Title

Comparison of the chest computed tomography findings between patients with pulmonary tuberculosis and those with Mycobacterium avium complex lung disease

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Abstract

Background: Since the computed tomography (CT) findings of nontuberculous mycobacterial lung disease are similar to those of pulmonary tuberculosis (PTB), we often have difficulty differentiating the two. In this study, we compared the differences in chest CT findings and their locations between cases of PTB and *Mycobacterium avium* complex lung disease (MACLD). **Methods:** The subjects were 100 MACLD patients and 42 PTB patients treated at our hospital from May 2005 to August 2015. The CT findings were retrospectively evaluated. **Results:** PTB more frequently showed lung shadows with calcification inside the lesion, calcification of the mediastinal/hilar lymph node, and pleural effusion on CT than MACLD, while extensive bronchiectasis and granular/large shadows connected to bronchiectasis were more frequently observed with MACLD than PTB. For cavitary lesions, the thinnest part of the cavity wall with MACLD was thinner than that with PTB. Granular shadows, large shadows, and bronchiectasis were typically distributed to the right upper lobe and left upper division in PTB cases vs. the right intermediate lobe and left lingula in MACLD. **Conclusions:** Chest CT findings would therefore be useful for distinguishing PTB and MACLD when typical findings are observed.

Keywords: CT findings, tuberculosis, *Mycobacterium avium* complex, differential diagnosis

Abbreviations: CT, computed tomography; PTB, pulmonary tuberculosis; MAC, *Mycobacterium avium* complex; MACLD, *Mycobacterium avium* complex lung disease; NTMLD, nontuberculous mycobacterial lung disease; RUL, right upper lobe; LUD, left upper division; S, Segment; RIL, right intermediate lobe; LL, left lingula; RS6, right segment 6; LS6, left segment 6; RBS, right basal segmental of the lung; LBS, left basal segmental of the lung; BE, bronchiectasis; HRCT, high-resolution computed tomography.

1. Introduction

The number of pulmonary nontuberculous mycobacterial lung disease (NTMLD) cases has reportedly increased worldwide in recent years [1]. In Japan, the estimated morbidity rate of NTMLD was 5.7 in a population of 100,000 in 2007, increasing to 14.7 in 2014 [2], and *Mycobacterium avium* complex lung disease (MACLD) caused by infection with *Mycobacterium avium* or *Mycobacterium intracellulare* accounts for about 85% of cases of NTMLD [3]. Respiratory physicians often encounter MACLD during routine practice, e.g., during medical checkups or cancer screening tests.

The morbidity rate of tuberculosis in 2017 was 13.3 per 100,000 persons in Japan [4]. While a decreasing trend has been noted, the morbidity rate is still higher in Japan than in other developed countries. When managing pulmonary tuberculosis (PTB) cases, it is necessary to consider airborne infection control; however, this is not necessary in NTMLD cases. Therefore, to first determine the appropriate infection control strategy and therapy, careful evaluation of chest computed tomography (CT) image findings is very important. However, since there are many similarities in CT findings between NTMLD and PTB, clinicians often face difficulty differentiating the two. In Japan, the majority of pulmonary NTMLD cases are MACLD cases; therefore, differentiation of MACLD and PTB is frequently required. Although several reports from Asian countries have compared CT images of NTMLD and PTB [5-7], the proportions of

nontuberculous mycobacterium species differ (i.e., the proportion of *M. abscessus* is high). Although a few papers have compared the chest CT findings in MACLD and PTB [8, 9], over two decades have passed since the most recent publication.

Working under the hypothesis that new findings might have become available in recent years and/or that differences in CT findings between MACLD and PTB might now be detectable, we analyzed and compared the differences in chest CT findings and their locations between adult cases of MACLD and PTB. We attempted to evaluate the CT findings as simply and objectively as possible.

2. Patients and methods

2.1. Subjects and diagnosis criteria

This retrospective study included subjects meeting the diagnostic criteria of MACLD or PTB from May 2005 to August 2015 in Shimane University Hospital. Patients with MACLD who met all of the following criteria were included: (1) chest CT images consistent with pulmonary MACLD; (2) other diseases were excluded; (3) sputum culture positive in two or more different specimens, or culture positive from one or more bronchial lavage fluid specimens. All extracted cases with MACLD met the NTMLD diagnostic criteria of the Japanese Respiratory Society/Japanese Society for Tuberculosis [10]. Patients with PTB all showed *M. tuberculosis* in at least one sputum sample. We excluded patients who did not undergo chest CT at our hospital, had a history of PTB or MACLD treatment, and had a clear association with active lung diseases, such as lung cancer and or bacterial pneumonia.

This study was approved on February 28, 2014 by the Shimane University Institutional Committee on Ethics (approval number is 1507), and the requirement for written informed consent was waived because of the retrospective design.

2.2. CT imaging conditions

We evaluated the CT images obtained on the day of or the closest date to the diagnosis of

MACLD or PTB. CT was performed using any of the following devices: TSX-101A, TSX-301A/2, or TSX-301X (Toshiba Medical Systems, Tokyo, Japan); or Brilliance 40 CT or Brilliance 64 CT (Philips Medical Systems, Amsterdam, Netherlands). The imaging conditions were as follows: lung field condition = window level 600, window width 1600; mediastinal condition = window level +30, window width 300. The slice thickness at our hospital was basically set at 5 mm, with a slice thickness of ≤ 2 mm regarded as high-resolution CT (HRCT).

2.3. Evaluation of imaging findings

Abnormal findings in the lung field were classified as follows: (A) granular shadow, shadow with a major axis of ≤1 cm; (B) nodular shadow, oval lesion with a clearly distinguishable boundary and a major axis of >1 cm; (C) large shadow, shadow with a major axis of >1 cm, including adhesive shadow, invasive shadow, and atelectasis; (D) bronchiectasis, when the bronchial lumen is more dilated than the central side, the bronchial lumen is clearly thicker than the diameter of the pulmonary artery running in parallel, or the lumen of bronchus can be clearly observed within 1 cm of the pleura; (E) cavitary lesions; (F) tree-in-bud appearance; (G) granular shadow connected to bronchiectasis; and (H) large shadow connected to bronchiectasis (Figure 1).

We evaluated the findings at each of eight sites: right upper lobe (RUL); left upper division

(LUD), Segment (S) 1+2 and S3; right intermediate lobe (RIL); left lingula (LL), S4 and S5; right S6 (RS6); left S6 (LS6); right basal segmental of the lung (RBS), S7 to S10; and left basal segmental of the lung (LBS), S8 to S10. Cavitary lesions were additionally evaluated in terms of the number of cavities, maximum diameter of the cavity, thickest part of the cavity wall, and length of the thinnest part.

We also evaluated the calcification of the mediastinal/hilar lymph node, pulmonary emphysema, honeycomb lung, pneumoconiosis, pleural effusion, and calcification inside the shadow within the lung.

These findings were evaluated based on discussions between two pulmonologists and one radiologist who were blinded to the patients' clinical information.

2.4. Statistical analyses

Computer software programs were used for the statistical analyses (IBM SPSS statistics version 20; IBM, New York, United States of America). For comparisons between groups, a *t*-test was used for the continuous data and the chi-squared test was used for descriptive data. A p-value ≤ 0.05 was considered significant.

3. Results

3.1. Patient background and characteristics

The study population consisted of 100 MACLD patients and 42 PTB patients. Among the 100 patients with MACLD, *M. avium* was detected in 47 cases, *M. intracellulare* in 40 cases, and both in 13 cases. Among the subjects with MACLD, chest CT showed the so-called nodular-bronchiectasis type lesions in 67 cases and cavitary-type lesions in 13 patients. However, in 20 cases, it was difficult to clearly distinguish due to the coexistence of both lesions. Among the 42 patients with PTB, 5 cases were associated with miliary tuberculosis, and 6 were associated with tuberculous pleurisy. HRCT was performed in 99 cases (99%) of MACLD and 38 cases (90.5%) of PTB.

The subjects with MACLD included 29 males and 71 females, with the mean age of 71.5 ± 11.0 years, whereas those with PTB included 30 males and 12 females, with the mean age of 73.9 ± 16.8 years. The proportion of males was lower in the MACLD cases and greater in the PTB cases ($p < 0.001$). The immunocompromised patients (those with poorly controlled diabetes, advanced renal impairment, liver failure, lymphocytopenia [<1,000/μL], taking immunosuppressive drugs, or receiving anti-cancer drug treatment) included 38 with MACLD and 28 with PTB, indicating a significantly higher incidence of PTB in this population ($p = 0.002$) (Table 1). All subjects were Japanese citizens living in Shimane Prefecture. There were no cases complicated with human immunodeficiency virus infection or cystic fibrosis in this study.

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160 *3.2. Characteristics of granular shadow, large shadow, bronchiectasis, and cavities*

161 Granular shadows were observed frequently with both diseases (MACLD 95% vs. PTB
162 100%, p = 0.168), while nodular shadows were relatively infrequent (MACLD 7% vs. PTB 16.7%,
163 p = 0.076). The frequency of large shadows and cavitary lesions was similar between the two
164 groups (MACLD 67% vs. PTB 76.2%, p = 0.277; MACLD 36% vs. PTB 26.2%, p = 0.257;
165 respectively). Bronchiectasis was significantly more frequently observed with MACLD than with
166 PTB (MACLD 93% vs. PTB 42.9%, p < 0.001) (Table 2). Among the patients showing
167 bronchiectasis, when the left upper lobe was counted by dividing it into LUD and LL, the average
168 number of pulmonary lobes showing bronchiectasis was significantly larger in patients with
169 MACLD (3.87 ± 1.66) than in those with PTB (2.11 ± 1.53) (p < 0.001) (Table 3).

170 The frequency of granular shadow disseminated in the airway and connected to
171 bronchiectasis was 81% in MACLD cases vs. 26.2% in PTB cases (p < 0.001), while that of a
172 large shadow connected to bronchiectasis was 56% in MACLD cases vs. 7.1% in PTB cases (p <
173 0.001), with both indicating a significantly higher frequency with MACLD than with PTB. There
174 were no significant differences between the two groups regarding the presence of tree-in-bud
175 signs (MACLD 68% vs. PTB 64.3%, p = 0.668). Lesions with calcification inside the lung shadow
176 were significantly more frequently observed with PTB than with MACLD (MACLD 30% vs.

PTB 61.9%, $p < 0.001$) (Table 2).

There were no significant differences in the average number of cavities (MACLD 3.06 ± 3.26 vs. PTB 2.73 ±1.49; $p = 0.749$) or the maximum diameter of the cavity (29.6 ± 21.3 mm vs. 34.9 ± 16.7 mm; $p = 0.457$). The thickest part of the cavity wall tended to thicker in patients with PTB (4.89 ± 3.07 mm vs. 7.91 ± 4.95 mm; $p = 0.079$), while the thinnest part was significantly thinner in patients with MACLD (2.36 ± 1.40 mm vs. 3.64 ± 2.46 mm; $p = 0.034$) (Table 3).

3.3. Distribution of granular shadow, large shadow, bronchiectasis, and cavities

The frequency at which a granular shadow was observed in the RUL/LUD was significantly higher in patients with PTB (MACLD 78% vs. PTB 92.9%, $p = 0.034$), while that in the RIL/LL was significantly higher in patients with MACLD (MACLD 84% vs. PTB 61.9%, $p = 0.004$) (Table 4). Similarly, the frequency at which a large shadow was observed in the RUL/LUD was significantly higher in patients with PTB (MACLD 30% vs. PTB 64.3%, $p < 0.001$), while that in the RIL/LL tended to be higher in patients with MACLD (MACLD 51% vs. PTB 33.3%, $p = 0.054$) (Table 5).

The frequency at which bronchiectasis was observed was higher in patients with MACLD overall, and especially in the RIL/LL (MACLD 82% vs. PTB 14.3%, $p < 0.001$). The presence of bronchiectasis in both the RIL and LL was observed with a moderate frequency in MACLD

patients, but was only rarely observed in PTB patients (MACLD 58% vs. PTB 2.4%, $p < 0.001$) (Table 6). Bronchiectasis in PTB patients tended to present in the RUL/LUD. No cavitary lesions were observed in the RIL/LL among PTB cases (MACLD 14% vs. PTB 0%, $p = 0.038$) (Table 7).

3.4. Other CT findings

The frequencies of calcification of the mediastinal/hilar lymph node, pleural effusion, and calcification inside the lung shadow were significantly higher with PTB than with MACLD (MACLD 12% vs. PTB 42.9%, $p < 0.001$; MACLD 4% vs. PTB 38.1%, $p < 0.001$; and MACLD 30% vs. PTB 61.9%, $p < 0.001$; respectively). The frequencies of emphysema, honeycomb lung, and pneumoconiosis were similar between the two groups (MACLD 19% vs. PTB 31%, $P = 0.120$; MACLD 7% vs. PTB 4.8%, $p = 0.471$; MACLD 0% vs. PTB 4.8%, $p = 0.086$; respectively) (Table 2).

We compared the frequency of CT findings between normal-immune patients and immunodeficient, respectively patients with MACLD and those with PTB. The results showed no obvious difference in the frequency of shadows between normal-immune and immunodeficient MACLD patients. However, among PTB patients, the frequency of tree-in-bud signs was higher in normal-immune patients (85.7% of 14 normal-immune patients vs. 53.6% of 28 immunodeficient, $p = 0.040$), and the frequency of pleural effusion was higher in

213 immunodeficient patients (7.1% normal-immune patients vs. 53.6% immunodeficient, p = 0.003).

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4. Discussion

Bronchiectasis is an important lesion that is frequently observed in NTMLD cases [11] and is thought to be caused by chronic inflammation mainly in the bronchioles and bronchus [12-14]. However, bronchiectasis is also commonly observed in PTB cases [15], where it is thought to be caused by inflammation in the bronchioles, bronchial obstruction, and granulomatous lesions occupying the airway in cases of active infection [16,17]. Furthermore, after healing from PTB, the loss of lung volume causes traction bronchiectasis [18].

Previous comparative studies have shown that bronchiectasis is more frequently observed and tends to exist in multiple pulmonary lobes in the CT findings of MACLD in comparison to the findings of PTB [8, 9]. Similarly, in our study, MACLD cases showed more extensive bronchodilation than PTB cases and cases showing bronchiectasis in both the RIL and LL were rarely observed among PTB patients. The CT findings in MACLD have been reported to indicate more centrilobular granular shadows around the areas of bronchodilation [19], with a frequency that is significantly higher than that in PTB patients [9]. In the present study, we evaluated the granular shadows connected to bronchiectasis, and showed that such CT findings were also more frequently observed in MACLD cases than in PTB cases.

Findings such as adhesive shadows, consolidation, and atelectasis are commonly observed in the chest CT images of MACLD patients. They are thought to be created due to the

enhancement of centrilobular granular shadows over time. In routine practice, these shadows (adhesive shadows, consolidation, and atelectasis), like granular shadows, are often found to be continuous with bronchiectasis, which we suspect to be a characteristic of MACLD. However, no previous reports have compared MACLD to PTB by evaluating the connection of these shadows to bronchiectasis as CT findings. A possible reason for this may be that accurately classifying lung shadow is difficult since the large lung shadows of MACLD patients have a wide variety of characteristics, and the fact that different characteristic patterns may sometimes coexist in a single atypical shadow. In addition, excessive shadow classifications make evaluating shadows a complex process and hamper the detection of statistically significant differences. Accordingly, as a new method, we evaluated abnormal lung shadows with a major axis longer than 1 cm, excluding spherical nodule shadows, as large shadows together. This approach resulted in large shadows connected to bronchiectasis being commonly observed in MACLD but only rarely found in PTB. We therefore believe that this method is a simple and useful approach to rule out a diagnosis of PTB. Incidentally, it should be noted that the air bronchogram due to consolidation is different from bronchiectasis.

In this study, there were no significant differences in the number or size of cavitary lesions, but the thinnest part of the cavity wall in cases of MACLD was thinner than that in case of PTB. This result is similar to several previous studies [6, 7]. Although these cavity findings may aid in

the differential diagnosis, caution should be practiced when ruling out PTB, because PTB with cavitary lesions is thought to carry a high infection risk [20, 21].

Regarding the distribution of lung shadows, the present study showed that the frequency of granular shadows in the RIL/LL was significantly higher with MACLD, while the frequency of granular shadows and large shadows in the RUL/LUD was significantly higher with PTB [9, 12, 22]. It is considered that the RIL/LL bronchi anatomically diverge at an acute angle and are oppressed by the anterior thoracic wall and heart with a low airway clearance, resulting in a tendency for MAC bacteria fixation to occur [23]. PTB in adults often manifests as secondary tuberculosis, and these lesions appear mainly in the pulmonary apex lesion and S6 of the lung [24], possibly because pathogens hematogenously and lymphogenously migrating from the primary infected lesion into the lung are fixed and proliferate in the apex area or S6 due to a low ventilator perfusion ratio and relatively high oxygen concentration [25]. Bronchiectasis in PTB cases seemed to show a tendency to appear in the RUL/LUD, which may indicate a site of inflammation. Although various CT findings tended to co-exist in both MACLD and PTB cases, the distribution (i.e., the segments or lobes in which granular shadows/large shadows/bronchiectasis are present) is considered useful for the differential diagnosis.

Regarding other findings, pleural effusion was significantly more frequent in cases of PTB than in MACLD. Furthermore, among PTB patients, pleural effusion was significantly more

frequent in immunodeficient cases than in normal-immune cases. The presence of pleural effusion is rare with MACLD, so this lesion suggests a diagnosis of PTB, especially in immunodeficient cases. According to previous reports, the thickness of the interlobular septa is typically greater with PTB than with MACLD [9]. These differences in CT findings are considered due to PTB has greater pathogenicity than MACLD, thereby causing more acute and stronger lymphatic inflammation.

Several limitations associated with the present study warrant mention. First, the results were based on a retrospective analysis of data from a single facility. Second, since MACLD patients were diagnosed based on the identification of the pathogen through routine clinical practice, there may have been a tendency to select severe cases. Third, the proportion of immunodeficient patients differed between PTB cases and MACLD cases, which may have affected the CT findings. To rule out the possibility of bias, a prospective study should be conducted in the future.

5. Conclusion

Extensive bronchiectasis, cavity lesions with a thin wall, and granular/large shadows connected to bronchiectasis were more frequently observed in cases of MACLD than in PTB.

Granular shadows, large shadows, and bronchiectasis were generally distributed to the RUL/LUD in PTB cases. Therefore, chest CT findings would be useful for distinguishing PTB and MACLD when typical findings are observed.

Acknowledgments

None.

Conflicts of interest

Yukari Tsubata received personal fees from AstraZeneca, Chugai Pharmaceutical and Daiichi-Sankyo, outside of the submitted work. Takeshi Isobe received personal fees from AstraZeneca, Pfizer and Boehringer Ingelheim, outside of the submitted work. The remaining authors declare no conflict of interest.

コメントの追加 [A1]: Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

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Figure caption

Fig. 1 – Typical CT image. (A) Granular shadow: aggregation of small nodule shadows sized 1 cm or less (55-year-old female, MACLD). (B) Nodular shadow: spherical nodule shadow exceeding 1 cm with a clear boundary (81-year-old female, MACLD). (C) Large shadow: ill-defined massive shadow exceeding 1 cm (88-year-old male, PTB). (D) Bronchiectasis: bronchiectasis noted on imaging and mucus stagnation in the lumen (73-year-old, MACLD). (E) Cavitary lesion: a cavitary lesion with a thick wall (66-year-old male, PTB). (F) Tree-in-bud signs (82-year-old, PTB). (G) Granular shadows connected to bronchiectasis (76-year-old female, MACLD). (H) Large shadow connected to bronchiectasis (77-year-old female, MACLD). (I) Schematic illustration ©. Granular shadow connected to bronchiectasis (black arrow). Large shadow connected to bronchiectasis (white arrow).

Table 1 – Patient characteristics

	MACLD (n = 100)	PTB (n = 42)	p-value
Mean age ± standard deviation	71.5 ± 11.0	73.9 ± 16.8	0.400
Sex			
Male (%)	29 (29.0%)	30 (71.4%)	<0.001
Female (%)	71 (71.0%)	12 (28.6%)	
Immunocompromised* (%)	38 (38.0%)	28 (66.7%)	0.002

* Immunocompromised refers to poorly controlled diabetes, advanced renal impairment, liver failure, lymphocytopenia, taking immunosuppressive drugs, or receiving anti-cancer drug treatment.

MACLD, *Mycobacterium avium* complex lung disease; PTB, pulmonary tuberculosis.

Table 2 – Comparison of chest CT findings

	MACLD (n = 100)	**PTB (n = 42)**	**p-value**
Granular shadow (≤1 cm)	95 (95.0%)	42 (100%)	0.168
Nodular shadow (>1 cm)	7 (7.0%)	7 (16.7%)	0.076
Large shadow (>1 cm)	67 (67.0%)	32 (76.2%)	0.277
Bronchiectasis	93 (93.0%)	18 (42.9%)	<0.001
Cavitary lesion	36 (36.0%)	11 (26.2%)	0.257
Tree-in-bud sign	68 (68.0%)	27 (64.3%)	0.668
Granular shadow connected to BE	81 (81.0%)	11 (26.2%)	<0.001
Large shadow connected to BE	56 (56.0%)	3 (7.1%)	<0.001
Calcification of the mediastinal/hilar lymph node	12 (12.0%)	18 (42.9%)	<0.001
Emphysema	19 (19.0%)	13 (31.0%)	0.120
Honeycomb lung	7 (7.0%)	2 (4.8%)	0.471
Pneumoconiosis	0 (0%)	2 (4.8%)	0.086
Pleural effusion	4 (4%)	16 (38.1%)	<0.001
Calcification inside the lung shadow	30 (30.0%)	26 (61.9%)	<0.001

CT, computed tomography; MACLD, *Mycobacterium avium* complex lung disease; PTB, pulmonary tuberculosis; BE, bronchiectasis.

Table 3 – Number of lobes with BE and number of cavity lesions

		MACLD	PTB	p-value
With BE		n = 93	n = 18	
	Number of lobes with BE*	3.87±1.66	2.11±1.53	< 0.001
With cavitary lesions		n = 36	n = 11	
	Number of lesions	3.06±3.26	2.73±1.49	0.749
	Maximum lesion size (mm)	29.6±21.3	34.9±16.7	0.457
	Maximum size of cavity wall (mm)	4.89±3.07	7.91±4.95	0.079
	Minimum size of cavity wall (mm)	2.36±1.40	3.64±2.46	0.034

Data are presented as the mean±standard deviation.

* The number was counted dividing the left upper lobe into left upper division and lingula.

MACLD, *Mycobacterium avium* complex lung disease; PTB, pulmonary tuberculosis; BE, bronchiectasis.

401 Table 4 – Distribution of granular shadows

	MACLD (n = 100)	**PTB (n = 42)**	**p-value**
RUL/LUD	78.0%	92.9%	0.034
RUL	69.0%	81.0%	0.145
LUD	52.0%	76.2%	0.007
Both RUL and LUD	43.0%	64.3%	0.021
RIL/LL	84.0%	61.9%	0.004
RIL	79.0%	52.4%	0.001
LL	65.0%	42.9%	0.015
Both RIL and LL	60.0%	33.3%	0.004
Segment 6	55.0%	59.5%	0.620
RS6	40.0%	47.6%	0.402
LS6	36.0%	40.5%	0.615
Both RS6 and LS6	21.0%	28.6%	0.330
Basilar Segment	72.0%	54.8%	0.046
RBS	58.0%	47.6%	0.257
LBS	57.0%	38.1%	0.040
Both RBS and LBS	43.0%	31.0%	0.180

402 MACLD, *Mycobacterium avium* complex lung disease; PTB, pulmonary tuberculosis; RUL, right upper
403 lobe; LUD, left upper division; RIL, right intermediate lobe; LL, left lingula; RS6, right segment 6; LS6,
404 left segment 6; RBS, right basilar segment; LBS, left basilar segment.
405
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Table 5 – Distribution of large shadows

	MACLD (n = 100)	**PTB (n = 42)**	**p-value**
RUL/LUD	30.0%	64.3%	< 0.001
RUL	24.0%	45.2%	0.012
LUD	11.0%	23.8%	0.050
Both RUL and LUD	5.0%	4.8%	0.659
RIL/LL	51.0%	33.3%	0.054
RIL	37.0%	19.0%	0.036
LL	27.0%	14.3%	0.102
Both RIL and LL	13.0%	0%	0.008
Segment 6	16.0%	23.8%	0.272
RS6	10.0%	14.3%	0.319
LS6	9.0%	11.9%	0.400
Both RS6 and LS6	3.0%	2.4%	0.660
Basilar Segment	24.0%	33.3%	0.252
RBS	17.0%	19.0%	0.770
LBS	10.0%	19.0%	0.139
Both RBS and LBS	3.0%	4.8%	0.464

MACLD, *Mycobacterium avium* complex lung disease; PTB, pulmonary tuberculosis; RUL, right upper lobe; LUD, left upper division; RIL, right intermediate lobe; LL, left lingula; RS6, right segment 6; LS6, left segment 6; RBS, right basilar segment; LBS, left basilar segment.

413 Table 6 – Distribution of bronchiectasis

	MACLD (n = 100)	**PTB (n = 42)**	**p-value**
RUL/LUD	76.0%	35.7%	< 0.001
RUL	74.0%	28.6%	< 0.001
LUD	48.0%	21.4%	0.003
Both RUL and LUD	46.0%	14.3%	< 0.001
RIL/LL	82.0%	14.3%	< 0.001
RIL	78.0%	11.9%	< 0.001
LL	62.0%	4.8%	< 0.001
Both RIL and LL	58.0%	2.4%	< 0.001
Segment 6	45.0%	11.9%	< 0.001
RS6	36.0%	9.5%	0.001
LS6	28.0%	4.8%	0.002
Both RS6 and LS6	19.0%	2.4%	0.009
Basilar Segment	52.0%	9.5%	< 0.001
RBS	50.0%	7.1%	< 0.001
LBS	31.0%	7.1%	0.002
Both RBS and LBS	29.0%	4.8%	0.001

414 MACLD, *Mycobacterium avium* complex lung disease; PTB, pulmonary tuberculosis; RUL, right upper
415 lobe; LUD, left upper division; RIL, right intermediate lobe; LL, left lingula; RS6, right segment 6; LS6,
416 left segment 6; RBS, right basilar segment; LBS, left basilar segment.
417
418

Table 7 – Distribution of cavitary lesions

	MACLD (n=100)	**PTB (n=42)**	**p-value**
RUL/LUD	23.0%	21.4%	0.838
RUL	19.0%	11.9%	0.303
LUD	6.0%	11.9%	0.193
Both RUL and LUD	2.0%	2.4%	0.654
RIL/LL	14.0%	0%	0.006
RIL	9.0%	0%	0.038
LL	7.0%	0%	0.081
Both RIL and LL	2%	0%	0.494
Segment 6	7.0%	14.3%	0.146
RS6	6.0%	7.1%	0.529
LS6	4.0%	7.1%	0.341
Both RS6 and LS6	3.0%	0%	0.346
Basilar Segment	10.0%	9.5%	0.600
RBS	9.0%	7.1%	0.503
LBS	4.0%	2.4%	0.536
Both RBS and LBS	3.0%	0%	0.346

MACLD, *Mycobacterium avium* complex lung disease; PTB, pulmonary tuberculosis; RUL, right upper lobe; LUD, left upper division; RIL, right intermediate lobe; LL, left lingula; RS6, right segment 6; LS6, left segment 6; RBS, right basilar segment; LBS, left basilar segment.