

# What is the cause of the reversed halo sign in this patient?

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A 37-year-old immunocompetent man presented to a local clinic with a 6-month history of pleuritic chest pain and dry cough. He had no background medical history and reported no other respiratory or constitutional symptoms. Clinical examination was unremarkable. A chest computed tomography scan revealed the reversed halo sign (RHS) in both upper lobes (Fig. 1), and serological investigations revealed strongly positive anti-proteinase 3 antibody, which is suggestive of granulomatosis with polyangiitis (GPA).

GPA is a small-vessel antineutrophil cytoplasmic antibody-associated vasculitis with multisystem involvement including the musculoskeletal system, skin, kidney and heart, but typically affecting the upper airway with nasal and ear symptoms.<sup>[1]</sup> The radiological pulmonary manifestations of GPA include nodules, ground-glass opacities and consolidation.<sup>[2]</sup>

The reversed halo comprises two parts: an inner area of ground-glass opacification and a complete or near-complete outer ring of surrounding consolidation, initially thought to be a specific feature of cryptogenic organising pneumonia.<sup>[3]</sup> The central area of ground-glass opacification represents an area of alveolar septal inflammation with non-disrupted alveolar air spaces, while the surrounding denser ring is consistent with debris in the alveolar space.<sup>[4]</sup>

In the past, the RHS was considered almost pathognomonic for cryptogenic organising pneumonia, but the differential diagnosis is vast and includes many non-infectious and infectious pathologies (Table 1). In immunocompromised patients, fungal pneumonias are a major concern.<sup>[4]</sup>

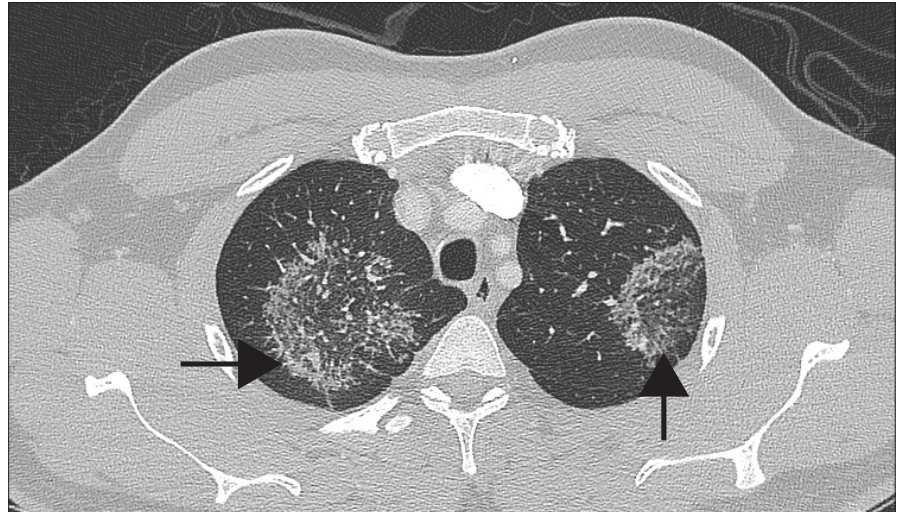


Fig. 1. Computed tomography scan image depicting the reversed halo sign, with outer ring of consolidation (rightward arrow) and inner ring of ground-glass opacification (upward arrow).

Table 1. Causes of the reversed halo sign<sup>[3]</sup>

Infectious	Non-infectious, benign	Malignant and related
Invasive or endemic fungal infection	Organising pneumonia	Lymphomatoid granulomatosis
<i>Pneumocystis jirovecii</i>	Nonspecific interstitial pneumonia	Lung adenocarcinoma
Tuberculosis	Sarcoidosis	Pulmonary metastases
Bacterial	Lipoid pneumonia	Post radiofrequency ablation or radiation
	Granulomatosis with polyangiitis	

The differential diagnosis of the RHS is vast and requires an in-depth clinical and radiological assessment in order to make a diagnosis. Although GPA may be uncommon, it remains an important consideration in the correct clinical context.

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