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## Case Report

### Pulmonary Sarcoidosis Mimicking Tuberculosis: Importance of the Galaxy Sign on Thoracic Computed Tomography<sup>☆</sup>

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#### ABSTRACT

Sarcoidosis and tuberculosis are two common granulomatous conditions that may share clinical and radiological presentations. The galaxy sign (sarcoid galaxy sign) is a characteristic radiological sign of pulmonary sarcoidosis on thoracic computed tomography (CT). We present the case of a patient with sarcoidosis that was initially misdiagnosed as tuberculosis, in whom the galaxy sign on CT was useful as it suggested the correct diagnosis.

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### Sarcoidosis pulmonar simulando una tuberculosis: importancia del signo de la galaxia en TC de tórax

#### RESUMEN

La sarcoidosis y la tuberculosis son 2 enfermedades granulomatosas frecuentes que comparten presentaciones clínicas y radiológicas. Entre los signos radiológicos característicos de sarcoidosis pulmonar descritos recientemente en la tomografía computarizada de tórax destaca el signo de la «galaxia». Presentamos un caso de sarcoidosis que inicialmente fue confundido con una tuberculosis en el que este signo radiológico fue útil para indicar el diagnóstico correcto.

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## Introduction

Tuberculosis and sarcoidosis are two common granulomatous chest conditions which share clinical and radiological presentations. As a result they are often diagnostic challenges for clinicians and radiologists.<sup>1,2</sup> Among the standard radiologic signs of sar-

coidosis recently described in chest CT is the sarcoid galaxy sign. This sign consists of a lung nodule formed by the confluence of multiple small-sized nodules which separate from one another as they move away from the centre, and thus portray a similarity to a galaxy of stars.<sup>3</sup> We present a case of sarcoidosis which was initially misdiagnosed as tuberculosis and for which the galaxy sign was useful for indicating correct diagnosis within the clinical and radiologic context.

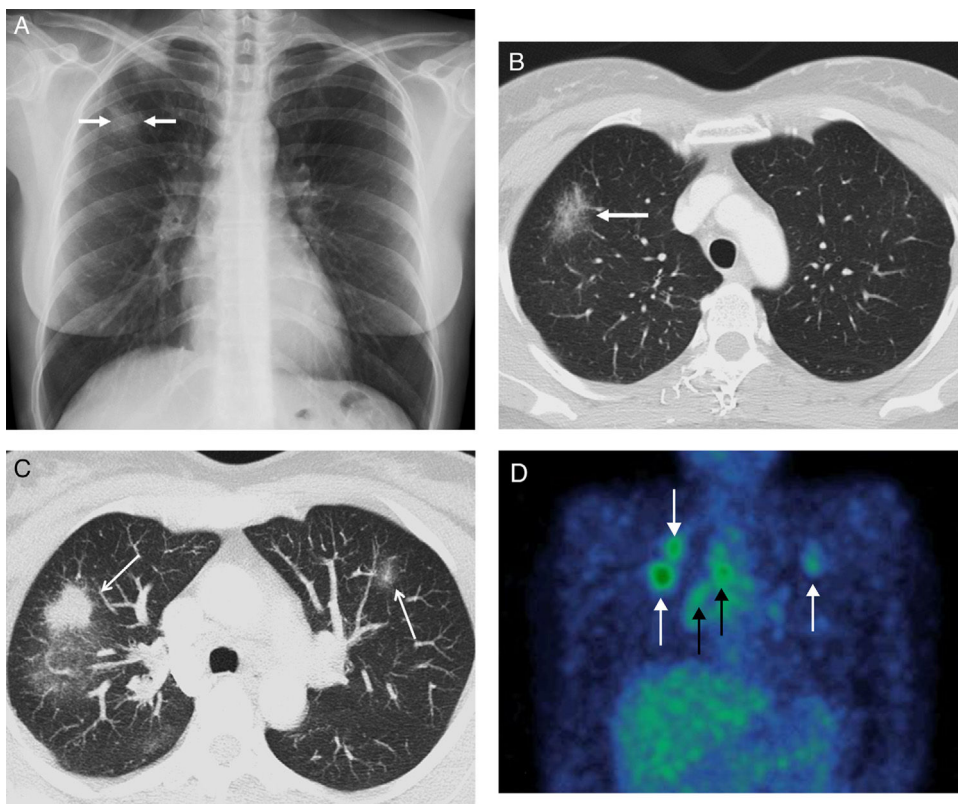
## Clinical Observation

We present the case of a 42 year-old woman, a non-smoker, of Brazilian origin, who presented with an intermittent cough,

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**Fig. 1.** (A) Chest X-ray where a nodular opacity in the URL is observed (arrows). (B) Axial image of the first chest CT (window of pulmonary parenchyma) in which a nodular lesion of ground-glass attenuation is observed (arrow). (C) MIP (maximum intensity projection) axial image of the second chest CT (window of pulmonary parenchyma) in which a radiological progression is observed despite antituberculosis treatment and the galaxy sign: solid nodular opacities (arrows) surrounded by multiple solid 1–2 mm nodules. (D) Coronal imaging of SPECT/CT with gallium in which uptake by the pulmonary nodules (white arrows) is determined and by the right pulmonary hilar adenopathies and ipsilateral mediastinum (black arrows).

for whom a chest X-ray showed nodular opacity in the URL (Fig. 1A). The patient had been studied some months previously by the primary care physician after non-cohabitant contact with a case of tuberculosis, and a positive tuberculin test. A chest CT scan confirmed pseudonodular opacity in the URL of ground-glass attenuation (Fig. 1B). No enlarged lymph nodes, tree-in-bud opacities or radiological stigmas (calcified granulomas, bronchiectases, calcified adenopathies) were observed from previous tuberculosis. Although the tuberculin test was positive, bronchoalveolar lavage (BAL) and a transbronchial biopsy did not show any microbiological or granuloma changes. Several sputum smears tested negative as well. Despite the absence of microbiological confirmation it was decided the patient was to be treated with 4 antituberculosis drugs. A control chest X-ray four months following treatment initiation showed radiological worsening with the appearance of bilateral parenchymal opacities. However, the patient did not present with new symptoms. A further chest CT scan detected enlarged lymph nodes without necrosis in the right pulmonary hilum and ipsilateral mediastinum, together with various dominant solid pulmonary nodules which characteristically presented with innumerable satellite 1–2 mm nodules around them (Fig. 1C). This radiological presentation is called the galaxy sign. No tree-in-bud images or cavitary lesions were observed. In view of these findings, stage II pulmonary sarcoidosis was diagnosed. Fine needle aspiration endobronchial ultrasound guided biopsy (EBUS) of the enlarged lymph nodes demonstrated the presence of non-necrotising epithelioid granulomas, confirming the clinical diagnosis of sarcoidosis. No microorganisms were isolated in the BAL. Single-photo emission CT (SPECT) with gallium (67Ga) was combined with CT (SPECT/CT) which showed metabolic uptakes in

the dominant pulmonary nodules and in the enlarged lymph nodes (Fig. 1D).

## Discussion

Tuberculosis and sarcoidosis are 2 granulomatous diseases which usually mostly affect the chest and which may present clinical, radiological and even histological similarities.<sup>1</sup> This peculiarity means that differential diagnosis between these 2 conditions presents a challenge to clinicians, and particularly in countries where the incidence of tuberculosis is high.<sup>2</sup> Studies have demonstrated that microbacterial antigens may trigger immunological response and eventually induce sarcoidosis.<sup>4</sup> However, patients with sarcoidosis treated with corticoids may present with tuberculosis as an infectious complication.<sup>5</sup> In our case, a non-cohabitant contact of the patient with a case of tuberculosis (some months earlier), together with a positive tuberculin test and an X-ray arousing suspicion were “sufficient” to justify treatment initiation with antituberculosis drugs, despite the absence of microbiological confirmation in sputum smears and the BAL. The appearance of non-necrotising enlarged lymph nodes in a further chest CT, the absence of standard tuberculosis radiological stigma (calcified adenopathies and granulomas, bronchiectasis, etc.) and above all the galaxy sign indicated that sarcoidosis was responsible for the clinical and radiological symptoms. This suspicion was finally confirmed in the EBUS performed on the patients several weeks later. The galaxy sign was originally described in 2002 in chest CT studies of patients with sarcoidosis (although it is not specific of this entity) and consists of a central dominant pulmonary nodule formed by the confluence of many small-sized nodules.<sup>3</sup>

These tiny nodules separate from one another as they fade away from the dominant nodule, forming satellite nodules which look like a galaxy of stars. Histologically the galaxy sign represents the coalescence of many interstitial granulomas which form an inseparable large dominant nodule. On the periphery, the granulomas are less concentrated and separate from one another, forming satellite nodules. Although this sign was initially described in patients with sarcoidosis (in fact the term “sarcoid galaxy” was coined) it has also been described as being associated with massive progressive fibrosis in patients with silicosis, with some pulmonary tumours and on occasion with active tuberculosis.<sup>6</sup> In the immense majority of cases the usefulness of the galaxy sign indicates a benign type of pulmonary tumour. The only exception to this would be that of a peripheral lung adenocarcinoma small in size, although in this case, bilateral and symmetrical adenopathies are not usually found in the mediastinum and the pulmonary hilar structures (as occurs in sarcoidosis), nor signs of infectious bronchiolitis with necrotic enlarged lymph nodes (as occurs in tuberculosis) nor radiological signs of a complicated type of silicosis. In our specific case it was not just the galaxy sign in isolation, that suggested correct diagnosis of sarcoidosis, but the combination of this radiological finding in a patient with radiological worsening of lung injuries despite having received antituberculosis treatment, together with the appearance of mediastinal adenopathies.

### Conclusions

We believe that in some clinical and radiological contexts, and especially if there is radiological progression despite antituberculosis treatment or if there is no microbiological confirmation of microbacteria or radiological stigmas which are typical of tuberculosis, the galaxy sign in chest CT may be highly useful for indicating diagnosis of sarcoidosis.

### Ethical Disclosures

**Protection of human and animal subjects.** The authors declare that for this research no experimentation has been carried out on human beings or animals.

**Confidentiality of data.** The authors declare that they have adhered to their centre of work on the publication of patient data.

**Right to privacy and informed consent.** The authors declare that no patient data appear in this article.

### Conflict of Interests

The authors have no conflicts of interests to declare.

### References

1. Gupta D, Agarwal R, Aggarwal AN, Jindal SK. Sarcoidosis and tuberculosis: the same disease with different manifestations or similar manifestations of different disorders. *Curr Opin Pulm Med.* 2012;18:506–16.
2. Mortaz E, Adcock IM, Barnes PJ. Sarcoidosis: role of non-tuberculosis mycobacteria and *Mycobacterium tuberculosis*. *Int J Mycobacteriol.* 2014;3: 225–9.
3. Nakatsu M, Hatabu H, Morikawa K, Uematsu H, Ohno Y, Nishimura K, et al. Large coalescent parenchymal nodules in pulmonary sarcoidosis: Sarcoid galaxy sign. *AJR Am J Roentgenol.* 2002;178:1389–93.
4. Gupta D, Agarwal R, Aggarwal AN, Jindal SK. Molecular evidence for the role of mycobacteria in sarcoidosis: a meta-analysis. *Eur Respir J.* 2007;30: 508–16.
5. Jamilloux Y, Valeyre D, Lortholary O, Bernard C, Kerever S, Lelievre L, et al. The spectrum of opportunistic diseases complicating sarcoidosis. *Autoimmun Rev.* 2015;14:64–74.
6. Aikins A, Kanne JP, Chung JH. Galaxy sign. *J Thorac Imaging.* 2012;27:W164.