widespread involvement and in the severity of bronchial wall thickening and bronchial dilatation.

**Conclusion :** In patients with bronchiectasis, HRCT findings of upper lobar distribution, fibrotic changes and calcification, traction or varicose type bronchiectasis, bronchovascular distortion, paracatricial emphysema, and adjacent pleural thickening suggest a tuberculous origin.

**Index words :** Lung, CT  
Bronchiectasis  
Tuberculosis, pulmonary

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