

# iMAGE

LETTERS TO THE EDITOR

## Pocket-Sized Echo for Evaluation of Mitral and Tricuspid Regurgitation

Advances in electronic miniaturization and digital techniques have resulted in the advent of portable transthoracic echocardiography (pTTE) imaging devices in the area of echocardiography. A pocket-sized pTTE imaging device that has color Doppler imaging capability has been recently introduced into clinical practice. This study aimed to examine the feasibility and accuracy of the pocket-sized pTTE in the assessment of the severity of mitral regurgitation (MR) and tricuspid regurgitation (TR).

One hundred and eighty-six consecutive patients (ages  $66 \pm 19$  years; 107 male) underwent standard transthoracic echocardiography (sTTE) and pTTE. Initially, pTTE was performed by a well-trained sonographer for 121 patients. For the later 65 patients, pTTE was examined by a less experienced sonographer who had 6 months of experience in echocardiography, with the number of TTE examinations compatible with American Society of Echocardiography training level 1 (1). These sonographers were blinded to sTTE results and all clinical information.

This study was approved by the ethics committees of Osaka Ekisaikai Hospital and Okayama University. Pocket-sized pTTE was performed using the Vscan (GE Medical Systems, Milwaukee, Wisconsin). The apical 4-chamber view by the color Doppler images was obtained with sTTE and pTTE, respectively. The ratio of regurgitant jet area to atrial area was then calculated for MR (%MR) and TR (%TR). The severity of regurgitation was graded as mild if it occupied <20%, moderate if between 20% and 34%, and severe if >34% in TTE examination.

Linear regression analysis was used for the correlation of variables of interest. Differences were considered significant at  $p < 0.05$ . Differences between sTTE and pTTE results were also compared with the mean value obtained by sTTE and pTTE using the Bland-Altman method, with the limits of agreement defined as  $\pm 2$  SD of the difference between the 2 methods.

Echocardiographic measurements were completed for sTTE and pTTE in all patients (feasibility 100%). In the examination by the well-trained sonographer, there were excellent correlations in MR jet area, left atrial area, %MR, TR jet area, right atrial area, and %TR between sTTE and pTTE ( $r = 0.89$  to  $0.96$ ,  $p < 0.001$ ). Also, there were small systematic differences with close limits of agreement between sTTE and pTTE measurements, respectively:  $-0.2$  cm<sup>2</sup> and  $1.5$  cm<sup>2</sup> for MR jet area;  $-0.4$  cm<sup>2</sup> and  $4.6$  cm<sup>2</sup> for left atrial area;  $-0.5$  cm<sup>2</sup> and  $5.6$  cm<sup>2</sup> for %MR;  $-0.2$  cm<sup>2</sup> and  $2.3$  cm<sup>2</sup> for TR jet area;  $0.0$  cm<sup>2</sup> and  $4.2$  cm<sup>2</sup> for right atrial area; and  $-1.2$  cm<sup>2</sup> and  $8.9$  cm<sup>2</sup> for %TR. The sensitivity and specificity of pTTE for detecting more than

moderate MR were both 96%. The sensitivity and specificity of pTTE for detecting more than moderate TR were 94% and 96%, respectively. In patients with more than moderate regurgitation, the evaluation of the etiology of MR and TR by pTTE was the same as for those with sTTE.

In the examination with the less experienced sonographer, the correlations between sTTE and pTTE were slightly reduced ( $r = 0.85$  to  $0.94$ ,  $p < 0.001$ ). The sensitivity and specificity for detecting more than moderate MR and TR were 85% and 92%, and 95% and 80%, respectively.

Pocket-sized portable devices are much lighter than the conventional echocardiographic imaging devices, enabling the physician to carry and use them anywhere, such as in outpatient clinics, ward rounds, and emergency settings, as well as for family doctor visits. Some drawbacks to pocket-sized devices are the small display and limited control features, and their accuracy should be evaluated. We demonstrated that, considering the experience in echocardiography (1), the pocket-sized pTTE with color Doppler feature was feasible and accurate in the assessment of the severity and etiology of MR and TR, and that should enhance the widespread use of pTTE in clinical practice.

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### REFERENCE

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## Why Delay Intervention in STEMI?

We read with interest the report by Yamashita et al. (1) regarding the noninvasive assessment of coronary "perfusion" by contrast-enhanced coronary multidetector computed tomography (MDCT) during the acute phase in patients with ST-segment elevation myocardial infarction (STEMI) before therapeutic reperfusion.

This pioneering study demonstrates that contrast-enhanced MDCT can be performed within 20 min in patients with STEMI at an experienced institution to evaluate coronary perfusion, with good levels of accuracy. In their study, Ya-