Role of Metabolic Imaging in Detecting Cardiac Involvement in Sarcoidosis

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Cardiac sarcoidosis is considered to be a significant cause of advanced atrioventricular (AV) block or ventricular tachyarrhythmia (VT) in the young to middle-aged population. The Heart and Rhythm Society (HRS) therefore recently raised the clinical importance of detecting cardiac involvement of sarcoidosis (CS). Although the total number of sarcoidosis cases in the Japanese population is limited, the frequency of cardiac involvement is significantly higher in the Japanese population than in other populations. Therefore, Japanese investigators have worked intensively to develop relevant diagnostic approaches, especially those involving 18F-fluorodeoxyglucose (18F-FDG) positron emission tomography (PET).

18F-FDG PET is a highly sensitive approach for detecting CS but with a relatively low specificity because of the propensity for physiological myocardial 18F-FDG uptake. This being the case, JSNC recommendations based on recent studies have suggested preparation involving long fasting and diet modification prior to 18F-FDG PET studies. Given the challenges associated with 18F-FDG preparation, alternative diagnostic approaches for CS are being sought.

In this issue of the Journal, Momose et al assess the diagnostic value of 123I-β-methyl-p-[123I]-iodophenyl-pentadecanoic acid (123I-BMIPP) single-photon emission computed tomography (SPECT) imaging in patients with suspected CS. A 123I-BMIPP abnormality reflects the myocardial metabolic shift often seen after the resolution of severe myocardial ischemia, so-called “ischemic memory imaging”, and is considered to be a sign of past myocardial injury. The usefulness of 123I-BMIPP for detecting CS has previously been suggested, but the strength of the current study by Momose et al lies in the fact that they compared 123I-BMIPP findings to those determined using current state-of-the-art diagnostic testing.
Comparing 123I-BMIPP findings with the findings of active inflammation as determined through 18F-FDG PET and those of tissue fibrosis as determined using 201thallium myocardial perfusion imaging or cardiac magnetic resonance imaging (CMR), it is apparent that 123I-BMIPP findings may reflect the early phase of myocardial injury following the active inflammation phase (Figure). 123I-BMIPP defects associated with early myocardial injury may appear earlier than the development of scar tissue. The current findings may have 2 important clinical applications. First, 123I-BMIPP may have a complementary diagnostic role for patients with suspected CS who have difficulties with 18F-FDG PET preparation or for patients who have non-diagnostic 18F-FDG PET results because of physiological myocardial 18F-FDG uptake. Second, a 123I-BMIPP defect may contribute to a treatment strategy because a key treatment goal is to prevent scar formation in myocardial tissue. Evaluation of these 2 important clinical issues should therefore be the next step.

Isolated CS, defined as sarcoidosis in patients lacking clinically apparent extracardiac disease, is difficult to detect because of the poor sensitivity of endomyocardial biopsy. Using the current diagnostic imaging modalities, a recent epidemiological study determined the existence of a number of isolated CS cases. The study further raised the important role played by imaging modality. The current study by Momose et al evaluated 12 patients with isolated CS. Patients with CS and those with isolated CS had similar backgrounds, and the frequency of subepicardial late gadolinium enhancement was similar in those with isolated CS and those with known extracardiac sarcoidosis. In addition, the similarities in the 123I-BMIPP and 201thallium SPECT defect scores between the 2 groups may indicate the possible diagnostic value of these radionuclide imaging approaches. This finding further adds to the importance of the current study.

Despite the important findings by Momose et al, several critical issues remain. First, the study design was retrospective, and there may have been selection bias for the study population. Second, not all patients completed the imaging studies. Third, the authors showed only the 123I-BMIPP SPECT abnormalities that were similar to both the isolated CS group and the CS with known extracardiac sarcoidosis group. Therefore, the diagnostic value of 123I-BMIPP SPECT for detecting isolated CS remains unclear. Despite these limitations, the current study by Momose et al provides several important hypotheses with regard to detecting CS using fatty acid metabolism imaging together with myocardial perfusion imaging. However, these questions remain open and these issues require further prospective studies.

Based on the recent HRS recommendation, the importance of diagnosing CS is well recognized in the clinical setting. With the increasing use of 18F-FDG PET and CMR, we have come to recognize the issues and difficulties associated with these imaging approaches. In this regard, the findings of Momose et al represent a significant contribution towards establishing additional diagnostic approaches for patients with CS.

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Conflicts of Interest

None.

References

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