

Fused echoes see whole heart

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A new way of combining ultrasound images taken from different positions can result in sharper, better quality 3D images of the heart to help doctors make a diagnosis.

The new technique aims to improve on conventional 3D echocardiography which is not yet routinely used, partly because of problems with the quality of images produced and difficulties in imaging the whole heart.

A team of Oxford University biomedical engineers and cardiologists has developed a way of merging 3D data from ultrasound transducers placed in different positions on a patient's body. The researchers recently reported in the journal JACC Cardiovascular Imaging that, in a pilot study of 32 people, this boosted the quality of good/intermediate quality images of the heart from 70% with existing methods to over 96%.

'For the first time we've shown in a detailed clinical study how fusion of 3D data from different positions can improve the quality and completeness of the final image,' Alison Noble of Oxford University's Department of Engineering Science, a co-author of the report, tells me.

'Our new technique saw significant improvements in the general image quality and the definition of features within the heart which should make it possible to spot even small abnormalities in, for example, the motion of the heart wall,' adds Harald Becher of Oxford University's Department of [Cardiovascular Medicine](#).

The team's method is based on 'voxels' - 3D units of data similar to the 2D pixels on a TV screen. By matching similar-looking voxels of data from different positions it is possible to calculate the 'best fit' of a sequence of individual frames. This alignment is then applied first across 'downgraded' low-resolution images before these are 'upgraded' again to their original high-resolution - saving computation time.

'This new approach is an exciting advance in echocardiography, as it enables us to see the sort of complete picture we weren't able to before,' Harald explains. 'For instance, in this study a number of the participants were Oxford rowers with very large left ventricles which could not be imaged from a single position. By fusing our data we were able to produce accurate three-dimensional images of the entire heart within seconds.'

The team say these preliminary results are encouraging, although further studies are needed with larger groups of patients. The researchers hope their approach could lead to a greater use of 3D echocardiography in the future and are currently looking at how it could be combined with other [heart](#) imaging techniques, such as magnetic resonance imaging.

More information: imaging.onlinejacc.org/cgi/content/abstract/3/7/682

Source: Oxford University

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