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Medical Imaging Quiz – Case 13

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A 45-year-old female was admitted to our hospital with productive cough of one month duration and fatigue. On physical examination, the patient's vital signs were within normal limits. Bilateral, small palpable lymph nodes were found in the neck. The breath sounds in both lung bases were slightly decreased. The laboratory results included an elevated white blood cell count of 12,500/μL (with increased lymphocyte concentration). Bronchoscopy and serological tests were negative.

Chest radiograph showed patchy opacities throughout both lungs (fig. 1), whereas computed tomography (CT) (figures 2, 3) showed multiple ground glass pulmonary opacities with ring-shaped air-space consolidation (reversed halo sign). According to the imaging findings along with the laboratory tests, the initial diagnosis was made which was confirmed by lung biopsy.

Comment

The typical imaging features of bronchiolitis obliterans organizing pneumonia (BOOP) on chest radiographs comprise patchy alveolar opacities, usually bilaterally, with predominance in the lower lung zones. The most frequent patterns of CT findings, respectively, have been reported to be bilateral patchy areas of densities, which vary ground-glass opacities to consolidation. The consolidation characteristically shows subpleural or peribronchovascular distribution, with middle and lower zonal predominance. These findings are seen in about 60% of the patients and are nonspecific.

A reversed halo sign on high-resolution CT (HRCT) scan is defined as central ground-glass opacity, which is surrounded by ring or crescentic-shape, dense air-space consolidation. Kim et al were the first who used this radiological term; however, this imaging finding had been described by Vouloudaki et al, 7 years earlier. Studies with biopsy confirmed BOOP patients who showed reversed halo sign in chest CT scans, revealed that the central ground-glass opacity corresponds histopathologically to the area of alveolar septal inflammation and alveolar cellular desquamation with a small amount of granulation tissue in the terminal air spaces, whereas the ring-shaped or crescentic peripheral air-space consolidation corresponds to the area of intraluminal organizing pneumonia and fibrosis within the distal air spaces.

In the retrospective case control study that performed by Kim et al,[2] the specificity of reversed halo sign for the diagnosis of BOOP was determined. The investigators identified the reversed halo sign in 1/5 of BOOP patients and none in non-BOOP patients. Thus, they concluded that the reversed halo sign, although not sensitive, it appears to be relatively specific to make a diagnosis of cryptogenic organizing pneumonia on CT and may be another diagnostic adjunct. However, the reversed halo sign has also been described in case reports, including pulmonary zygomycosis, pulmonary paracoccidioidomycosis, pulmonary tuberculosis, lymphomatoid granulomatosis and Wegener's granulomatosis.

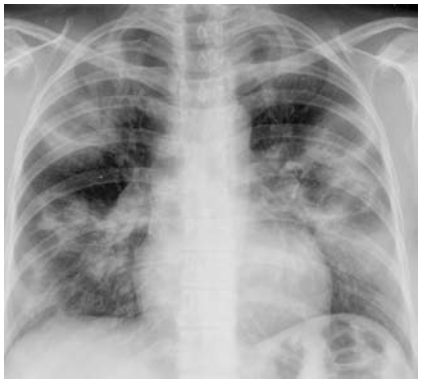

Figure 1

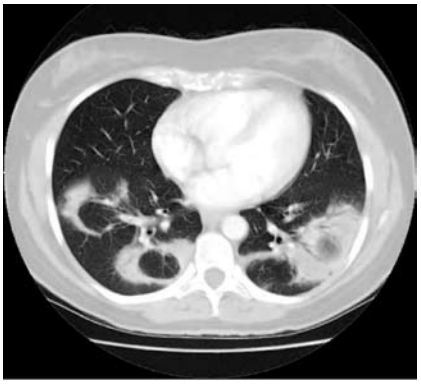

Figure 2

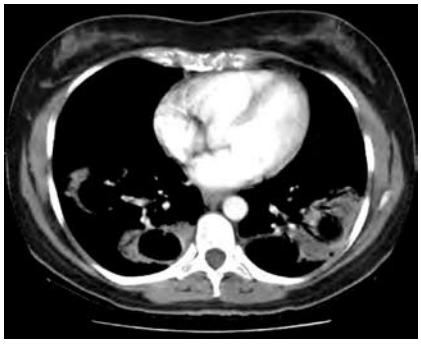

Figure 3

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