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EDITOR'S PAGE


What's Old Is New Again

A Reminder of the Importance of Left Ventricular Geometry and Function as Markers of Risk

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Established imaging measurements are often ignored in clinical practice or not used in the most beneficial way. With all the focus on new technologies, it is often easy to forget that many common tests offer information beyond diagnostic visual patterns in images and predictive value. Even a simple measurement such as blood pressure (BP) contains much more information than just providing a measure of vascular tone. Understanding how the body "sees" BP load and how it changes organ morphology in response can be revealing. For example, a given elevated number is a catalogue of long-term changes in risk factors, endothelial function, vascular stiffness, and vascular remodeling that may have antedated the current BP and possibly mediated its progression (1). Three-dimensional cardiac magnetic resonance studies with computational modeling have shown that much of the remodeling begins before manifest hypertension (2). Morphological signatures (e.g., left ventricular [LV] remodeling) may be like tree rings or archeologic layers: such information might improve our ability to tailor risk boundaries as well as intensity of management. A fascinating study in this issue of *iJACC* is 1 such example that finds links between LV geometry and the outcomes of acute ischemic stroke (3).

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Although there is evidence that the incidence of stroke is falling, the morbidity and mortality of this disease remain among the worst of acute medical diseases (4). BP control is particularly important in patients with recent history of stroke, and poor control is associated with adverse outcomes (5). However, more active BP control is often limited by the risk for stroke extension when the ischemic penumbra is compromised by hypotension (6). The threshold of BP leading to impaired cerebral perfusion may vary according to the severity and duration of existing hypertension, but unfortunately the latter details are often not available, compromising the ability to individualize treatment.

In this issue of *iJACC*, Park et al. (3) investigate the hypothesis that LV mass and geometry can be used to predict mortality after acute ischemic stroke in a prospective registry of more than 2,000 patients with stroke admitted between 2002 and 2010. LV geometry provides a summary statistic for the degree and duration of increased cardiac work load (7), just as left atrial volume reflects LV filling pressure (8). Although it may seem counterintuitive that such a measurement could be beneficial when measuring BP seems so simple, the reality is that BP management is not simple at all, varying as it does from minute to minute, and with all of the ambiguities that surround clinic BP management, including masked and labile (e.g., white-coat) hypertension (9,10). For these reasons, recent recommendations about the use of echocardiography in the setting of hypertension have reinforced the benefits of careful assessment of LV remodeling (11), especially as the

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accuracy of echocardiography for LV hypertrophy has improved so much from the era of M-mode measurements of LV mass.

Park et al. (3) show that all-cause mortality was increased by 42% in concentric LV hypertrophy and by 54% in concentric remodeling, although the 39% increment with eccentric hypertrophy was nonsignificant, possibly because of the numbers involved. Relative wall thickness but not LV mass index was also associated with mortality. Patients with altered LV geometry showed a J-curve relationship between acute-phase systolic BP and mortality. These findings build on an existing body of research that links LV mass and geometry to stroke risk (12). Indeed, previous research has linked the change from normal LV geometry to concentric LV hypertrophy with a decrease in the nocturnal BP dip, in parallel with an increase in the prevalence of carotid and renal end-organ disease (13). The accompanying editorial by Gillebert and Chirinos (14) emphasizes the link between the morphological LV response and both the magnitude and timing of systolic load. The link between autoregulation and arterial function with to LV response perhaps explains the J-shaped response of arterial pressure and outcome.

Echocardiography is widely performed in patients with stroke, and the information gathered in this study could be readily applied. Of course, the application of echocardiography in this setting may not be simple; aortic stiffness and pulsatile hemodynamic load affect LV concentric remodeling in a sex-specific manner (15), and there are likely to be other confounders. Even in jurisdictions where full echocardiography is not performed in patients with stroke, the information presented here could readily be obtained at the bedside using handheld echocardiography. Nonetheless, the next steps will be to understand the therapeutic implications for patients with these findings and to tailor their BP control accordingly.

It is inevitable that an imaging journal will be predominantly focused on new technologies. However, some of the most interesting papers originate from new insights obtained with old measurements. Contributors don't need new equipment to publish in *iJACC*, but new ideas are essential!

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