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Tetsuya Amano[1], Norihiro Shinoda[2], Ayako Kunimura[2], Ken Harada[2] Tadayuki Uetani[2] Hiroaki Takashima[1] Hirohiko Ando[1] Soichiro Kumagai[1] Masahiko Gosho[3], Toyoaki Murohara[4]

Impact of noninvasive mathematical analysis of spectral electro-cardiographic components on the prediction of recurrent cardiac ischemic events after coronary intervention

Background: The 1-year cumulative rates of adverse cardiovascular events after coronary intervention are around 15%. Guidelines for the assessment of recurrent cardiac ischemic events recommend a risk assessment and noninvasive testing. The aim of this study was to evaluate the recurrent cardiac ischemic events after successful coronary intervention through the Multifunction Cardiogram (MCG).

Methods and Results: A total of 45 consecutive patients who underwent coronary intervention were enrolled. The MCG (Toray Medical Co. Ltd.) and associated computer with the MCG software version 2.1.1 (Premier Heart Japan Inc.) were used. An electrocardiogram was performed with leads II and V5 for 82 seconds, and 3-5 tests were taken at each session. Only those tests with marginal or better quality trace which was checked automatically by the system were sent for analysis to PH LLC data center through internet. The serial data for MCG score were obtained and analyzed just after coronary intervention and at follow up. The recurrent cardiac ischemic events included recurrence at the original culprit site and nonculprit lesions. During the follow up period (median: 305 days), eight recurrent cardiac ischemic events occurred, 6 for events related to nonculprit lesions and 2 for events related to restenosis. Serial changes in MCG score at baseline and follow up (delta MCG) was significantly increased in patients with events compared to those without events (2.4 [1.4-2.9] vs. 0 [-0.3-0.3], p=0.016). With the Cox proportional hazard model after adjusting for confounding factors, delta MCG (OR 1.89, 95% CI 1.08-3.31, p=0.027) proved to be an independent and significant predictor for the recurrent cardiac ischemic events. The area under the receiver operating curve (ROC) analysis for delta MCG in the prediction of adverse events was 0.94(0.89-1.00), and the optimal

cutoff value identified through ROC analysis was 1.0, with a sensitivity of 94,3.0% and a specificity of 97.3%.

Conclusions: The MCG may be useful for the prediction of recurrent cardiac ischemic events after coronary intervention, especially in patients who are not able to exercise and have low kidney function.

1 Department of Cardiology,

Aichi Medical University,

Nagakute, Japan

2 Department of Cardiology,

Chubu Rosai Hospital,

Nagoya, Japan

3 Advanced Medical Research

Center, Aichi Medical

University, Nagakute, Japan

4 Department of Cardiology,

Nagoya University Graduate

School of Medicine, Nagoya,

Japan