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Clinical Investigation

Pattern and Outcome of Heart Failure–Related Hospitalization Over 5 Years in a Remote Australian Population: A Retrospective Administrative Data Cohort of 617 Indigenous and non-Indigenous Cases

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ABSTRACT

Objective: The aim of this work was to understand the pattern and outcomes for heart failure (HF)–related hospitalization among Indigenous and non-Indigenous patients living in Central Australia.

Methods and Results: A retrospective analysis of administrative data for patients presenting with a primary or secondary diagnosis of HF to Central Australia's Alice Springs Hospital during 2008–2012 was performed. The population rate of admission and subsequent outcomes (including mortality and readmission) during the 5-year study period were examined. A total of 617 patients, aged 55.8 ± 17.5 years and 302 (49%) female constituted the study cohort. The 446 Indigenous patients (72%) were significantly younger (50.8 ± 15.9 vs 68.7 ± 14.9; $P < .001$) and clinically more complex compared with the non-Indigenous patients. Annual prevalence of any HF hospitalization was markedly higher in the Indigenous population (1.9%, 95% CI 1.7–2.1) compared with the non-Indigenous population (0.5%, 95% CI 0.4–0.6); the greatest difference being for women. Overall, non-Indigenous patients had poorer outcomes and were significantly more likely to die ($P < .0001$), but this was largely driven by age differences. Alternatively, Indigenous patients were significantly more likely to have a higher number of hospitalizations, although indigeneity was not a predictor for 30- or 365-day rehospitalization from the index admission.

Conclusion: The pattern of HF among Indigenous Australians in Central Australia is characterized by a younger population with more clinically complex cases and greater health care utilization. (*J Cardiac Fail 2017;■■:■■–■■*)

Key Words: Epidemiology, heart failure, health outcomes, Indigenous, remote.

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Heart failure (HF) continues to exert an exacting burden on individuals and populations worldwide.[1] However, the overall pattern of diseases related to HF varies according to the characteristics and levels of antecedent risk within a population. The most common pathways to HF worldwide are coronary artery disease (CAD) and hypertension.[2] In high-income countries, there is a predominance of HF with reduced ejection fraction (HFrEF) among relatively younger men with a history of ischemic cardiac events. This contrasts to greater levels of HF with preserved ejection fraction (HFpEF) seen in older women in whom hypertension is more prevalent.[3] However, research from low-to-middle-income countries (LMIC) reports a different etiology. In sub-Saharan Africa, a combination of traditional communicable and noncommunicable diseases (hypertension, obesity but not type II diabetes [T2D], and rheumatic heart disease) linked to epidemiologic transition has led to a predominance of women and younger individuals with a completely different pattern of HF compared with high-income countries.[4] The burden of HF is intensified in these communities by a combination of poverty and lack of health care resources and evidence-based strategies specifically tailored to the needs of the local population.

Beyond global heterogeneity in patterns of disease, socioeconomic gradients and other factors can often drive distinct differences in the burden of disease within the same population. Nowhere is this more evident, than in the high-income country of Australia. Australian Aboriginal and Torres Strait Islander peoples (Indigenous Australians) have a life expectancy 10–14 years less than non-Indigenous Australians.[5] Notably, cardiovascular disease (CVD) accounts for one-fourth of this key disparity.[6] However, there remains a paucity of data to describe what forms of CVD are most prevalent among the Indigenous population. With the exception of 2 key studies,[7,8] this critical lack of data is particularly true for HF. Both of those existing studies suggest that among Indigenous Australians the pattern of HF is more consistent with that found in LMIC, that individuals are more likely to be younger and female and to have a nonischemic form of the syndrome.

Study Aims and Hypothesis

We conducted a retrospective cohort study to address the lack of critical data relating to HF in Indigenous Australians, with a particular focus on documenting the pattern of HF hospitalizations and subsequent outcomes in Central Australia (CA). Based on the results of our previous findings at a population level, we hypothesized that Indigenous Australians would experience higher rates of hospitalization and poorer health outcomes than their non-Indigenous counterparts.

Methods

This was a retrospective cohort study using administrative hospital and clinical services data in Central Australia (CA). Wherever possible, it adhered to the RECORD (Reporting of Studies Conducted Using Observational Routinely Collected Data) guidelines for an observational study using administrative data.[9] The study was approved by the local human ethics research committee (Central Australian Human Research Ethics Committee). The study complied with the principals outlined in the Declaration of Helsinki.

Study Setting and Design

This study focused on the geographically dispersed communities of CA (Fig. 1), whose population is estimated to be 50,000–60,000 individuals with just under one-half being Indigenous.[10] Alice Springs (estimated population of 25,000)[10] is the commercial hub for Central Australia (estimated area 546,046 km^2); as such, the study was conducted at the Alice Springs Hospital (ASH). ASH is a 180-bed hospital that has a geographic catchment of >1.6 million km^2 including CA and the adjacent remote regions of Western Australia (WA) and South Australia (SA).[11] It is the major hospital for this area where all incident cases of HF are managed. Notably, the hospital has only visiting cardiology specialists, and most advanced cardiac investigations (other than echocardiography but including coronary angiography) require transfer to distant tertiary hospitals. A small hospital, with ~20 beds, is situated ~500 km north of Alice Springs; that hospital is managed and staffed by the same service department, and its inpatient data is linked to ASH.[11] Given its unique setting, ASH activity can be used as a reliable barometer for patterns of health and health care in this remote region of Australia.

A retrospectively designed audit was developed with the use of hospital data. All patients presenting at ASH with a primary or secondary diagnosis of HF within a 5-year period (January 1, 2008–December 31, 2012) were screened for inclusion in the study. Primary and secondary diagnosis of HF was based on the International Classification of Disease 10th Revision (ICD-10) discharge code for HF (I50.*n*). Patients were excluded from the study if their permanent residence was outside the ASH jurisdiction. The earliest or the only admission in the study period was taken as the index admission. Each patient was assigned a unique identifying code and all patient data were labeled accordingly.

Overall, 675 HF-related index admissions were identified during the study period, with 58 patients (9%) matching the exclusion criteria. Of the remaining 617 patients, 446 (72%) identified themselves as Indigenous and 62 (10%) were derived from adjacent WA/SA (these cases being excluded for population estimates—see below).

Study Data

Demographic and clinical data were collected for age, sex, indigeneity, location, primary diagnosis, comorbidities, and mortality for the index hospitalizations and recurrent hospitalizations (described in more detail below). Previous reports have shown high levels of accuracy (98%) of the demographic and clinical data from this hospital.[12]