

Reversed halo sign in organizing pneumonia secondary to rheumatoid arthritis

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A 79-year-old non-smoker woman was admitted to our hospital following 15 days of unproductive coughing, moderate fever (38°C) and asthenia. She was diagnosed with rheumatoid arthritis five years before; the diagnosis was made based on the presence of morning stiffness, symmetric joint pain and swelling in fingers, wrists, elbows, and ankles, and a positivity for both rheumatoid factor (1/160) and anti-cyclic citrullinated peptide antibodies (52.4 U/ml); disease activity was high (disease activity score [DAS]-28 was 5.4). However, radiograph showed the absence of bone erosions. In addition, health assessment questionnaire (HAQ) score was 1. Therefore, the woman started treatment with hydroxychloroquine 400 mg daily, and methylprednisolone 8 mg daily. After 12 weeks of treatment, disease activity was moderate (DAS-28 was 3.8). However, the woman complained of frequent episodes of headaches during the last weeks; this was considered as an adverse effect of the hydroxychloroquine, and therefore the dose was tapered to 200 mg daily; within six months, the patient achieved stable low disease activity (DAS-28 was 2.8), HAQ score was 0, and radiograph confirmed the absence of bone erosions. Hydroxychloroquine 200 mg daily was continued, and methylprednisolone was tapered to 4 mg daily. At the time of the admission to our ward, the patient was under treatment with hydroxychloroquine 200 mg daily, and methylprednisolone 4mg daily. Physical examination revealed inspiratory crackles at both lung bases. Articular examination showed no joint swelling/pain except for both wrists. Arterial blood gas values were the following: pH 7.45, pO₂ 69 mmHg, pCO₂ 34 mmHg, SO₂ 94%. White blood count was in the normal range, C-reactive protein was 103 mg/dl and erythrocyte sedimentation rate was 60 mm/h. Biochemical variables were unremarkable. Chest x-ray showed bilateral

areas of consolidation. CT scan disclosed multiple and bilateral ground glass opacities surrounded by rings of consolidation (reversed halo sign), distributed mainly in the lower zones of the lungs (Figure 1). Bronchoalveolar lavage (BAL) fluid showed an increase in lymphocyte count (30%), a decrease in the CD4/CD8 ratio (0.5) and a low number of eosinophils (less than 5%). BAL cultures and serology were negative for bacteria, fungi, mycobacteria and viruses. The patient refused transbronchial biopsy. An open lung biopsy of the right lower lobe was performed, and pathological findings were consistent with organizing pneumonia (OP) (Figure 2). Therefore, the patient was diagnosed with organizing pneumonia associated with rheumatoid arthritis. Therapy with intravenous methylprednisolone (40mg/day) was begun and visible clinical improvements were seen within one week. The patient was

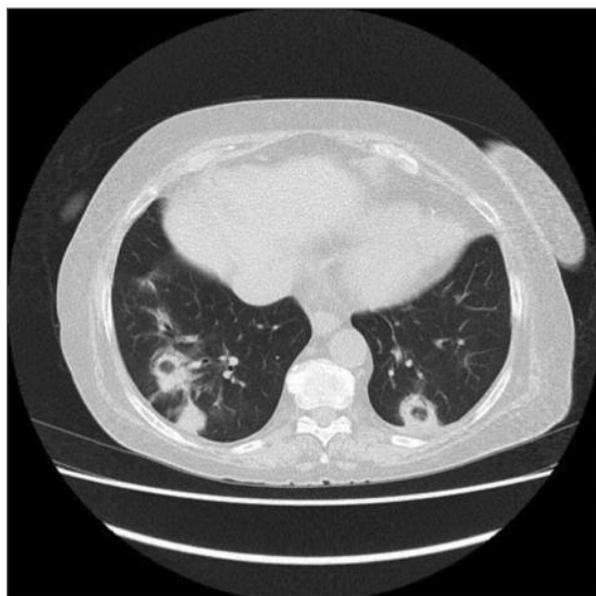


FIGURE 1. CT scan, performed during hospitalization before corticosteroid therapy, showing multiple reversed halo signs involving predominantly the lower lobes

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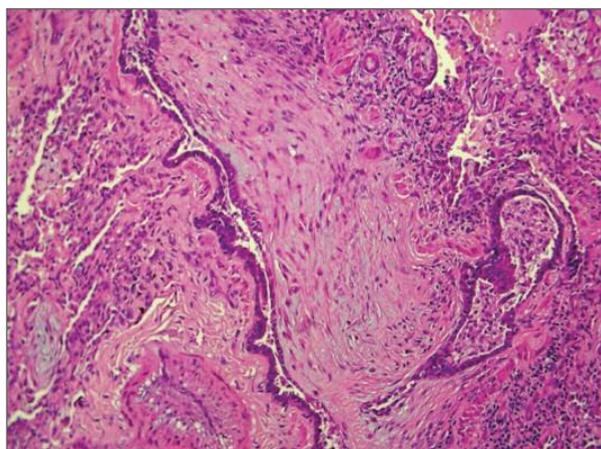


FIGURE 2. Open lung biopsy from the right lower lobe revealed mild interstitial collagen fibrosis; isolated foci of nonspecific chronic inflammatory bronchiolitis, with non-necrotizing granulomatous inflammation; aspects of myofibroblastic proliferation in the bronchiolar lumen; and the presence of endoalveolar foamy macrophages

discharged with oral methylprednisolone (16mg/day for two months with subsequent tapering). Three months later, she had complete resolution of her symptoms, and the CT scan showed nearly complete disappearance of the reversed halo signs bilaterally (Figure 3).

In this case, the clinical presentation, the CT scan abnormalities and the histological specimens^{1,2} were suggestive of OP. On CT scan, a reversed halo sign is defined as a focal, rounded area of ground-glass opacity surrounded by a ring of consolidation³. This radiological finding is due to concentric spread of inflammation starting from a given point in the lung, while centrally there is an improvement resulting in the ground-glass opacity⁴.

To our knowledge, in literature are reported several cases of both OP secondary to connective tissue diseases and OP presenting with reversed halo sign. On the other hand, this is the first case of bronchiolitis obliterans organizing pneumonia secondary to rheumatoid arthritis presenting with reversed halo sign.



FIGURE 3. CT scan, performed three months after methylprednisolone treatment, showing an almost complete resolution of pulmonary opacities

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