Medical Xpress

Cardiac arrest patients do better if taken immediately to a specialist heart center

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People who suffer cardiac arrest outside of hospital have a better chance of survival if they are taken immediately to a specialist heart centre rather than to the nearest general hospital, according to research published today (Wednesday) in the *European Heart Journal*. The study found that distance needed to travel to a specialist heart centre was not linked to better or worse risk of death.

In specialist heart centres invasive diagnostic and treatment procedures—coronary angiography (CAG) and percutaneous coronary intervention (PCI)—can be performed and the researchers found these were also linked to a significant difference in survival, improving the chances of survival by 45% compared to patients who were not treated in this way. These procedures are most effective if carried out within six hours of the first call to emergency services and more than 90% of CAG and PCI in this study occurred within this time.

The researchers led by Dr Tinne Tranberg, a cardiologist at Aarhus University Hospital (Aarhus, Denmark) say their findings support the establishment of few, high-volume invasive heart centres to which patients should be transferred directly by the emergency medical services, regardless of the distance.

"We acknowledge that you should always be careful when generalising results to other countries with different emergency services, treatments available before arrival at hospital, medical culture and so on," said Dr Tranberg. "However, we do think our results are applicable to other

countries. These findings are in line with experience regarding performance of percutaneous coronary intervention, which show that high-volume invasive heart centres are associated with better outcomes for patients."

Dr Tranberg and colleagues analysed data from 41,186 patients who had suffered an "out-of-hospital cardiac arrest" between 2001 and 2013 in Denmark, making this the biggest study ever to investigate the associations between distance to invasive heart centres, performance of emergency CAG and PCI with six hours of the first contact with the health care system, and the level of care provided immediately after a cardiac arrest.

A total of 3,550 (9%) patients were still alive 30 days after suffering a cardiac arrest; 7,373 patients (29%) were admitted directly to an invasive heart centre, while the majority, 17,991, were admitted to a local hospital; 1,785 (21%) of patients who achieved a return of spontaneous circulation had CAG performed and 1,262 (15%) had PCI performed after CAG.

Compared with other cardiac arrest patients, admission directly to an invasive heart centre was associated with an 11% improvement in the chances of still being alive 30 days after the event, CAG/PCI was linked to a 45% improvement, being in highly populated area (population density above 2000 people per square kilometre) was linked to a 10% improvement, cardiopulmonary resuscitation (CPR) by a bystander was linked to a 10% improvement, and having the cardiac arrest when other people were around to witness it was linked to a 12% improvement in the chances of survival.

Dr Tranberg said: "Generally speaking, the pre-hospital treatment is equal and uniform in Denmark, which is crucial in surviving a cardiac arrest. However, our results show that among cardiac arrest patients

admitted to hospital, those admitted directly to an invasive heart centre have a higher chance of surviving, regardless of the distance. Thus, these results support a strategy that prioritises the establishment of an efficient pre-hospital organisation over the establishment of multiple geographically distributed heart centres, and suggest that patients should be admitted directly to few invasive heart centres for optimal post-resuscitation care."

There was a large increase over the period of the study in the proportion of patients receiving cardiopulmonary resuscitation: 18% in 2001 and 60% in 2013. CPR given by a bystander was linked to a 10% improvement in the chances of survival.

Overall survival 30 days after a cardiac arrest increased significantly over time: 5% in 2001 and 12% in 2013, with the largest increase being seen in patients who did not receive CPR from a bystander: 3% in 2001 and 10% in 2013. "The explanation for these results may be improved emergency services skills and better in-hospital treatment. Importantly, our results indicate that the improvement in rates of cardiopulmonary resuscitation given by bystanders is not the only reason for improved survival following a cardiac arrest," said Dr Tranberg.

She concluded: "Centralisation, with fewer high-volume invasive heart centres, is an essential prerequisite for advanced post-resuscitation care. Furthermore, uniform and aggressive use of acute coronary angiography and percutaneous coronary intervention in cardiac arrest patients may translate into an even higher survival rate in the future."

Patients in this study were not randomised and so the researchers stress that it can only demonstrate an association, not a causal relationship, between survival and hospital level of care, as well as acute CAG/PCI.

More information: "Distance to invasive heart centre, performance of

acute coronary angiography, and angioplasty and associated outcome in out-of-hospital cardiac arrest: a nationwide study", by Tinne Tranberg et al. *European Heart Journal*. DOI: 10.1093/eurheartj/ehx104

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