Outcomes of Cardiac Arrest in Brunei Darussalam

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Abstract
Cardiac arrest outcomes in Brunei Darussalam have not been previously reported. The mean (SD) time of arrest to cardiopulmonary resuscitation in hospital was 1.6 min (2.31 min; range 0–6 min) compared to the mean (SD) time of arrest to first cardiopulmonary resuscitation out of hospital of 19 min (23.91 min; range 0–87 min). The majority (71.2%) were out-of-hospital cardiac arrests (OHCA) (versus in-hospital cardiac arrests (IHCA)). One-year median survival for cardiac arrests was 1.4% which is below survival rates reported by other groups previously. Median 1-month survival rates were 25% for IHCA versus 5% for OHCA. Survival rates at 1 month for shockable rhythms were better (40%; p<0.001) for IHCA versus 16.7% for OHCA. Survival from cardiac arrests is low in Brunei Darussalam. This is associated with low rates of bystander cardiopulmonary resuscitation and may need to be addressed to improve outcomes.

Keywords
Cardiac arrest, resuscitation, VF, ventricular tachycardia

Almost one-third of the global population die of cardiovascular diseases annually, and cardiovascular disease is the second leading cause of mortality in Brunei after cancer.1 Survival rates can range from 0% to 42% for in-hospital cardiac arrests (IHCA) and are generally lower for out-of-hospital cardiac arrests (OHCA).2 This is the first report to determine the outcomes of cardiac arrests in Brunei.

A 3-year retrospective record review of patients who experienced cardiac arrest in the Brunei Muara district of Brunei Darussalam (January 2017 to December 2019) identified 145 patients who met the inclusion criteria (age >12 years). A further 34 patients were excluded (26 do-not-resuscitate patients, six trauma patients, two patients with missing outcomes).

The majority were Malay (82.1%), had hypertension (97%) and were male (66.2%). The mean age of this population was 50.3 years (SD 16.1). A ‘Utstein style’ template was used to collect data on the arrest, resuscitation, first cardiac rhythm and return of spontaneous circulation.2 R Studio V3.5.2 (The R Foundation) was used to analyse data, and p<0.050 was considered statistically significant.

Most arrests were OHCA (71.2%), and vital signs not recorded within the 3 h prior to the arrest. Although they were often witnessed by a lay person (73.1%), bystander cardiopulmonary resuscitation (CPR) was not performed in all cases. Emergency medical services were called in 81.4% of cases and 44% were resuscitated.

Time to treatment was faster for IHCA patients. The mean (SD) time of arrest to first CPR in hospital was 1.6 min (2.31 min; range 0–6 min), whereas the mean (SD) time of arrest to first CPR out-of-hospital was 19 min (23.91 min; range 0–87 min).

There was a higher median 1-month (27.3%) and 1-year (18.2%) survival in patients with shockable compared with non-shockable rhythms (p>0.005). Survival of IHCA patients with shockable rhythms (40% 1 month; 20% 1 year) was significantly higher than OHCA patients (16.7% 1 monthly; p=0.001). Overall survival rates were higher in IHCA patients (25% 1-month median survival) compared with OHCA patients (5% median 1-month survival; p<0.001).

There was a very low 1-year survival rate in this patient cohort (1.4%, n=2), which was below the ranges for OHCA observed in other countries in the Asia-Pacific region (2.7–8.0%), Europe (6.4–12.0%) and North America (2.8–5.3%), and IHCA (13%).1,3 This may be explained by a lack of bystander CPR and delays to the first defibrillation attempt, especially for OHCA. Survival rates were higher in the hospital setting, 40 out of 41 IHCA patients were witnessed and immediately resuscitated, in common with most published studies.2 Shockable rhythms (VF, ventricular tachycardia) had significantly higher survival rates to discharge than non-shockable rhythms, as this is more easily treated by defibrillation.

This is the first report of cardiac outcomes from Brunei following cardiac arrest.
arrest. A cardiac arrest registry to monitor resuscitation practices and outcomes, including implementation of a simple and standardised ‘Utstein’ template data collection form, is recommended to help improve outcomes.\(^4\) Further training and community engagement are needed to improve the observed very low rates of bystander resuscitation in Brunei Darussalam.

**Clinical Perspective**

- Survival rates for cardiac arrests in countries with low bystander rates of cardiopulmonary resuscitation can be low.
- As expected, outcomes for IHCA are better than OHCA with a shorter time of arrest to first cardiopulmonary resuscitation.
- The observed survival rates appear to be lower compared to data from the region and internationally, and concerted efforts may need to be undertaken involving multiple stakeholders in order to improve outcomes.

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