The current state of myocardial contrast echocardiography: what can we read between the lines?

Myocardial contrast echocardiography (MCE) is advocated for the assessment of myocardial perfusion in addition to wall motion during stress echocardiography for the diagnosis of coronary artery disease.1,2 We therefore read with interest the article by Bhattacharyya et al.3 on behalf of the British Society of Echocardiography detailing the current status and performance of stress echocardiography in the UK. In particular, we note the limited performance of MCE with only a small number of units (10.5%) using this technique, and a corresponding ‘under-utilization’ of vasodilator stress.

Given the emerging literature,4–6 the observed uptake of MCE in clinical practice remains low, and despite continued enthusiasm of its proponents, the rate of progress integrating this modality has been a source of frustration.7 In a publicly funded health service that prioritizes efficiency alongside quality, the shorter stress times facilitated by the use of vasodilator stress would seem attractive, yet the authors found that adenosine and dipyridamole were used in 7 and 13% of units, respectively, compared with dobutamine in 100%.

In comparison with vasodilator stress, the use of dobutamine or exercise poses challenges for perfusion imaging. Maintaining adequate image quality for accurate perfusion assessment becomes problematic with increasing tachycardia, and additional respiratory motion with exercise. At peak exercise, most patients are unable to hold their breath sufficiently for adequate flash replenishment images to be obtained. Gain settings for the optimization of myocardial contrast may differ from those used for wall motion, and the ability to detect perfusion abnormalities may be reduced if assessment of wall motion is not to be compromised. Furthermore, no contrast agent is currently approved by the FDA or EMA for myocardial perfusion assessment, and use for this purpose remains ‘off-label’. This continues to be a significant barrier to the uptake of vasodilator stress MCE in North America.

Nevertheless, in our institution, perfusion is assessed with a flash replenishment technique in selected cases with dobutamine or exercise stress. We have employed a perfusion imaging mode with some success usually in the earlier stages of stress, where hyperaemia is evident before the onset of significant tachycardia, or dyspnoea with exercise. We have also noted that flash imaging may briefly enhance endocardial definition, making some wall motion abnormalities easier to visualize. Our practice reflects an on-going institutional learning curve regarding the optimization of equipment settings, sonographer training, and standardization of reading among reporting echocardiologists.

In light of recent data from large clinical trials, the role of MCE is now emerging in clinical guidelines.2 Additional FDA/EMA approval of contrast agents for this purpose would be a significant step forward. However, individual laboratories will also need to invest time and training to adopt new protocols, and gain the necessary experience before embracing the technique for everyday clinical use. Ultimately, widespread uptake of MCE will depend on the confidence and ability of practicing stress echocardiologists to look beyond endocardial borders, and ‘read between the lines’.

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References

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We thank Gibson et al.1 for their interest in our article. The authors have raised important issues. We agree that the uptake of myocardial contrast echocardiography (MCE) for stress echocardiography within the UK has been low.2 This may be surprising given the wealth of data that has accumulated over the past decade, demonstrating the clinical, prognostic, and practical value of performing MCE stress echocardiography using exercise, dobutamine, and dipyridamole techniques.

There have been multiple large prospective and multicentre studies, which have demonstrated that MCE stress echocardiography is safe and comparable with single-photon emission computed tomography (SPECT) for the detection of coronary artery disease3,4 with consistent superior sensitivity in the intermediate high-risk population. Furthermore, assessment of myocardial perfusion with MCE...