

Cardiac arrest: Much to take heart from

In Restart-a-Heart Month, a cardiac arrest researcher takes a timely look at Singapore's progress in this area

Marcus Ong Eng Hock

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It was an ordinary week day and 22-year-old Tesha (not her real name) was preparing for work. She never made it to work that day. She suffered a sudden cardiac arrest and collapsed at home.

Her husband called 995 – Singapore's emergency services number – and received instructions to start cardiopulmonary resuscitation (CPR). When the ambulance paramedics arrived, they found her without a pulse because her heart was stuck in an abnormal rhythm called ventricular fibrillation. Delivering electric shocks with a defibrillator, they managed to restart it.

Tesha was rushed to the hospital. Along the way, her heart stopped another 31 times. At the emergency department, my colleagues and I had to rely on advanced resuscitation techniques to stabilise her condition.

She survived her ordeal and was discharged after a week. Later, I

found out that Tesha has a strong family history of sudden cardiac death. Her brother died from cardiac arrest at the age of 30.

Twenty years ago, patients like Tesha had a less than 2 per cent chance of survival. This sad fact motivated me to study cardiac arrests as a young emergency physician more than 20 years ago. Since then, I have evolved into a clinician scientist and health services researcher focusing on improving outcomes for cardiac arrest victims.

Over the last 20 years, research and implementation have helped Singapore dramatically improve survival rates for cardiac arrest. We have seen survival for witnessed, "shockable" arrests increase tenfold from less than 2 per cent to more than 20 per cent today.

With World Heart Day taking place earlier in the week, and Restart-a-Heart campaigns happening worldwide this month, it is timely to look at what has happened in terms of treating cardiac arrest victims in Singapore.

TIME IS OF THE ESSENCE

The situation today is that cardiac arrest is a fatal – yet survivable – condition. It can occur in anyone and at any time. Almost 3,000 people have a sudden cardiac arrest every year in Singapore and cardiac arrests kill more people yearly than cancer, stroke or trauma.

Yet, the initial treatment is fairly simple and effective if delivered early: CPR and defibrillation.

More advanced treatments are available, delivered by ambulance crews and at the hospital, but this is often conditional upon timely initial care.

Time is the enemy. In the time you take to read this article, the fate of a sudden cardiac arrest victim is decided. Without any intervention, the chances for survival decline by 10 per cent for every minute that passes. Globally, the average time taken by an ambulance to respond is more than 10 minutes.

That means the best chance a victim has to survive is if someone who has witnessed the event (what we call a "bystander") starts CPR and uses an automated external defibrillator (AED).

MUCH PROGRESS MADE

Community interventions such as CPR training in schools, during national service and through the Dare (Dispatcher-Assisted First Responder) programme, dispatcher-assisted CPR and the MyResponder application (activation of volunteer first responders with a smartphone app) have seen Singapore's "bystander" CPR rates increase from 20 per cent to more than 50 per cent today.

We are also seeing a fivefold increase in the use of AEDs through the Save-A-Life programme and

mapping of public AEDs.

Advanced treatments by firefighters and ambulance crews (high-performance CPR, devices to deliver drugs, open the airway, and mechanical CPR) and at the hospital (cooling to protect vital organs, opening blocked arteries, heart-lung bypass) mean that more than 70 per cent of survivors have good brain function on discharge.

But the current pandemic has shown how fragile this progress is. We have seen a small decline in bystander CPR rates (10 per cent to 15 per cent). With a highly transmissible virus, there have been concerns about bystander CPR.

However, with "hands-only" CPR, low community rates of Covid-19, masking of the population and hand hygiene, the potential benefits of bystander CPR far outweigh potential harm.

CHAIN OF SURVIVAL

It takes a system to save a life. Researchers use a concept called the "chain of survival" to describe the fact that a well-coordinated response is key to survival and there is no single "magic bullet". The key elements in the chain of survival include: community (early recognition of cardiac arrest, CPR, AED), dispatch (early activation of the 995 system, telephone CPR instructions and sending appropriate help), ambulance (early advanced care) and hospital (post-resuscitation care).

Research into improving systems of care, such as that conducted at Singapore's newly established Pre-hospital and Emergency Research Centre, hosted at Duke-NUS Medical School, is vital in our efforts to save lives.

I spoke to Tesha after her discharge from hospital and it was a joy to hear that she had returned to her normal life. I remember how passionately she advocated for everyone to learn CPR to save a life.

However, the truth is that even today, most of our cardiac arrest victims still do not have as good an outcome as Tesha. Recently, one of my colleagues, a wonderful surgeon and human being, died in the prime of his life from sudden cardiac arrest after collapsing while running in East Coast Park.

Yet, many cardiac arrest victims can be saved with a little help from bystanders.

With an ageing population, the numbers of cardiac arrests are still increasing every year. While we are seeing more survivors every year, the majority of cardiac arrest victims still die. Many could have been saved.

Each year, we hold a simple ceremony called the Survivor Awards to celebrate the lives saved and the unsung heroes – bystanders, 995 staff, paramedics and MyResponder volunteers – who helped to save them. Together, we can snatch victims like Tesha from the jaws of death and save more lives.

stopinion@sph.com.sg

• Professor Marcus Ong is the director of Duke-NUS Medical School's health services and systems research programme and senior consultant and clinician scientist at Singapore General Hospital's Department of Emergency Medicine.



With time being the enemy, the best chance a cardiac arrest victim has to survive is if someone who has witnessed the event – a "bystander" – starts cardiopulmonary resuscitation and uses an automated external defibrillator, says the writer. PHOTO: LIANHE ZAOBAO