

## Singapore: a tradition of “state of the art” cardiology



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In less than 50 years, Singapore has established itself as a centre for cardiovascular excellence. With a population of approximately 5.5 million people, great attention has been paid to the creation of our healthcare and emergency healthcare system and, today, Singapore has the third highest life expectancy in the world with an average lifespan for both males and females of 84.6 years.

Within the realm of interventional cardiology, Singapore has long been seen as a leader in Asia in the adoption of percutaneous technologies. The first balloon angioplasty was performed in 1984 in our country by our pioneering interventionalist Richard Ng in 19 patients. The first drug-eluting stent implantation in Singapore and Asia occurred during the 11<sup>th</sup> Singapore LIVE Course in 2002. Asia's first percutaneous aortic valve replacement was performed in Singapore in 2009.

### Interventional cardiovascular care today

Relative to the rest of the world, Singapore has a healthy population. Still, there is an increased number of patients with cardiovascular disease but, when this is adjusted for age, it is seen that this is not increasing statistically in terms of the population as a whole. At present, there are six public hospitals and an equal number of private hospitals certified to perform angioplasty. Concerning the evolution of interventional treatments, the number of angioplasties continues to grow, while the numbers of CABG are dropping. Reviewing the trend from 2010-2014 concerning PCI, a 5% growth can be seen. However, with respect to CABG,

from 2013-2014, a decrease of 3.4% is evident. Taken together, this amounts to a 6:1 ratio in terms of PCI to CABG procedures. Most of this increase originates in emergency PCI rather than elective PCI.

In Singapore, an active structural programme has matured over the last six or seven years – more than 300 TAVIs have now been performed. Also, MitraClip and left atrial appendage closure are standard procedures. As the number of patients receiving these treatments has increased, Singapore has concurrently become an international centre of reference with patients coming from, amongst other countries, India and Indonesia.

### Challenges

The challenge today is not the number of qualified operators, which in itself is very good considering that the volume of PCI procedures continues to rise. In fact, for Singapore, the biggest challenge today is in the management of patients with myocardial infarction. Primary PCI is the universally accepted modality for the treatment of myocardial infarction in this country with 99.9% of patients receiving primary angioplasty coupled with impressive reductions in the overall mortality rate. Currently, the mortality rate for treatment within 12 hours of onset is 6.6% – and that includes patients with cardiogenic shock – and the 30-day mortality, excluding cardiogenic shock, is 4%. The Singaporean reduction in mortality rates is due to two important factors, firstly the national healthcare system, including the well-developed

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emergency care system. The average time in which an ambulance will reach the site of call is eight minutes, and 90% of the time the ambulance will reach the site of the call in less than 11 minutes. Secondly, overall door-to-balloon time has been reduced. This reduction is due to refinements in our organisation: when an ambulance picks up a patient with a suspected heart attack, an ECG is performed immediately and transmitted to the nearest PCI-capable hospital so that, by the time the patient arrives at that hospital, the team is already activated and ready. This pre-hospital, ambulance-based and transmissible ECG significantly shortens the time to treatment for the patient with a myocardial infarction.

### Education and the future

The educational value of live case demonstration meetings has been an important element of Singapore's professional development and indeed Singapore was the first country to host live case demonstration courses in this part of the world in 1989 (known as Singapore LIVE). It also started the Asian Interventional Cardiovascular Therapeutics (AICT) meeting, along with several regional member countries, which has evolved to become the official scientific meeting of the Asia-Pacific Society of Interventional Cardiology (APSIC). Furthermore, Singapore has a tradition of sharing its know-how and expertise with physicians

from around the world and has established itself as the training centre for many developing countries. Indeed, the interventional training programme at the National University Heart Centre, Singapore (NUHCS) started in 2000 with over 50 interventional cardiologists trained from all over the world, including China, India and recently also Europe and South America.

In the near future, more comprehensive programmes in interventional training will be developed. Considering that the interventional field has flourished beyond the initial expectations from coronary to structural interventions, what is now imperative is an evolving educational approach that will be inclusive of every different aspect of interventional cardiology as these aspects develop over the coming years. The modern-day fellows in interventional cardiology should not limit themselves to coronary, but should also be required to have a grasp of other endovascular procedures, structural as well as peripheral.

The future requires that we continue to build from the strong foundations we have created at present, to ensure the ongoing evolution of our practice, here in Singapore, and throughout our region and the world.

### Conflict of interest statement

The author has no conflicts of interest to declare.