Clinical Imaging 40 (2016) 382–385

Contents lists available at ScienceDirect

Clinical Imaging

journal homepage: http://www.clinicalimaging.org

Original Article

Thin-section chest CT findings in polymyalgia rheumatica: a comparison between with and without rheumatoid arthritis

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ARTICLE INFO

Article history:
Received 6 May 2015
Received in revised form 22 October 2015
Accepted 5 November 2015

Keywords:
CT
Polymyalgia rheumatica
Rheumatoid arthritis
Chest
Lung

ABSTRACT

We retrospectively compared the thin-section chest computed tomography (CT) findings between 25 patients of polymyalgia rheumatica (PMR) with rheumatoid arthritis (RA) and 29 patients of PMR without RA. PMR patients showed high-frequency CT abnormalities (68.5%) regardless of the association with RA. Ground-glass opacity (56% vs. 24%), traction bronchiectasis (44% vs. 3%), architectural distortion (32% vs. 0%), centrilobular nodules (32% vs. 7%), and honeycombing (20% vs. 0%) were significantly more common in the PMR with RA group than in the PMR without RA group ($P<.01$). PMR patients with RA have more increased prevalence of chest CT abnormalities than those without RA.

1. Introduction

Polymyalgia rheumatica (PMR) as an inflammatory condition of multifactorial etiology is generally characterized by aching and stiffness in neck, shoulder, and pelvic girdles. It occurs in people over the age of 50 years, and it usually responds rapidly to low doses of glucocorticoids and has a favorable prognosis. PMR is sometimes associated with rheumatoid arthritis (RA). Patients with RA who have the PMR have been documented as having poor prognosis and need early intervention with nonbiological or biological disease-modifying antirheumatic drugs [1].

Pulmonary manifestations of PMR are considered to be rare and include usual interstitial pneumonia (UIP) [2,3], cryptogenic organizing pneumonia [4,5], and pulmonary vasculitis [6]. To our knowledge, pulmonary involvements have been sporadically reported in the literature, but there is no report specifically detailing the thin-section chest computed tomography (CT) findings in PMR. Moreover, the differentiation of the findings between "with RA" and "without RA" has not been described.

The purpose of our study was to assess thin-section chest CT findings in PMR with RA and to compare with the findings in PMR without RA.

2. Materials and methods

2.1. Patients

We retrospectively reviewed the medical records of all patients who had a diagnosis of PMR and who had undergone CT for therapy monitoring at our hospital, and we selected for this analysis the patients who met the following criteria: (a) having fulfilled the 1979 Bird/Wood criteria for PMR [7], (b) having no other autoimmune disease such as Sjögren syndrome, (c) having no active inflammation, and (d) having undergone thin-section CT. Finally, 54 patients were included in our study and were categorized as PMR with RA or PMR without RA. Of 54 patients, 25 met the 2010 American College of Rheumatology/European League Against Rheumatism classification criteria for definite RA [8]. Characteristics of the 54 subjects included in the study are shown in Table 1. Of the 54 patients, 35 were undergoing drug treatment at the evaluation. Drug treatments included oral corticosteroid ($n=27$), nonsteroidal antiinflammatory agents ($n=6$), nonbiological disease-modifying antirheumatic drugs ($n=5$), and tumor necrosis factor-α inhibitors (etanercept) ($n=2$). No statistical differences were seen between the two groups in age, gender, smoking habits, history of biological therapy, or duration of disease.

Our institutional review board approved this study and informed consent was waived.

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http://dx.doi.org/10.1016/j.clinimag.2015.11.013
0899-7071/

Table 1
Patient characteristics

Characteristic	PMR ($n=29$)	PMR+RA ($n=25$)	P value
Sex			NS
Male	9 (31%)	10 (40%)	
Female	20 (69%)	15 (60%)	
Age (years)	70	72	NS
Range	51–89	54–89	
Smoking	9 (31%)	9 (36%)	NS
Biological therapy	0 (0%)	2 (8%)	NS
Duration of disease (month)	4.6±5.5	5.0±3.9	NS

2.2. CT imaging and image analysis

Whole-lung CT scans were obtained with a 16-, 32-, or 64-detector row CT scanner (Aquilion 16, 32, or 64; Toshiba Medical Systems) using the following technique: section width of 2.0 mm with reconstruction interval of 2.0 mm, pitch (ratio of table travel per rotation to total beam width) of 15, 120 kVp, 300 mA, rotation time of 0.5 s, beam width of 32 mm, reconstruction algorithm, and a lung algorithm (FC53; Toshiba). CT scans were assessed independently in random order by two chest radiologists without knowledge of the patients' clinical information except that all patients had PMR. Each CT image was displayed and evaluated using a standard lung window (window width, 1600 HU; window level, −600 HU) and mediastinal window (window width, 350 HU; window level, 50 HU) on a high-resolution 1560×2048 monitor (Barco, Kortrijk, Belgium). After independent interpretations, any differences in assessment were resolved by consensus.

Each of the following CT findings was separately coded as present or absent; (a) reticulation (a collection of innumerable small linear opacities that, by summation, produce an appearance resembling a net); (b) airspace consolidation (a homogeneous increase in pulmonary parenchymal attenuation that obscures the margins of vessels and airway walls); (c) ground-glass opacity (hazy increased opacity of lung, with preservation of bronchial and vascular margins); (d) mosaic attenuation (patchwork of regions of differing attenuation that may represent patchy interstitial disease, obliterative small airways disease, or occlusive vascular disease); (e) interlobular septal thickening (thin linear opacities between lobules; these septa are to be distinguished from centrilobular structures); (f) bronchial wall thickening; (g) bronchiectasis (bronchial dilatation with respect to the accompanying pulmonary artery (signet ring sign), lack of tapering of bronchi, and identification of bronchi within 1 cm of the pleural surface); (h) emphysema; (i) centrilobular nodules; (j) traction bronchiectasis (irregular bronchial and bronchiolar dilatation caused by surrounding retractile pulmonary fibrosis); (k) honeycombing (clustered cystic air spaces, typically of comparable diameters on the order of 3–10 mm but occasionally as large as 2.5 cm); (l) architectural distortion (lung anatomy has a distorted appearance and is usually associated with pulmonary fibrosis and accompanied by volume loss); (m) pleural effusion; and (n) pleural thickening. These CT findings were interpreted based on the recommendations of the Nomenclature Committee of the Fleischner Society [9].

2.3. Statistical analysis

A Fisher's Exact Probability Test was used to compare the prevalence of CT findings in PMR with RA and PMR without RA. All statistical analyses were performed with StatView 5.0 (SAS Institute). P values less than .01 were considered significant in all analysis.

3. Results

The frequency of thin-section CT findings in all PMR patients is summarized in Table 2. Thirty-seven patients (68.5%) showed abnormalities on thin-section CT. Ground-glass opacity (38.9%) was the most frequent finding in the patients (Fig. 1). Interlobular septal thickening (24.1%), reticulation (22.2%), and traction bronchiectasis (22.2%) were also frequently seen. There was good interobserver agreement for each CT findings (κ value: 0.85–1). UIP pattern was observed in 5 of 25 PMR with RA group patients (20%), but it was not observed in PMR without RA group patients.

Table 2
Thin-section CT findings of 54 PMR patients

Thin-section CT finding	PMR ($n=54$)
Reticulation	12 (22.2%)
Interlobular septal thickening	13 (24.1%)
Airspace consolidation	9 (16.7%)
Ground-glass opacity	21 (38.9%)
Traction bronchiectasis	12 (22.2%)
Honeycombing	5 (9.3%)
Architectural distortion	8 (14.8%)
Mosaic attenuation	4 (7.4%)
Bronchial wall thickening	5 (9.3%)
Bronchiectasis	11 (20.3%)
Centrilobular nodule	10 (18.5%)
Emphysema	9 (16.7%)
Pleural effusion	2 (3.7%)
Pleural thickening	7 (13.0%)

Table 3 shows the frequency of thin-section CT findings between two groups. The frequency of thin-section CT abnormalities was higher in PMR with RA group (76%) than in PMR without RA group (62%) ($P<.01$). Ground-glass opacity (56%), traction bronchiectasis (44%), honeycombing (20%), architectural distortion (32%), and centrilobular nodules (32%) were significantly more common in the PMR with RA group than those in the PMR without RA group ($P<.01$) (Figs. 2–5). There was no significant difference in the other thin-section CT findings.

4. Discussion

Although the lung involvement of PMR has been sporadically reported, the association has been considered to be rare. The discrepancy between the incidence of PMR associated with lung disease in our patients (68.5%) and that in the previous reports almost certainly relates to the use of thin-section CT in the present study. In the previously published works, the diagnosis of lung disease mostly relied on clinical examination, plain film findings, and pulmonary function test alone. Thin-section CT can aid in the evaluation of interstitial lung disease (ILD) and may show subtle abnormalities when chest radiographic findings are normal, and this advantage has been illustrated in other collagen vascular disorders, including RA [10], progressive systemic sclerosis [11,12], polymyositis, dermatomyositis [13], and systemic lupus erythematosus [14].

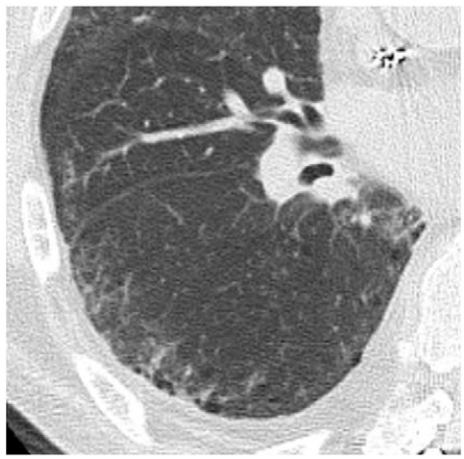

Fig. 1. A 66-year-old man with PMR without RA. Thin-section CT at level of right middle and lower lobes shows subpleural ground-glass opacity.