Heartbeat: Highlights from this issue

Catherine M Otto

There are several original research papers of interest in this issue of *Heart*, with topics ranging from cardiac risk factors and prevention, to cardiomyopathies, to arrhythmias and sudden cardiac death. Only a few articles are highlighted here so readers should consult the table of contents for a full listing.

The presence of myocardial fibrosis, as demonstrated by late gadolinium enhancement on cardiac magnetic resonance imaging (MRI), is helpful in making the diagnosis of hypertrophic cardiomyopathy (HCM) and it has been suggested that the extent of myocardial fibrosis might correlate with prognosis. In a prospective cohort study of 711 adults with HCM who underwent MRI imaging, sudden cardiac death occurred in 3.1% at a median followup of 3.5 years (***see page 1851***). Although the extent of myocardial fibrosis was a univariate predictor of sudden cardiac death, the only predictor on multivariable analysis was left ventricular ejection fraction Figure 1.

This study is relevant because it illustrates the importance of evaluating imaging findings in relation to clinical outcomes, rather than simply in comparison to other diagnostic data or even pathologic findings. Lack of information on the prognostic value of imaging findings is one of the major information gaps in development of evidence-based guidelines for patients with cardiac disease.

In the accompanying editorial, Drs. Jellis and Desai (***see page 1825***) point out that MRI remains useful for evaluation of the presence, extent and distribution of myocardial hypertrophy; evaluation of subaortic outflow obstruction; and accurate measurement of ventricular volumes and ejection fraction. In patients with an unclear diagnosis, the presence and distribution of gadolinium enhancement may allow diagnosis of potentially treatable infiltrative myocardial disease. Finally, in terms of using MRI for risk stratification in HCM patients, "there is still substantial hope of more optimistic findings in a larger, lengthier well-powered study."

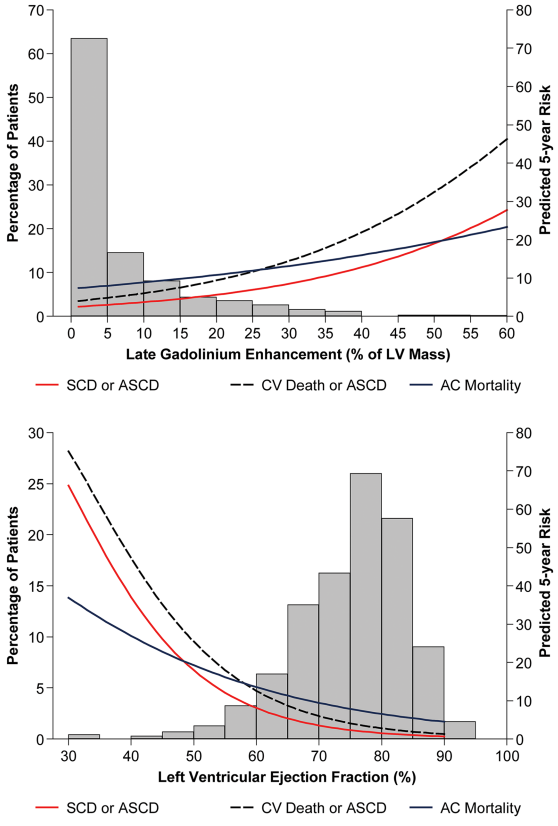

Figure 1 Predicted 5-year risk (right vertical axis) of reaching the study outcome measures according to amount of fibrosis (A) and LVEF (B). ASCD, aborted sudden cardiac death; CV, cardiovascular; AC, all-cause; SCD, sudden cardiac death. The bars shows the percentage of patients (left vertical axis) in each group.

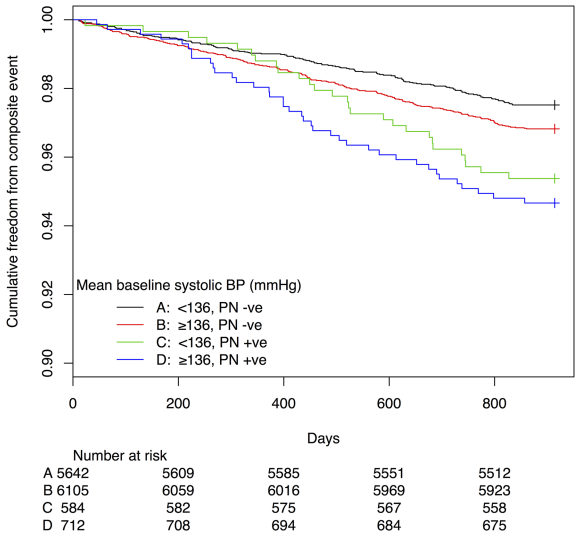

Figure 2 Kaplan–Meier estimates of the probability of the composite event by blood pressure status with and without peripheral neuropathy (PN). Composite event includes myocardial infarction, coronary revascularisation, congestive cardiac failure, stroke and transient ischaemic attack. BP, blood pressure. HRs for PN as compared with no PN are systolic BP <136 mm Hg, HR 1.92 (1.30–2.84), p=0.001; systolic BP ≥136 mm Hg, HR 1.66 (1.15–2.38) p=0.006.

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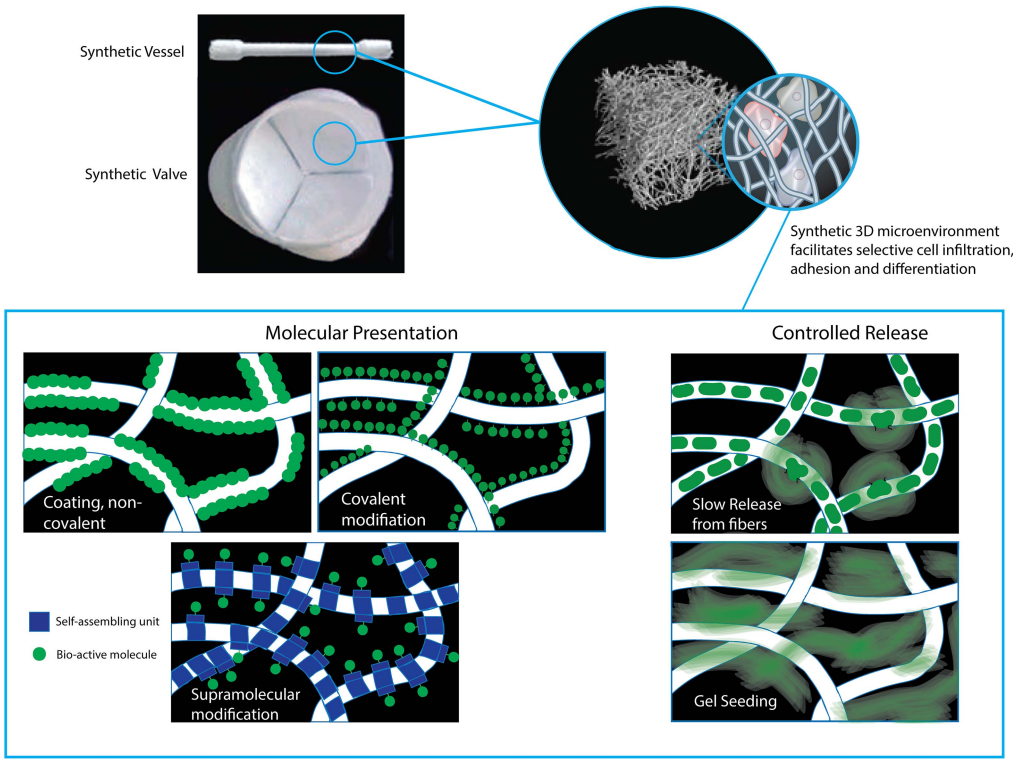

Figure 3 Representation of synthetic scaffold material for vascular and valvular replacement grafts. Synthetic fibres resembling a 3D extracellular matrix environment can be acquired using techniques like electrospinning, and facilitate cell infiltration and adhesion. Within the fibres, local release or presentation of specific factors can guide cell differentiation. The timing and presentation of incorporated factors depends on how they are incorporated into the fibres, varying from strongly bound, minimally leaking dynamics to loosely associated, burst release dynamics. The various approaches can be combined to mimic elements of the in vivo damage response, affording elaborate control over the subsequent cellular response and tissue regeneration. Additional artwork courtesy of Marc Simonet and Rogier Trompert.

In another outcomes based imaging paper, Dr Steinberg and colleagues (***see page 1871***) examined variation in use of imaging procedures (in addition to electro-anatomic mapping) during catheter ablation for atrial fibrillation in 11,525 Medicare patients treated from 2007 to 2009. Periprocedural imaging included transesophageal echocardiography (TEE) in 53%, intracardiac echocardiography (ICE) in 67% and computed tomography (CT) or MRI in 50%. Although there was wide variation in the use of imaging among clinicians, pre ablation CT or MRI was associated with a lower risk of stroke whereas ICE was associated with a lower need for repeat ablation but an increased risk of bleeding. In this study, TEE was not associated with any differences in mortality, stroke, bleeding or repeat ablation. It is naïve to think that more imaging is always better, even when caring for an individual patient. This type of rigorous outcome-based assessment is critical for appropriate allocation of healthcare resources and ensuring optimal patient outcomes.

As cardiologists, we might not pay much attention to the issue of diabetic neuropathy in our patients. Perhaps we should. In a study of 13,043 patients with Type 2 diabetes, peripheral neuropathy was associated with a 33% higher risk of adverse cardiovascular events, even when adjusted from other known risk factors Figure 2. (***see page 1837***)

Dr Margariti (***see page 1823***) discusses the importance of these findings and speculates that "interventions to precisely target risk factor control might attenuate the excess cardiovascular risk among those with peripheral neuropathy". She reminds us that cardiac autonomic neuronopathy in diabetics is also associated with increased microvascular complications and raises the question of whether diabetic neuropathy is an indicator of endothelial cell damage which might explain the association with increased cardiovascular risk.

A translational medicine article (***see page 1825***) reviews the status of tissue engineering for heart valve and vessel replacement grafts. Promising data are emerging that synthetic materials, treated with biologically active factors, might allow implantation of a "scaffold" that will allow growth of the patient's own cells to form a new blood vessel or heart valve. This article provides a readable summary of the science behind this exciting approach that may soon be a clinical reality Figure 3.

The Education in Heart article (***see page 1886***) in this issue provides an overview of testing approaches for ischemic heart disease by Professors Yilmaz and Sechtum. This balanced presentation summarizes the advantages and disadvantages of stress echocardiography, nuclear perfusion imaging, cardiac magnetic resonance imaging and computer tomographic imaging of the coronary arteries. There also is a brief discussion of microvascular coronary disease and coronary spasm.

The Image Challenge (***see page 1898***) in this issue makes an important educational point. See if you can diagnose the cause of myocardial infarction in this young woman. If you disagree with the answer or have additional comments, use the "Submit a response" button to the right of the full text article online.

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