

EDITORIAL POINT OF VIEW

Toward Standardization of Imaging Time Points for ¹²³I-MIBG Scan

Ichiro Matsunari, MD, PhD

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Abstract

In this issue of the journal, Dimitriu-Leen et al. addressed a question of whether an early late imaging (e.g., 1, 2, or 3 hours after tracer injection) can be used as an alternative to 4 hour ¹²³I-MIBG imaging in terms of heart-to-mediastinum uptake ratio (HMR) and washout rate (WR). They found that, by applying the linear regression model, HMR and WR obtained at 3 hours after injection can accurately estimate those at 4 hours. Additionally, the parameters estimated at 2 hours showed a close correlation to those at 4 hours. This study shows that a shorter imaging protocol is feasible without loss of clinical significance as compared to 4 hour imaging, which is certainly more convenient for the patients. More importantly, collected ¹²³I-MIBG imaging data from different acquisition protocols can directly be compared and exchangeable. Because we now have tools for standardization of data derived from different camera systems, the results of this study would further facilitate the use of ¹²³I-MIBG imaging as a reliable aid for risk stratification of HF patients.

Keywords: ¹²³I-MIBG, Heart-to-mediastinum ratio, Sympathetic neuron, Washout rate

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Despite recent advances in therapeutic options, heart failure (HF) continues to be a major cause of mortality and morbidity in many developed countries. It is known that sympathetic neuronal function plays an important role for the pathogenesis of HF. In this context, imaging biomarkers using ¹²³I-metaiodobenzylguanidine (¹²³I-MIBG) provides a unique opportunity for assessing cardiac sympathetic neuronal function. Heart-to-mediastinum uptake ratio (HMR) as well as washout rate (WR) in late image are considered to be a reliable marker of prognosis in HF patients (1). Before its wide clinical use, however, standardization of imaging parameters is critical because there are many factors that can affect HMR and WR measurements such as collimator choice, regions of interest setting, and imaging time points after tracer injection. In view of the imaging time points, the majority of published results from Europe and USA typically use a 4 hour imaging (2,3), whereas those from Japan a 3 hour imaging (1). This

difference may partially explain for the higher HMR cutoffs to identify high risk HF patients in studies from Japan (1) than those from Europe and USA (3,4). Such a difference in imaging time points becomes even more critical when measuring WR. In this issue of the journal, Dimitriu-Leen et al. (5) addressed a question of whether an early late imaging (e.g., 1, 2, or 3 hours after tracer injection) can be used as an alternative to 4 hour ¹²³I-MIBG imaging in terms of HMR and WR. They found that, by applying the linear regression model proposed by Okuda et al. (6), HMR and WR obtained at 3 hours after injection can accurately estimate those at 4 hours. Additionally, the parameters estimated at 2 hours showed a close correlation to those at 4 hours. Therefore, they concluded that the accurate estimation of the actual HMR and WR at 4 hours is possible using acquisition data at 2 and 3 hours. Furthermore, they also demonstrated in this (5) and their prior study (7) that HMR is rather stable between 2 and 4 hours, whereas WR increases as the scan time is delayed. For this reason, they recommend to use a 3 hour rather than 2 hour

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Ichiro Matsunari

Division of Nuclear Medicine, Department of Radiology, Saitama Medical University Hospital, 38 Morohongo, Moroyama, Iruma-gun, Saitama, Japan 350-0495

E-mail: m_ichiro@saitama-med.ac.jp

imaging as an alternative to 4 hour imaging.

This study has 2 clinically relevant implications. Firstly, a shorter imaging protocol is feasible without loss of clinical significance as compared to 4 hour imaging, which is certainly more convenient for the patients. Secondly, collected ^{123}I -MIBG imaging data from different acquisition protocols can directly be compared and exchangeable. This is particularly important for multi-center studies and meta-analysis, resulting in more robust evidence for clinical use of ^{123}I -MIBG imaging. To date, there is no data available in which data from Western countries and Japan are combined on individual patient basis to construct a world-wide database. Because we now have tools for standardization of data derived from different camera systems (8,9), the results of this study would further facilitate the use of ^{123}I -MIBG imaging as a reliable aid for risk stratification of HF patients.

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Conflicts of interest

None

Reprint requests and correspondence:

Ichiro Matsunari, MD, PhD

Division of Nuclear Medicine, Department of Radiology,
Saitama Medical University Hospital, 38 Morohongo,
Moroyama, Iruma-gun, Saitama, Japan 350-0495

E-mail: m_ichiro@saitama-med.ac.jp

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