

**Quantification of area and percentage of infarcted myocardium by
single photon emission computed tomography with thallium-201:
A comparison with serial serum CK-MB measurements**

Tomoaki NAKATA, Tetsuya NOTO, Kikuya UNO, Atsushi WADA, Nobuichi HIKITA,
Shigemichi TANAKA, Tetsuro SHOJI,* Masahiro KUBOTA,** Takatoshi TSUDA,**
Kazuo MORITA** and Osamu IMURA

*The Second Department of Internal Medicine, *Division of Emergency and Critical Care and
**Department of Radiology, Sapporo Medical College*

In order to quantify the size of the infarcted myocardium, two kinds of data processing techniques were applied to single photon emission computed tomography (SPECT) with thallium-201 and its clinical reliability was evaluated by comparing it with the infarct sizing procedure with the serial serum creatine kinase-MB measurements in 14 patients with acute myocardial infarction. After maximum-count circumferential profile analysis, short axis images were reformatted into an unfolded surface map and a bull's eye view map. The SPECT-determined infarct size was defined as the area or the percentage of hypoperfused myocardium of which the profile count was less than the mean minus 2SD derived from 8 normal subjects. The infarct area was calculated from the number of pixels with an abnormal count and expressed in an unfolded surface map. The percentage was calculated from the number of abnormal profile points and displayed in a bull's eye view map. A high linear correlation was observed between the enzymatically determined infarct size and the infarct area or the percentage ($r=.947$, $r=.872$, respectively), despite underestimations in 2 patients with accompanying right ventricular infarction and overestimations in 2 patients with prior anterior infarction. Moreover, a close negative correlation was found between the left ventricular ejection fraction and the infarct area or the percentage ($r=.836$, $r=.821$, respectively).

Thus, the semiautomatic techniques for processing thallium-201 SPECT images might contribute to the quantitative estimation and display of infarcted myocardium and have high clinical reliability.

Key words: Thallium-201, Single photon emission computed tomography, Infarct size, Quantitative analysis, Circumferential profile analysis