Incidentally detected lung lesions in a patient with Crohn's disease

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THE CASE

A 57-year-old man, nonsmoker, recently diagnosed as having Crohn's disease was referred to us for evaluation of an incidentally detected radiological lesion. As part of the workup for Crohn's disease, a computed tomography (CT) scan of the abdomen was taken, which revealed a few infiltrates in the visualized portion of both lower lobes. He denied having any significant respiratory symptoms apart from an infrequent dry cough. Clinical examination of the respiratory system revealed the presence of random, inspiratory crackles at both lung bases. A high-resolution CT (HRCT) scan was taken [Figure 1].

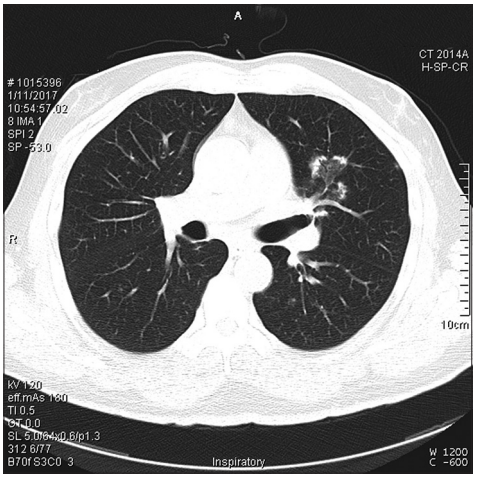

Figure 1: Name the radiological sign seen in this image? What is the most likely diagnosis?

QUESTIONS

Question 1: Name the radiological sign seen in this image?
Question 2: What is the most likely diagnosis?

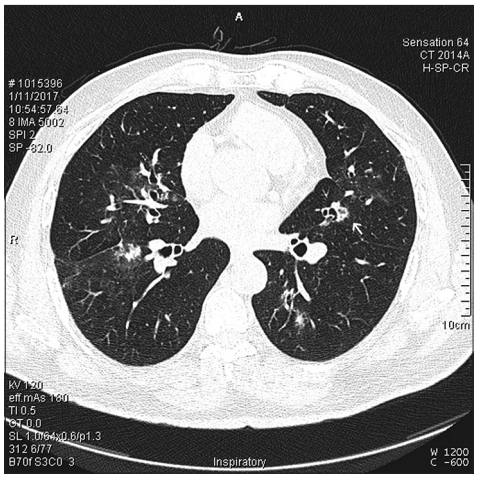

Figure 2: Axial section of high-resolution computed tomography scan of the thorax showing ground glass density surrounded by a ring of consolidation, in the superior segment of left lower lobe (white arrow)

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ANSWERS

1. The (Reverse Halo sign)

2. Cryptogenic organizing pneumonia.

DISCUSSION

The "Reverse halo sign" (also referred to as "reversed halo sign") is characterized by the presence of a central ground-glass opacity surrounded by a ring [Figure 2, white arrow] or crescent [Figure 3, white arrow] of dense airspace consolidation. It is also called atoll sign since it resembles a coral atoll. Although it was first described in cryptogenic organizing pneumonia (COP) and was thought to be diagnostic of the condition, it has been subsequently described in a variety of other conditions including fungal infections and adenocarcinoma of the lungs. But still, COP remains the most common condition in immunocompetent patients where the reverse halo sign is seen.[1] Table 1 lists the various conditions in which reverse halo sign is seen.[2]

Correlating the clinical details with the CT findings will help to narrow down the diagnosis.[2] For instance presence of this sign in a patient detected to have HIV is suggestive of *Pneumocystis jirovecii* infection, whereas the same in a patient who has undergone a solid organ transplant would mean pulmonary zygomycosis. If there are coexisting tree-in-bud lesions and centrilobular nodules, it points toward a diagnosis of tuberculosis. Its presence in a patient with Crohn's disease, as in our case would narrow down the differential diagnosis to COP.

Lung involvement is uncommon in Crohn's disease. It could either be due to the disease or sometimes due to treatment with drugs such as sulfasalazine and methotrexate. Pulmonary involvement could be upper airway involvement like glottic or subglottic stenosis, and tracheal stenosis, or small airway diseases like COP and diffuse panbronchiolitis or lung parenchymal involvement like interstitial lung disease or necrobiotic nodules.[3]

COP is a rare extraintestinal manifestation of Crohn's disease. This disease, which used to be previously referred to as bronchiolitis obliterans organizing pneumonia, is a subacute process characterized by the presence of granulation tissue in the bronchioles and alveolar ducts with extension into the alveoli. The "shared antigen theory" has been postulated to explain the occurrence of organizing pneumonia in Crohn's disease.[4] Patients commonly present with fever, cough, or chest pain. HRCT is the investigation of choice in the evaluation of diffuse lung diseases. The common findings in CT are ground glass opacities and parenchymal consolidation. Fleeting consolidation and the reverse halo sign are sometimes present, which are all the most suggestive of the diagnosis.

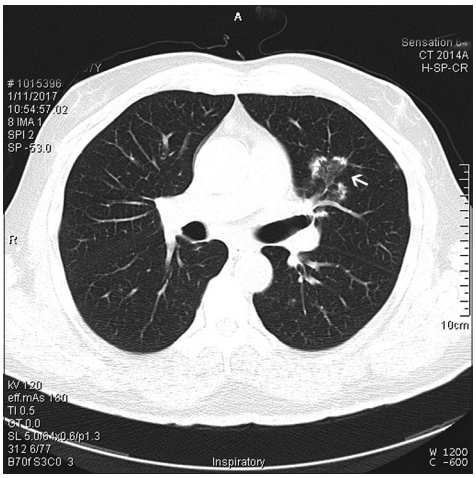

Figure 3: Axial section of high-resolution computed tomography scan of the thorax showing ground glass density surrounded by a crescent of consolidation, in the anterior segment of left upper lobe (white arrow)

Table 1: Differential diagnosis of the reverse halo sign

Causes	Conditions
Infectious diseases	Invasive fungal infections, for example, zygomycetes like mucor
	Endemic fungal infections, for example, paracoccidiodomycosis
	Pneumocystis jirovecii pneumonia
	Tuberculosis
	Bacterial pneumonia, for example, psittacosis, legionnaire's pneumonia
Noninfectious, nonneoplastic	Cryptogenic organizing pneumonia
	Nonspecific interstitial pneumonia
	Sarciodosis
	Lipoid pneumonia
	Wegener's granulomatosis
	Pulmonary embolism
Neoplastic diseases	Lymphomatoid granulomatosis
	Adenocarcinoma lung
	Metastatic disease
Posttreatment changes	Radio frequency ablation
	Radiation therapy

Since COP is always a diagnosis of exclusion, a flexible bronchoscopy, and lavage to exclude infections is mandatory. Sometimes, surgical lung biopsy is needed to confirm the diagnosis. This case is being presented to highlight the radiological finding of the "Reverse halo sign." A knowledge of the various etiologies where it occurs would give a clue to make the appropriate diagnosis, avoid unwanted investigations, and institute timely management. As illustrated in our case, the presence of this radiological sign in patients with Crohn's disease should make one think about the possibility of COP.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and

other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest
There are no conflicts of interest.

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