

Identification of Non-ST-Segment Elevation Myocardial Infarction by Virtual Monochromatic Imaging

Junji Mochizuki; Takeshi Nakaura, MD, PhD; Mitsuru Matsukura, MD, PhD;
Yoshiki Hata, MD, PhD; Toshinori Hirai, MD, PhD

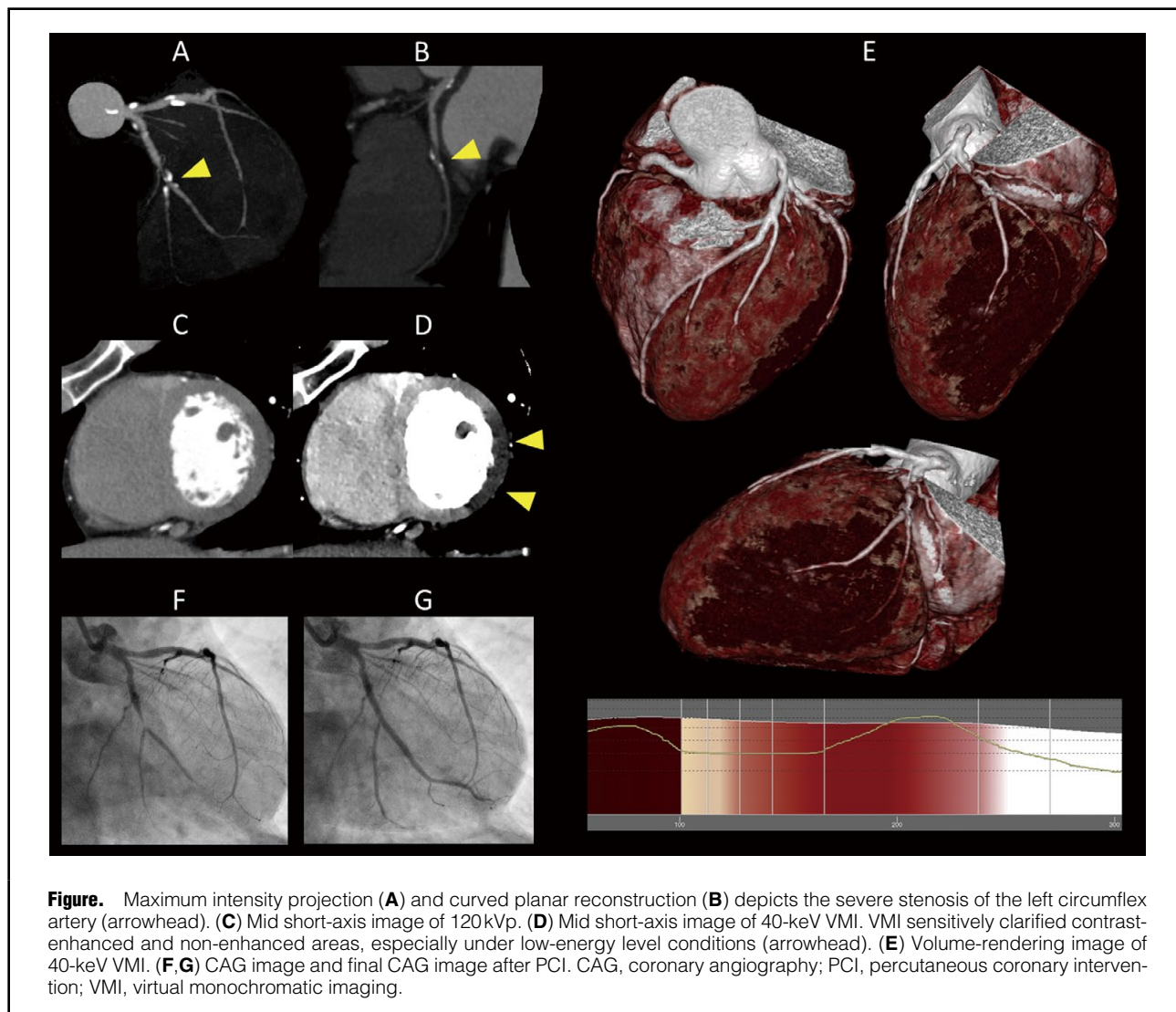


Figure. Maximum intensity projection (A) and curved planar reconstruction (B) depicts the severe stenosis of the left circumflex artery (arrowhead). (C) Mid short-axis image of 120kVp. (D) Mid short-axis image of 40-keV VMI. VMI sensitively clarified contrast-enhanced and non-enhanced areas, especially under low-energy level conditions (arrowhead). (E) Volume-rendering image of 40-keV VMI. (F,G) CAG image and final CAG image after PCI. CAG, coronary angiography; PCI, percutaneous coronary intervention; VMI, virtual monochromatic imaging.

Received November 24, 2020; revised manuscript received December 23, 2020; accepted January 8, 2021; J-STAGE Advance Publication released online January 30, 2021 Time for primary review: 23 days

Department of Radiology (J.M.); Department of Cardiology (Y.H.), Minamino Cardiovascular Hospital, Tokyo; Department of Diagnostic Radiology, Graduate School of Medical Sciences, Kumamoto University, Kumamoto (T.N., T.H.); and Department of Vascular Surgery, The University of Tokyo, Tokyo (M.M.), Japan

Mailing address: Junji Mochizuki, MSc, RT, Department of Radiology, Minamino Cardiovascular Hospital, 1-25-1 Hyoue, Hachioji, Tokyo 192-0918, Japan. E-mail: mochizuki.j@minaminohc.jp

All rights are reserved to the Japanese Circulation Society. For permissions, please e-mail: cr@j-circ.or.jp
ISSN-2434-0790



Dual-layer dual-energy computed tomography (DL-DECT) allows the construction of many different types of unique images. One such approach is virtual monochromatic imaging (VMI), and low-energy VMI can enhance the contrast effect of iodine-based contrast materials.¹ This case report describes the use of low-energy VMI to assess hemodynamic changes in an area of an infarcted myocardium. A 69-year-old man was evaluated for severe chest pain. No abnormalities were noted on ECG. Laboratory testing showed elevated cardiac troponin. Coronary computed tomography was performed using DL-DECT (iQon Spectral CT, Philips Healthcare, Best, The Netherlands) and detected severe stenosis in the left circumflex artery (LCX) (**Figure A,B**). Using the conventional approach, computed tomography attenuation values were 98.2 ± 10.9 Hounsfield units (HU) in the normal myocardium and 50.3 ± 10.1 HU in the infarct region (**Figure C, Supplementary Figure**); however, measurements using 40-keV VMI were 219.7 ± 12.7 HU and 52.1 ± 11.9 HU, respectively (**Figure D, Supplementary Figure**), showing a marked increase with the use of VMI (**Figure E**). Therefore, low-energy VMI may be a useful

option to reveal abnormalities associated with myocardial perfusion. The patient underwent coronary angiography and percutaneous coronary intervention of the LCX (**Figure F,G**).

Disclosure

None.

IRB Information

This study was approved by Ethics Committee of Minamino Cardiovascular Hospital (reference no. MJ-004).

Reference

1. Tanoue S, Nakaura T, Iyama Y, Iyama A, Nagayama Y, Yoshida M, et al. Diagnostic performance of dual-layer computed tomography for deep vein thrombosis in indirect computed tomography venography. *Circ J* 2020; **84**: 636–641.

Supplementary Files

Please find supplementary file(s);
<http://dx.doi.org/10.1253/circrep.CR-20-0127>