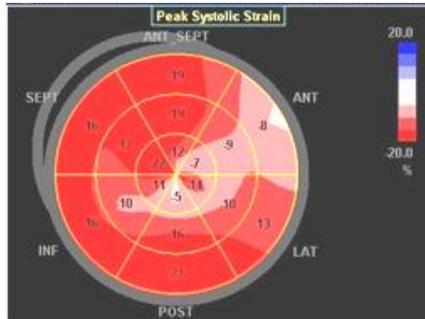# AFI Healthymagination Fact Sheet

What is AFI

Automated Function Imaging (AFI) is a software tool that automates 2D speckle tracking to measure in real-time the deformation (strain) of the myocardial wall. AFI is available on multiple Vivid products: Vivid 7, Vivid E9, Vivid S6, Vivid q and EchoPAC.

How AFI works

The algorithm tracks the wall motion and calculates the percentage of lengthening or shortening in a set of three longitudinal 2D-image planes (apical long, two chamber and four chamber) and displays the results for each plane. It then combines the results of all three planes in a single bull's-eye summary, which presents the analysis for each segment along with a global peak strain value for the left ventricle. Similar in concept to MRI tagging, AFI objectively analyzes myocardial motion by tracking features (natural acoustic tags) in the ultrasonic image in two dimensions (see Figure 1). AFI could potentially be used to differentiate disease from non-disease segments, and to learn more about the various strain patterns indicative of specific disease types.
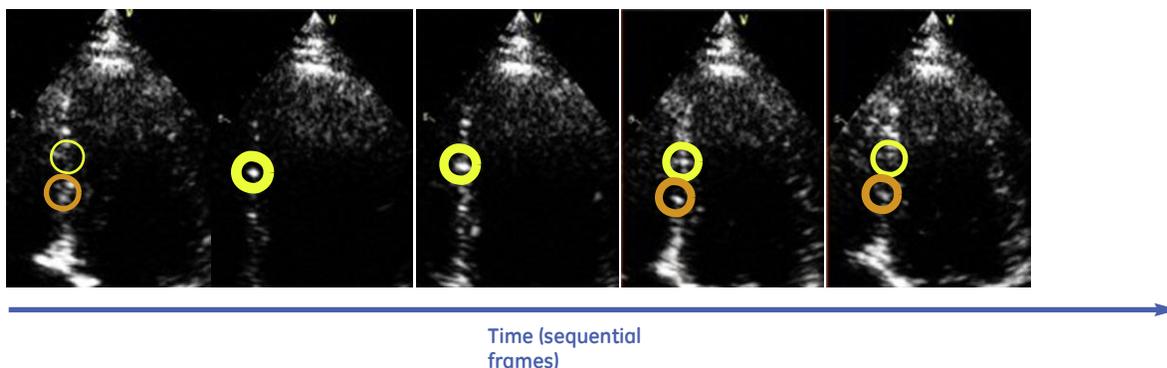

Time (sequential frames)

Figure 1.

Motion and velocities are analyzed by calculating frame-to-frame changes using "natural acoustic tagging." New features (orange circles) keep coming into the image as old ones (yellow circles) fade away.

Benefits

- AFI is a more sensitive method for assessment of LV function than the EF and WM (standard echo methods)[2],[3],[4],[5],[7]
- AFI provides both a global and regional quantitative assessment of the contractility function of the heart[4]
- AFI is less operator dependent than EF and WM assessments[3]
- AFI is fast < 3 min[3]
- AFI works up to heart rates of ~120 beats/min

Customer Needs/ Standard of Care

A viability assessment after AMI using SPECT is an expensive Medicare cost. There is a need to reduce the Medicare cost of the examinations. The 2012 technical component rates for when these tests are paid under the Medicare Physician Fee Schedule are $295.45 for SPECT myocardial perfusion and $148.40 for Echo including AFI.[8]

Cost:
AFI has the potential to reduce costs by replacing procedures with a higher Medicare cost. The average Medicare cost of an AFI assessment is 50% lower than SPECT.[1]

Medical Need/Standard of Care

The standard echo measurements of left ventricular function EF and WMSI are important predictors of outcome and determine eligibility for interventions. The measurements have challenges related to image quality, geometrical assumptions and expertise.

Quality:
AFI has the potential in predicting mortality versus standard echo methods in known or suspected LV impairment compared to Ejection Fraction.[4]

Medical Need/Standard of Care

Cancer patients receiving certain chemotherapy are at risk of developing cardiotoxicity.[1]
Current standard of care include Echo with standard measurements... EF, WMSI

Quality:
AFI has showed potential in prediction of cardio toxicity in chemotherapy patients.[7]

Medical Need/Standard of Care
High-risk asymptomatic AS patients can benefit from aortic valve replacement. Management of these patients has benefited from exercise ECG testing and this is currently recommended practice. However, exercise testing may not be feasible in certain situations, particularly elderly, diabetic, disabled or obese patients. This population account for ~20 % of the eligible population.[2],[3]

Access:
AFI has the potential to expand access to care for the subset of high risk asymptomatic AS patients who cannot exercise or who exercise submaximally.[4, 7]

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2. Mollema et al., Viability assessment with global left ventricular longitudinal strain predicts recovery of left ventricular function after acute myocardial infarction. Circ Cardiovasc Imaging 2010;3:15-23

3. Stanton et al., Prediction of all-cause mortality from global longitudinal speckle strain: Comparison with ejection fraction and wall motion scoring. Circulation Cardiovasc Imaging 2009;2;356-364

4. Lafitte et al., Impact of impaired myocardial deformations on exercise tolerance and prognosis in patients with asymptomatic aortic stenosis, Eur J Echocardiogr 2009;10;414-419

5. Bertini et al., Longitudinal mechanics of the periinfarct zone and ventricular tachycardia inducibility in patients with chronic ischemic cardiomyopathy. Am Heart J 2010;160;729-36

6. AMR Statistics. Image Market Guide 2011. USA January – June 2011. Germany Q2 2011. France Q2 2011.

7. Sicari et al., Stress echocardiography expert consensus statement. European Association of Echocardiography (EAE) (a registred branch of the ESC). Eur J Echocardiogr 2008;9;415-437

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