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iVIEW

EDITOR'S PAGE

Acquiring Multiple Parameters From Multiple Tests

The Real Principle of Multimodality Imaging

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There is no principle worth the name
if it is not wholly good.

—Mohandas Gandhi (1)

Advances in all aspects of computing, ranging from processing speed to memory and long-term storage have presented an unprecedented gift to imagers, who now have access to modalities and capabilities which not long ago seemed unattainable. But the benefits of these choices have been balanced by the development of "silos," with consequent headaches that range from training and credentialing (2) to the development of consensus positions on test selection in only subgroups of patients (3). The unresolved issue pertains to the development of an imaging strategy that avoids duplication and increasing cost. The biggest problem with "multimodality" imaging is that it reflects just that—the use of multiple modalities which may or may not be duplicative or add value. This issue of *iJACC* presents 3 investigations that could inform practice, where the use of more than one imaging modality brings together the particular strengths of different modalities to produce new insight into diagnosis and management.

Choi et al. (4) combine cardiac computed tomography with tissue Doppler imaging in order to understand the diagnostic potential of septal and free wall motion in patients with pericardial constriction. This study leverages off the high spatial resolution of computed tomography to measure pericardial thickening and the high temporal resolution of tissue Doppler to measure tissue diastolic velocities. The results confirm the suspected correlation between the degree of pericardial thickening and the local reduction of function, and offer an additional step to facilitate the recognition of this elusive diagnosis. The accompanying editorial by Klein (5) puts this finding in context with previous observations of tissue Doppler imaging.

Niemann et al. (6) combine cardiac magnetic resonance for the measurement of myocardial thickening and fibrosis with ultrasonic strain-rate imaging for the assessment of systolic function. This work demonstrates that, while men with Fabry disease typically show functional changes and fibrosis after increased myocardial thickening, this sequence does not occur in women, with implications for the selection of female patients for screening. In this combination, the high spatial resolution and tissue characterization of cardiac magnetic resonance is matched by the high temporal resolution of echocardiographic strain-rate in order to provide new insights about anatomy, function, and scar.

Finally, Rapezzi et al. (7) combine echocardiography with the diagnosis of amyloidosis with myocardial scintigraphy using technetium labeled 3,3-diphosphono-1,2-propanodicarboxylic acid, to recognize patients with transthyretin related cardiac amyloidosis. In this study, patients with amyloid cardiomyopathy showed moderate to severe tracer uptake, which was rarely seen in subjects without myocardial thickening. However, when tracer was seen in the absence of structural changes, biopsies showed amyloid infiltration, implying the echocardiographic result to be effectively a false negative. In contrast to the former 2 studies, this research uses multiple modalities as a vehicle to understand an imaging strategy that is potentially based on single parameter for the early detection of myocardial infiltration.

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These studies exemplify how a combination of modalities provides a structural, functional, or pathological insight that may not be available from a single modality alone. While it is not necessarily required to coregister and display such findings—as in hybrid imaging (8)—the principle is similar. In this respect, we propose that clinical practice should parallel clinical research, to the extent that a physician requesting an additional test should identify a test which would provide an otherwise unavailable perspective not provided by the first investigation. Technologies will come and go, but understanding of the functional, structural, and anatomic facets of pathophysiology will remain.

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