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Resuscitation

More supportive evidence for Cardiac Arrest Centres

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More supportive evidence for Cardiac Arrest Centres

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The incidence of emergency medical services (EMS)-treated out of hospital cardiac arrests (OHCA) vary significantly amongst different regions. It ranges from 40.6 per 100,000 person-years in Europe, 45.9 in Asia, 47.3 in North America, to 51.1 in Australia.[1] Nevertheless the ability of EMS to correctly triage and manage patients who have sustained sudden cardiac arrest in the prehospital setting is crucial to increase patient survival.[2] Cardiac arrest registries have been set up around the world to provide understanding of epidemiology of OHCA, and valuable opportunities for both performance evaluation and clinical research.[3]

The number of national registries has increased significantly in the past decade. A recent review identified 49 cardiac arrest registries, 15 sudden cardiac death registries and 9 other registries worldwide.[4] An OHCA Utstein Resuscitation Registry template was introduced in 2015 to encourage structured framework and universal data collection, and to facilitate inter and intra-system comparison of system factors and patient outcomes following OHCA.[5] A 2020 report into registries reviewed that key system factors that crucially determine EMS response such as dispatch and triage criteria, decision making on patient transfers and destinations and differences in legislation are not being collected.[3] The significant heterogeneity in different EMS systems meant that direct comparisons of patient outcomes remains fraught with difficulty. A systematic review and meta-analysis examined whether patients should be cared for in designated cardiac arrest centres (CACs) found very low certainty of evidence that supports post-cardiac arrest care at CACs is associated with improved outcomes at hospital discharge.[6] Significant knowledge gaps exist on how transport distance may affect patient outcomes, how direct transfer compare with secondary transfer and whether there is any difference in outcomes for patients who present with shockable versus non-shockable initial cardiac rhythm.

In this issue, Yoon et al. presented data on 6935 patients who were treated by EMS and achieved prehospital return of spontaneous circulation (ROSC) from Korean Out of Hospital Cardiac Arrest Registry.[7] The authors were interested in two specific areas: outcomes of patients who suffer pre-

hospital arrest, resuscitation capacity of the receiving hospital was classified as (Heart Attack Center, HAC versus non-HAC) and whether these two factors interact. In their multivariable logistic model, patients in the prehospital re-arrest group had worse outcomes in terms of neurological recovery and for survival to discharge compared to those who did not rearrest. Patients who were transferred to an HAC had higher probability of favourable neurological recovery and survival to discharge compared to patients who were conveyed to a non-HAC. The authors conducted additional interaction analysis and was able to demonstrate that transfer to HAC could significantly improve both favourable neurological outcome as well as survival to discharge in patients who suffer prehospital rearrest.

Their findings of significant beneficial effect of transfer to HAC is noteworthy. Baseline demographics revealed that patients who sustain prehospital rearrest had fewer witnessed cardiac arrests, higher rates of non-shockable presenting rhythms and they were less likely to have received bystander CPR. They required more advanced life support interventions including advanced airway, defibrillation, more medications, and longer EMS on scene time. Despite these factors mostly known to be associated with poor outcome, significant gains can still be made if patient was transferred to HAC. This highlights the needs for EMS transfer protocol to consider the dynamic changes in a patient's condition and subsequent level treatment and support that the patient will need.

This study had some limitations. Like other registry-based cohort studies and despite the authors' best efforts, this study may suffer from inherent bias due to confounding factors. Study findings based in Korea may not be generalisable to other patient populations. At the time of the study, Korea has 75 designated HACs with 24/7 percutaneous coronary intervention capacity but no designated CACS with added prognostication and neurology input. The study also did not undertake quantitative analyses of timing, duration of rearrest and ECG rhythms.[8] There was no data available on treatment received by patients following hospital admission and how post resuscitation care was managed. Whilst their findings were unable to fully explain why admission to HAC led to

improved patient outcomes, they are generally in keeping with other recent studies [9,10] and supportive of transfer to hospitals with PCI capacity or CAC as recommended by international guidelines.[11,12]

European Resuscitation Council recommends the measurement and evaluation of resuscitation systems so that key areas can be targeted for improvement by organisations or communities that treat cardiac arrest.[13,14] Whilst some systems have managed successful data linkage between cardiac arrest registries, national statistics and outcome data, other systems have struggled to get comprehensive coverage.[15-18] The application of data mining and risk prediction models could help focus future research efforts but crucial data beyond prehospital and EMS is required.[19,20] A collaborative and whole systems approach in cardiac arrest registries that consists of EMS, hospital and post-discharge data is indispensable in our efforts to improve patient outcomes from OHCA.

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