

学位論文の要旨

氏名 三浦 聖高

学位論文名 Comparison of the Chest Computed Tomography Findings Between Patients with Pulmonary Tuberculosis and Those with *Mycobacterium avium* Complex Lung Disease

発表雑誌名 Respiratory Investigation
(巻, 初頁～終頁, 年) (58, 137-143, 2020)

著者名 Kiyotaka Miura, Megumi Nakamura, Yasuyuki Taooka, Takamasa Hotta, Megumi Hamaguchi, Tamio Okimoto, Yukari Tsubata, Shunichi Hamaguchi, Takashige Kuraki, Takeshi Isobe

論文内容の要旨

INTRODUCTION

The number of nontuberculous mycobacterial lung disease (NTMLD) patients has reportedly increased worldwide in recent years. In Japan, *Mycobacterium avium* complex lung disease (MACLD) caused by infection with *Mycobacterium avium* or *Mycobacterium intracellulare* accounts for about 85% of cases of NTMLD. Respiratory physicians often encounter MACLD during routine practice. While, the morbidity rate of pulmonary tuberculosis (PTB) is still higher in Japan than in other developed countries. Therefore, differentiation of MACLD and PTB is frequently required.

When managing PTB cases, it is necessary to consider airborne infection control; however, this is not necessary in MACLD cases. To first determine the appropriate infection control strategy, careful evaluation of chest computed tomography (CT) findings is very important. However, there are many similarities in chest CT findings between MACLD and PTB, clinicians often face difficulty differentiating the two. Although a few papers have compared the chest CT findings in MACLD and PTB, over two decades have passed since the most recent publication. Working under the hypothesis that new findings might have become available in recent years, we analyzed and compared the differences in chest CT findings and their locations between adult cases of MACLD and PTB.

MATERIALS AND METHODS

This retrospective study included subjects meeting the diagnostic criteria of MACLD or PTB from May 2005 to August 2015 in Shimane University Hospital. We excluded patients who had a history of PTB or MACLD treatment and had a clear association with active lung diseases.

We evaluated the CT images obtained on the date to the diagnosis of MACLD or PTB. 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 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; (E) cavitory lesions; (F) tree-in-bud appearance; (G) granular shadow connected to bronchiectasis; and (H) large shadow connected to bronchiectasis. We evaluated these findings locations 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.

For comparisons between two 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. This study protocol was approved by the Research Ethics Committee of Shimane University (approval number is 1507).

RESULTS AND DISCUSSION

The study population consisted of 100 MACLD patients and 42 PTB patients. The subjects with MACLD included 29 males and 71 females, with the mean age of 71.5 years, whereas those with PTB included 30 males and 12 females, with the mean age of 73.9 years. The proportion of males was lower in the MACLD cases and greater in the PTB cases ($p < 0.001$). The immunocompromised patients included 38 with MACLD and 28 with PTB, indicating a significantly higher incidence of PTB in this population ($p = 0.002$).

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

The frequency of granular shadow connected to bronchiectasis was 81% in MACLD cases

vs. 26.2% in PTB cases ($p < 0.001$), while that of a large shadow connected to bronchiectasis was 56% in MACLD cases vs. 7.1% in PTB cases ($p < 0.001$), with both indicating a significantly higher frequency with MACLD than with PTB. The thinnest part of cavitory lesion was significantly thinner in patients with MACLD (2.36 ± 1.40 mm vs. 3.64 ± 2.46 mm; $p = 0.034$).

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%, $p = 0.004$). 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%, $p = 0.054$). 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%, $p < 0.001$). The frequencies of pleural effusion were significantly higher with PTB than with MACLD (MACLD 12% vs. PTB 42.9%, $p < 0.001$).

Bronchiectasis is considered an important lesion that is frequently observed in NTMLD cases, but it is also commonly observed in PTB cases. Previous comparative studies have shown that bronchiectasis is more frequently observed and tends to exist in multiple pulmonary lobes, and that centrilobular granular shadows around the areas of bronchodilation are more frequently in MACLD cases than PTB cases. These results were similar our study.

In the present study, we evaluated the large shadows connected to bronchiectasis, and it was also more frequently observed in MACLD cases than in PTB cases. This CT findings are commonly observed in MACLD but only rarely found in PTB, so we consider this CT findings is useful to rule out diagnosis of PTB.

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.

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, while RIL/LL in MACLD cases. Therefore, these chest CT findings and their distribution would be useful for distinguishing PTB and MACLD.