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Commentary

Commentary on: The "cluster of black pearls" sign of sarcoid lymphadenopathy: a new sign on thin-section contrast-enhanced multidetector CT

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Introduction

The study of Venkata Ramanan *et al.*[1] published in this issue of the Journal, highlights the continuous quest to find new "pathognomonic" imaging signs that could obviate the necessity for histopathological sampling. Time is usually implacable in proving us wrong regarding pathognomonic imaging signs. Our imaging-guided biopsies would not have such an important role in current medicine, if that were not true. Despite that, identifying clues that could help us to narrow the diagnostic possibilities based on radiological signs is probably one of the most exciting aspects of our specialty.

A diagnosis of pulmonary sarcoidosis based on computed tomography (CT) findings is most frequently correct; however, that is only true for the stage II (bilateral hilar lymphadenopathy [BHL] plus pulmonary infiltrations) of this disorder. The imaging diagnosis of sarcoid at other stages may be much more difficult.

In their paper, Venkata Ramanan *et al.*[1] suggest that the "cluster of black pearls" (CBP) sign on enhanced CT (taken after 70 seconds delay), has a specificity of 98% and a sensitivity of 83% in distinguishing nodal sarcoid, from other causes of lymphadenomegaly. Accordingly to them, this sign was also useful on extra-thoracic lymphadenopathy.

A similar sign, the "dark lymph node sign" (DLNS), was observed by Chung *et al.*[2] in 49% of patients with nodal sarcoid. The term was proposed by them to describe the presence of internal low-intensity foci with a peripheral rim of hyperintensity on post-gadolinium three-dimensional gradient echo magnetic resonance imaging (MRI). Unfortunately, the CT images from their series were unenhanced; therefore, one cannot prove that DLNS on MRI is the same as CBP on CT. This granular inner structure of sarcoid lesions was also observed and described as the "sandpaper sign" in endobronchial ultrasound studies[3] and in pulmonary

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sarcoid within the structure of the reversed-halo sign by Marchiori *et al.*,[4] as a distinguishing feature from non-granulomatous lesions showing a reversed-halo sign. Marchiori *et al.* described that the outer denser structure of a sarcoid reversed-halo has a nodular appearance, although it is more homogeneous in cryptogenic organising pneumonia, and that the inner ground-glass element has a more foaming than nodular appearance in areas of lung infarction (personal communication).

Other imaging characteristics of sarcoidosis may also help. Gwayne-Cain and Hansel[5] studied the distribution of calcification in sarcoidosis. They observed that the anterior mediastinal nodes (station 3A) were calcified in <10% of cases. A study published by Patil and Levin[6] also confirmed that it is unusual for the anterior mediastinal nodes to be involved in sarcoidosis. In their series, no case showed lymphadenopathy in nodal station 3 and only 17.5% of the patients had enlarged nodes in station 6. Comparing nodal sarcoid and lymphoma, Mehrian and Erahimzadeh[7] observed that only 7.6% of their patients presented with lymphadenopathy at station 3A (pre-vascular), as opposed to 81% in patients with lymphoma. Niimi *et al.*[8] had shown that stations 10R, 7, 4R, and 5 are the most commonly affected in patients with chronic diffuse lung diseases, including sarcoid.

Additionally, one must remember that the finding of non-caseating epithelioid cell granulomas on histopathological specimens defines the diagnosis of sarcoidosis as an autonomous disease/disorder. There are other known causes of local sarcoid-like granulomatous reaction, including drugs, malignancy, and infectious diseases. Local sarcoid-like reactions can be seen in nodal stations that drain a neoplasm or a site of chronic inflammation and in patients who have undergone chemotherapy or radiotherapy.[9] An interesting study assessing the finding on using combined 2-[^{18}F]-fluoro-2-deoxy-D-glucose (FDG) positron-emission tomography (PET)/CT in malignancy-related sarcoid-like reaction has been published by Chowdhury *et al.*[10] The imaging or histopathological diagnosis of sarcoidosis must also take into account the clinical picture, as described in a large series of typical and atypical sarcoidosis.[11]

Although time usually fades away the initial enthusiasm about a new imaging sign, one should remember that the role of imaging diagnosis in medicine depends on our knowledge and identification of any clues/signs that could be investigated to increase diagnostic confidence.

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