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An observational study assessing the impact of a cardiac arrest centre on patient outcome

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Background: Out-of-hospital cardiac arrest (OHCA) is a major cause of death in Europe and the United States. There has been recent literature to suggest that the centralisation of OHCA services may benefit patient outcomes. In 2015, two major tertiary cardiac centres in the UK agglomerated to form a large dedicated tertiary cardiac centre. The previous centre had strict criteria on which OHCA patients could be admitted, with the vast majority of cases being STEMI-related. After the agglomeration, admission criteria were relaxed to include all OHCA cases within geographic range with a suspected cardiac cause.

Purpose: This study aimed to compare the short-term mortality of patients admitted with an OHCA to a tertiary cardiac centre before-and-after a major agglomeration of services had taken place and admission criteria had been relaxed.

Methods: We retrospectively analysed the data of patients admitted before and after agglomeration (2015) with OHCA who were resuscitated via conventional cardiopulmonary resuscitation. Baseline demographic characteristics were recorded, along with factors relating to the cardiac arrest. Primary endpoint was in-hospital mortality.

Results: A total of 650 patients (189 before and 461 after the agglomeration) with an OHCA between 2013 and 2018 were analysed. Patients admitted pre-merger were older (67.7 vs 62.4 years, p=0.022), otherwise there were similar baseline demographic characteristics between patients admitted before and after the agglomeration (pre vs post) in terms of gender (74.4% vs 75.9% male, p=0.827), ethnicity (66.7% vs 58.9% Caucasian, p=0.588) and existing coronary artery disease (22.8% vs 22.7%, p=0.432). There were also similar peri-arrest characteristics, with a comparable number of patients having a non-shockable rhythm (15.4% vs 25.4%, p=0.164) and similar total downtimes between the groups (33 vs 32.3 mins, p=0.883). Interestingly there was a decrease in those with cardiogenic shock on arrival (92.3% vs 57.0%, p=0.0001) and fewer patients with an ejection fraction <30% (63.2 vs 38.7%, p=0.0003) post-agglomeration. There was a greater proportion of non-ACS-related OHCA admission after the agglomeration (16.9% vs 24.1%, p=0.047) and a corresponding decrease in those admitted with a STEMI (81.5% vs 62.3%, p=0.032) and those treated with PCI (77.8% vs 54.0%, p=0.034). Despite this, in-hospital mortality was lower after the agglomeration (69.7% vs 47.1%, p=0.019), which persisted after adjustment for the previously described demographic and arrest-related characteristics using stepwise logistic regression (p=0.036) between the two groups.

Conclusion: Despite an increase in non-ACS-related-OHCA cases, the formation of a centralised invasive heart centre was associated with improved survival in OHCA patients. This suggests there may be a benefit for an out-of-hospital cardiac arrest-centre model of care, supporting a centralised strategy for immediate post-resuscitation care in OHCA patients.