

Cardiac arrest survivors need proof of neurological function before percutaneous coronary intervention

George A Skowronski

Early percutaneous coronary intervention (PCI) is now commonly used in many Australian hospitals to treat patients after out-of-hospital cardiac arrest (OHCA), despite a lack of clinical trial evidence of efficacy. As the high mortality of OHCA is much more often due to its neurological consequences than to its (often presumed) cardiac cause, and the costs of PCI are substantial, it would be more appropriate to reserve PCI for those patients who are likely to achieve a favourable neurological outcome.

The mortality of OHCA remains uniformly high. In the most recently published large Australian study in 2002, only 3% of patients with OHCA to whom emergency responders were called survived to hospital discharge.¹ Of the 8% who survived to reach hospital, only around a third survived to hospital discharge. The Australian study made no attempt to evaluate the neurological status of survivors.

In the recently published SOS-KANTO study from Japan,² only 3% of patients reaching hospital after OHCA and bystander cardiopulmonary resuscitation (CPR) had favourable neurological outcomes. Even in the subgroup in whom the arrest had a primary cardiac cause, only 4% had favourable neurological outcomes.

Studies that have reported considerably better neurological outcomes have been very restrictive in patient selection. For instance, the European hypothermia study claimed a good neurological outcome in its treatment arm in 55% of patients.³ However, this study had extremely strict entry criteria, comprising ventricular fibrillation or pulseless ventricular tachycardia, witnessed arrest, presumed cardiac aetiology, age range of 18–75 years, a “down-time” of no more than 15 minutes, and return of spontaneous circulation no longer than 1 hour from collapse. Exclusions also included hypotension, hypoxaemia and “factors that made participation in follow-up unlikely”. In fact, 92% of those screened were deemed ineligible for this trial.

Thus, OHCA is a disease carrying a very high morbidity and mortality, most of which is due to its neurological, rather than cardiac, consequences.

Reperfusion therapy using thrombolytic drugs — now rarely used following OHCA — has been shown to improve survival in this setting in several small studies and a meta-analysis,⁴ and is the subject of a large-scale

randomised controlled trial in Europe, the TROICA (Thrombolysis in Cardiac Arrest) trial. Thrombolysis has been proposed as having potential benefits for the cerebral, as well as the coronary, circulation in this setting, and has not been associated with an excessive bleeding risk in selected patients, even after CPR.

By contrast, PCI following OHCA has become ubiquitous despite the complete absence of evidence of benefit from clinical trials. A recent small Norwegian study⁵ reported a 56% hospital survival with good neurological outcome using a protocol which included PCI as well as therapeutic hypothermia — results similar to those reported using hypothermia alone. However, in this single-centre observational study that included only arrests of cardiac cause, 98% of arrests were witnessed, the initial rhythm was ventricular fibrillation in 90%, bystander CPR was performed in over 70%, 70% of patients were younger than 70 years, and the ambulance response time averaged 6 minutes. This is quite different from the spectrum of OHCA seen in a typical Australian hospital. Moreover, PCI was performed only in patients who showed clear evidence of ST-segment elevation myocardial infarction (STEMI).

Two other Norwegian case series^{6,7} also suggest that patients with OHCA who undergo early PCI can do well, but both these series also involved highly selected patient groups. Even in the most optimistic studies published to date, the mortality of OHCA patients treated with PCI remains around 50%.

In the absence of a large-scale, randomised controlled trial, PCI should not be routinely performed following OHCA. In those patients with clear evidence of evolving STEMI at presentation, current evidence tends to favour the use of thrombolytic drug therapy (where at least two small randomised controlled trials show benefit) over PCI. For the time being, early PCI should remain a treatment of last resort following OHCA, until the neurological prognosis is clear.

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