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IMAGE OF THE MONTH

Radiation-induced myocardial damage indicated by focal defect on ^{123}I-MIBG SPECT

Takashi Norikane[1] · Yuka Yamamoto[1] · Yasukage Takami[1] · Katsuya Mitamura[1] · Hanae Arai-Okuda[1] · Ryosuke Tani[2] · Yoshihiro Nishiyama[1]

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We present a 57-year-old woman with gradually worsening heart failure (Fig. 1). She had a history of left breast cancer treated with surgery, chemotherapy, and radiotherapy 4 years previously. Echocardiography, coronary artery angiography (CAG), ^{123}I-metaiodobenzylguanidine (^{123}I-MIBG) scintigraphy, and ^{18}F-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography (PET)/computed tomography (CT) were performed for diagnosis. Echocardiography demonstrated diffuse hypokinesis in the left ventricular wall, and regional severe hypokinesis in the anteroseptal wall and apical wall (*not shown here*). CAG showed no significant coronary artery stenosis (*not shown here*). Transaxial early ^{123}I-MIBG single photon emission computed tomography (SPECT)/CT image revealed a focal defect on the apex and distal anterior wall (*A*). Focal increased ^{18}F-FDG uptake at the same location was observed on the ^{18}F-FDG PET/CT (*B*). A mismatch between bull's eye image of delayed ^{123}I-MIBG uptake and ^{18}F-FDG uptake was observed, and the low uptake area on delayed ^{123}I-MIBG bull's eye image was wider than the high uptake area on ^{18}F-FDG bull's eye image (*C*). The area of low ^{123}I-MIBG uptake and high ^{18}F-FDG uptake approximately corresponded to the irradiated myocardium field (*D*) and the anteroseptal wall with severe hypokinesis showed by echocardiography. .

The myocardium is relatively resistant to radiation. However, as the survival rate of patients with malignancy has improved, radiation-induced myocardial damage has become one of the serious complications of radiotherapy in patients with thoracic malignancies. Radiation exposure leads to various types of heart insufficiency including microvascular disorder, coronary artery disease, myocardial fibrosis, and valvular disease. In previous reports, nuclear medicine imaging such as perfusion study [1, 2], ^{123}I-BMIPP scintigraphy [3, 4] and ^{18}F-FDG PET/CT [5, 6] demonstrated radiation-induced myocardial damage. In the present case, ^{123}I-MIBG SPECT also probably demonstrated radiation-induced myocardial damage as an innervation lesion, with the myocardial injury area seeming to be wider than the ^{18}F-FDG uptake area.

This article is part of the Topical Collection on Image of the Month

✉ Takashi Norikane
t-nori@kms.ac.jp

[1] Department of Radiology, Faculty of Medicine, Kagawa University, 1750-1 Ikenobe, Miki-cho, Kita-gun, Kagawa 761-0793, Japan

[2] Department of Cardiorenal and Cerebrovascular Medicine, Faculty of Medicine, Kagawa University, Kagawa, Japan

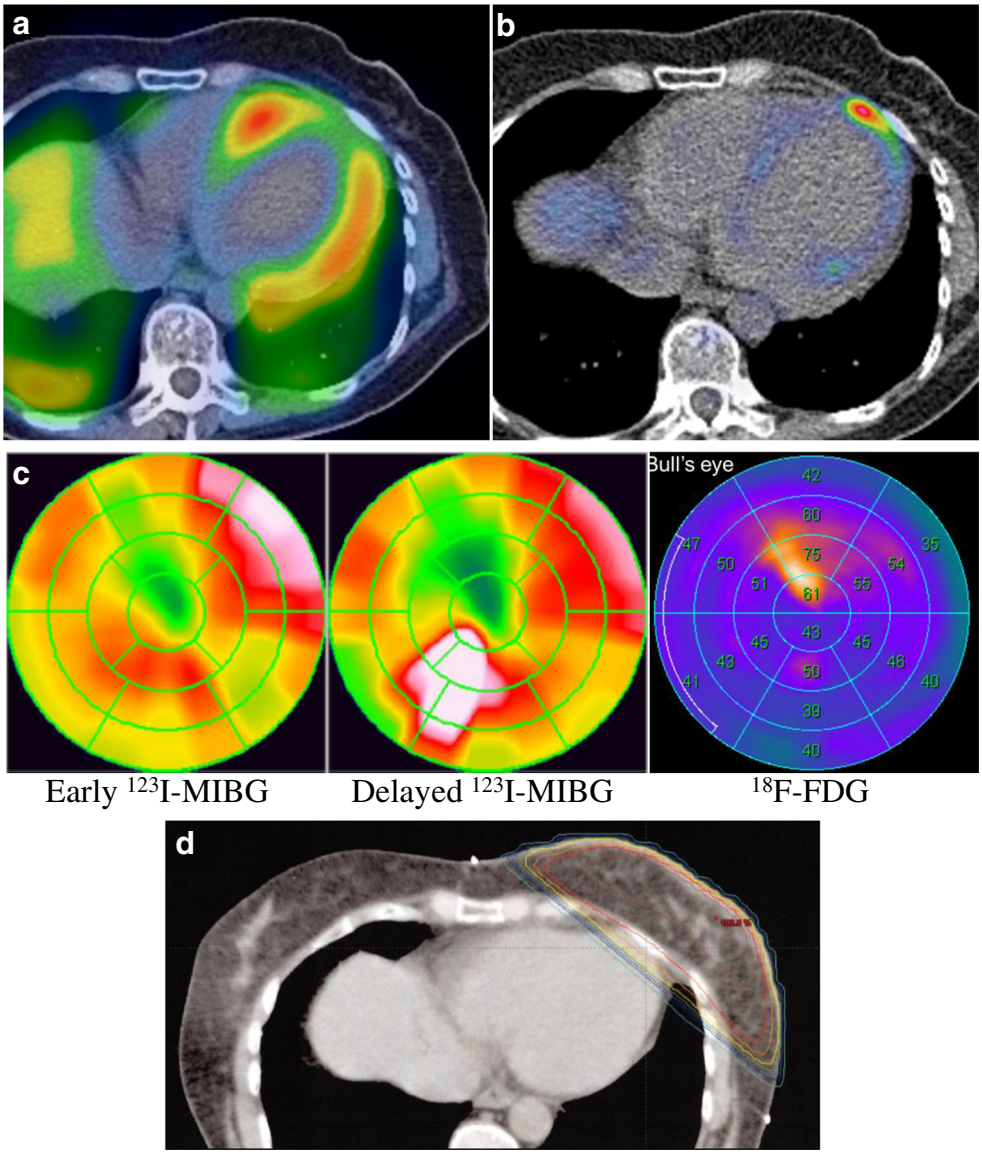

Fig. 1. Results of procedures performed.

Compliance with ethical standards

Conflict of interest The authors declare that there is no conflict of interest regarding the publication of this article.

Informed consent Written informed consent was obtained from the patient for publication of this case report and accompanying image.

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