
We reported the reliability of left ventricular ejection fraction (EF) with nuclear-stethoscope (NS) which described left ventricular time activity curve at real time, last year.

In this study, we evaluated the reliability and the limitation of EF, especially lower EF, with NS at rest and during exercise in comparision with gated camera method. We also analyzed the correlation between EF, cardiothoracic ratio (CTR) and stroke volume measured by the dye-dilution method. The result showed that 1) Good correlation between EF measured by NS and gated camera was found (r=0.90 p<0.001). The lower EF measured by NS was slightly overestimated more than EF by gated camera. 2) During exercise, EF had good correlation between NS and gated camera (r=0.75 p<0.001). 3) In patients with CTR more than 50%, the only EF was decreased, but with more than 60%, the both EF and stroke volume were dropped down.

We clarified that NS was very useful for evaluating left ventricular performance not only at rest but during exercise.


The nuclear stethoscope (NS) is an apparatus provided as a safe, noninvasive and repeatable method for determining left ventricular ejection fraction (EF). The EF by NS is reliable and useful for evaluating cardiac performance at rest and during exercise. In this study, we applied NS to the assessment of cardiac performance with exercise testing in cardiac patients. In 27 cardiac patients and 24 normal healthys, the EF by NS and hemodynamic parameters were measured during the multistage ergometric stress testing the supine position. As a result, the hemodynamics and EF during exercise was more useful for evaluating the cardiac performance than at rest. And the severity estimated by change of hemodynamics during exercise, almost, paralleled to that by the criteria of NYHA. But, both was not always agreed.

In conclusion, it was revealed that the evaluation of change of hemodynamics and EF during exercise stress testing was useful in evaluating the cardiac performance.


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The Nuclear Stethoscope is able to obtain a high temporal resolution (10ms per data point) left ventricular volume-time curve, the rates and times of filling phase can be easily calculated by the aid of the system's adjustable cursors. We used the Nuclear Stethoscope to assess peak filling rate (PFR) and time to peak filling rate (TPFR) as indexes of left ventricular diastolic performance in 6 normals and 39 patients with coronary artery disease (CAD). CAD patients consisted of three groups without previous myocardial infarction (MI) (Group AP:N=9) and with previous MI, both normal<50% ejection fraction (Group MI-1:N=14) and abnormal<50% ejection fraction (Group MI-2:N=16).

1) PFR were significantly depressed in Group MI-2 (1.98±0.69 EDV/sec: P<0.01), but not significantly different between normals (2.88±0.23) and Group AP (3.47±0.62), Group MI-1 (3.41±0.52).
2) TPFR were also not significantly different between normals (152±50 msec) and other groups (Group AP:180±25, Group MI-1:162±43, Group MI-2:165±70).
3) In these all patients, ejection fraction and PFR correlated closely (r=0.88).


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