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Editorial

Comorbidity and cardiac arrest: A continuing conundrum

The management of the increasing comorbidity and multi-morbidity burden is a key challenge in 21st century healthcare delivery [1]. In cardiac arrest, patients with a higher number of comorbidities are less likely to survive a resuscitation attempt [2–4]. However, individual comorbidities may influence survival in different directions, such that whilst most comorbidities are associated with worse outcomes, others may have no association or may even be associated with improved outcome [5–7]. Observational studies report that resuscitation attempts are made in an increasing number of comorbid patients [2,8]. In a study of 813,493 American in-hospital cardiac arrest patients, the percentage of patients with a Charlson Comorbidity Index (CCI) score ≥ 4 increased by 4.9% between 2000 and 2009, although the percentage of patients with some comorbidities, such as congestive heart failure, decreased over this period [2].

In this edition of Resuscitation, a cohort study by Hjalmarsson and colleagues provides important new information about this complex relationship between comorbidities and in-hospital cardiac arrest survival [9]. Using data from a Swedish hospital registry, they describe the comorbidity burden and outcome of 1373 adult in-hospital cardiac arrest patients over a nine-year period. Comorbidity burden is categorised using the Age-adjusted CCI as low (0–2 points), medium (3–5 points), high (6–8 points), and very high (≥ 9 points).

Over the study period, the comorbidity burden remained relatively constant. Overall, the number of patients falling in the high and very high category categories was 351 (25.6%) and 128 (9.3%) patients respectively. In line with previous studies, increased comorbidity burden was associated with non-survival. Across the whole cohort, 30-day survival was 27%, with a 30-day survival of 11% and 10% reported in the high and very high comorbidity groups respectively. Over the study period survival in both the low and medium comorbidity groups increased significantly, although the lack of observed effect the high and very high groups may reflect a lack of statistical power in these groups.

The key strength of the study is the use of an institutional in-hospital cardiac arrest database with almost complete data capture, with linkage to other datasets to derive the Age-adjusted CCI score and 30-day outcome. Secondly, the study used the validated CCI to classify comorbidity, which is the most frequently used system in the cardiac arrest literature [10,11]. However, variability across cardiac arrest studies in the way that data and groups are categorised makes it challenging to directly compare studies [3,4]. Other key study limitations include the moderate size of the dataset (1373 patients), such that some analyses likely lacked statistical power, and lack of data on important patient-focused outcome measures, such as neurological outcome.

So, how should these study findings inform practice? Survival in both the highest comorbidity groups was similar to that reported in patients presenting in non-shockable rhythms [12]. As such, these data suggest that in select cases, patients with a high or very high comorbidity burden may be appropriate candidates for resuscitation. As noted by the authors, study findings should be seen in the context of a country with an established system for making and recording Do Not Attempt Cardiopulmonary Resuscitation decisions, which will not reflect practice across all countries [9,13].

This highlights a challenge in practice in identifying which patients may benefit from resuscitation and which patients are unlikely to benefit due a low likelihood of success. Resuscitation decisions typically incorporate assessment of comorbidities, alongside considerations such as the acute condition, level of frailty, functional status, and patient wishes. Such assessments are often based on individual clinical judgement, which is likely reflected in evidence of variability in the making of DNACPR decisions.[14,15].

The use of scoring systems has the potential to help inform resuscitations decisions and reduce variability in decision-making. For example, the GO-FAR score is a validated score that uses pre-arrest characteristics to categorise patients (very low, low, medium, high) based on their predicted likelihood of IHCA survival with good neurological outcome [16]. However, the time-dependent nature of the score, such that the score may fluctuate over time, makes the score challenging to use to inform resuscitation decision-making in clinical practice. Interestingly, the four main factors that determine the score relate to admission neurological status, acute condition (major trauma or acute stroke), and age of 85 years and above, rather than being comorbidity variables.

Comorbid state is associated with cardiac arrest outcome. However, as demonstrated in this study by Hjalmasson et al, select patients with high comorbidity burden may have acceptable survival rates following IHCA. As such, whilst the patient's comorbid state should inform decisions on prognostication and DNACPR decisions, the precise weight that clinicians should give to individual comorbidities and overall comorbidity burden in making these decisions remains unclear. Future research should seek to clarify further how comorbid function and other factors influence in-hospital cardiac arrest outcome.

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Conflict of interest

SPT and KC have no conflicts of interest.

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