A novice experience with AI-powered point-of-care ultrasound in screening primary care diabetic patients for systolic and diastolic dysfunction

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ABSTRACT

Introduction: Diabetes is highly prevalent among Malaysians, and is associated with heart failure (HF). Early detection of subclinical HF before patients decompensate and hospitalized is important. However, lack of access to echocardiography and trained sonographers limit primary prevention echocardiography screening at primary care. We hypothesized that AI-powered point-of-care (POC) ultrasound enables novices to perform echocardiography screening. **Methods:** This pilot study enrolled primary care outpatient diabetic patients aged ≥40 years without known cardiovascular disease. A novice layperson with no prior echocardiography experience underwent a 3-day training program to acquire echocardiography images using AI-guided handheld POC ultrasound with AI-automated analysis and interpretation (AI-POCUS). All patients had AI-POCUS examination by the novice, and conventional cart-based manual transthoracic echocardiography (TTE) by trained sonographers validated by board-certified experts. The primary outcome was AI-POCUS accuracy in detecting left ventricular (LV) systolic dysfunction [LV ejection fraction (LVEF) <50%] or diastolic dysfunction [left atrial volume index (LAVI) >34 mL/m2], using TTE as the reference standard. **Results:** We studied a total of 10 patients [60% male, mean age 63.5(9.8) years]. AI-POCUS yielded interpretable LVEF in 6 patients and LAVI in 5 patients. LVEF classification on AI-POCUS was concordant with TTE in 5 (83.3%) cases and discordant in 1 (16.7%) case. LAVI classification on AI-POCUS was concordant with TTE in all cases. The mean image acquisition time for AI-POCUS was 4.4(2.0) minutes. **Conclusion:** AI-POCUS enables a novice layperson with 3-day training to perform echocardiography screening for LV systolic and diastolic dysfunction in primary care outpatient diabetic patients with good yield, well-correlated LV function classification, and short acquisition time.