

Cardiovascular Medicine and Surgery in Singapore: The Next Lap

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Fourteen years ago, an editorial¹ in the *Annals* announced the coming of age of cardiology in Singapore. Among the issues raised in that editorial were the impact of changing demographics and disease patterns, the importance of optimising resources, and the need for structured training and sub-specialisation. Many of those observations remain highly relevant, even though the field of cardiology has undergone further transformation.

The high prevalence of coronary heart disease in the developed world and the commercial potential of drugs and devices have helped to fuel the development of new medicines and technical solutions, such as angioplasty and its many adjuncts such as stenting, brachytherapy. Cardiologists in Singapore have been quick to acquire these techniques, with over 3400 angioplasties performed nationwide in 2001. In this issue of the *Annals*, Wong and Chan² describe the latest refinement – the introduction of drug-eluting stents. These implants have been associated with a significantly lower restenosis rate compared to conventional bare metal stents. With this development, restenosis, the Achilles heel of angioplasty, appears to have been significantly reduced.

There have also been impressive advances in cardiac surgery. Surgical correction of atrial fibrillation is now a reality,³ as described in this issue of the *Annals*. To cardiologists accustomed to the irreversibility of chronic atrial fibrillation in patients with long-standing valvular heart disease, the results of AF ablation surgery are impressive, with over 80% of patients maintaining sinus rhythm at 3 years. The development of off-pump techniques for coronary artery bypass grafting surgery promises to reduce the morbidity associated with cardiopulmonary bypass and is established firmly in cardiac surgical practice. Yet another development is the left ventricular assist device that sustains life in critically ill patients with cardiogenic shock, thus offering hope to those with life-threatening yet potentially reversible conditions, such as fulminant myocarditis. Besides transplantation and assist devices, there are major alternative surgical treatments of heart failure such as mitral valve repair⁴ for cardiomyopathy, and the Saver procedure (Surgical anterior ventricular endocardial restoration) for ischaemic cardiomyopathy.⁵

In non-invasive imaging, new modalities compete for attention. Positron emission tomography (PET),⁶ often regarded as the “gold standard” for heart muscle viability, has arrived in Singapore. For patients with poor left ventricular function being considered for revascularisation, medical therapy or transplantation, tissue viability is often critical in decision-making. Yet another approach for viability assessment, albeit less well established, is cardiac magnetic resonance imaging,⁷ which is now being developed locally. Further study is needed to determine the most cost-effective assessment modality. Multidisciplinary work between different specialties will spur the development of these new techniques.

The above are but a few examples of how cardiology is developing, with an increasing reliance on a technology-based approach to intervention and imaging. We are fortunate in that Singapore has not lagged behind in acquiring the latest devices and techniques. The system of structured training and sub-specialisation established more than a decade ago has paid off in terms of depth of expertise, which in turn has helped us to rapidly absorb new advances. However, despite the potential for improved diagnosis and treatment, many challenges remain.

The modernisation of Singapore, combined with an ageing population, has meant that coronary artery disease continues to dominate the leading causes of death, despite gradual reductions in the age-specific incidence of myocardial infarction and improved survival rates.⁸ Indeed, improved treatment may have produced more survivors with residual left ventricular dysfunction and heart failure. The latter has become one of the major causes of hospital admissions. Large randomised trials have identified multiple drugs (e.g. beta-blockers, ACE inhibitors, angiotensin receptor blockers) that improve the outcome of heart failure.⁹ More recently, biventricular pacing and implantable defibrillators have also been shown to improve clinical outcomes in subgroups of these patients. Left ventricular assist devices, developed as a bridge to transplantation, are now contemplated as destination therapy. Although effective, these treatments are not curative, and they are expensive. There can be little doubt that heart failure will continue to be a major challenge in the years to come.

Management of heart failure is typical of a recurring dilemma that we face today: the availability of advanced treatments that improve quality of life or prognosis, or both, but at considerable cost. Resource limitations always occur in any

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healthcare system, but the increasing reliance on high-tech medicine in cardiology, plus greater patient expectations, has sharpened this issue. Consequently, doctors in training not only have to learn the latest treatment skills but must also know the cost effectiveness of treatment options. We need to be clear about exactly what benefits are provided by each treatment in a given clinical situation, and do our best to communicate its benefits and risks to patients, often not an easy task in a busy clinic. Alternative approaches to reducing costs or improving efficiency, such as same-day admissions or outpatient cardiac catheterisation, are preferred whenever appropriate.

Achieving quality in medical care is clearly much more than acquiring new skills or providing a particular device or drug. Ensuring timely access, appropriate use, and good outcomes are as important. Several studies in the US have shown that there is often a gap between the availability of recommended treatment and its actual use in “real world” clinical practice.^{10,11} The paper by Soon et al in this issue of the *Annals* highlights a potential gap at the primary care level for heart failure.¹² We need to be open to new solutions that can complement the traditional model, in which the treatment process is largely driven by individual patient-doctor encounters. A “disease management” approach, involving a systematic overview of health care processes and indicators, is emerging. Increased reliance on guidelines and a more structured approach to patient care through the use of care pathways will help to close treatment gaps.¹³ Availability of electronic evidence-based physician resources can help to offset information overload and improve knowledge management. The shifting of care, where appropriate, for example from an inpatient to an outpatient setting, and approaches such as case managers and specialised clinics, are logical.

Collaboration between traditionally separate disciplines can also yield further improvements through better coordination (e.g. between cardiology and emergency medicine to reduce door-to-balloon time) or development of new areas (e.g. cardiology and radiology for imaging and intervention). Collaboration between tertiary hospitals and primary care physicians to facilitate training and the “right-siting” of care can moderate our high clinical load, some of which could be better managed in primary care. Collaboration between institutions can also help us to achieve the volume necessary to perform large trials or observational studies in less common conditions.

Finally, it will also be on the basis of our training and research that Singapore will be recognised as a predominant centre in cardiology. We already attract a substantial number of foreign doctors for subspecialty training. Annual coronary intervention courses established 14 years ago have helped to highlight our progress in cardiology to the region. Other new opportunities, such as the Graduate Medical School, are on the horizon. In clinical research, there has been a proliferation of multicentre cardiology trials involving our hospitals. The next area of growth must be in basic science, which needs to be encouraged and nurtured. One promising area, still highly experimental, is the potential use of stem cells for replacement of damaged myocardium.¹⁴

In the race to be at the cutting edge of cardiology, Singapore may lay claim to having arrived, with the latest treatment options, well-developed subspecialties and rapidly developing research programmes. However, providing excellent care is more than just acquiring new skills or advocating a particular device or drug. The ability and discipline to carefully weigh the benefits and risks of every treatment based on sound evidence remains as important as ever, so that our limited resources are wisely used. This approach must be combined with a willingness to review and, if needed, re-engineer the delivery of care according to measured clinical outcomes.

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