

Long-term Outcomes of Patients with Acute Myocardial Infarction Presenting to Regional and Remote Hospitals



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Background

Acute myocardial infarction (AMI) has poorer outcomes in disadvantaged populations such as those in regional and remote locations. We compared long-term outcomes associated with presentation to regional or remote hospitals among AMI patients.

Methods and Results

Administrative claims data from New South Wales (27% regional and remote residents) was used to identify patients >18 years admitted to any NSW hospital with a principal diagnosis of AMI (ICD10 codes: I21.0-I21.4) between 01/07/2004 and 30/06/2008. Hospital of presentation location with a population <250,000 was defined as regional and remote while hospitals with a population >250,000 were deemed urban. Receipt of revascularisation and mortality were analysed and adjusted for age, comorbidities and previous revascularisation. Patients were censored at death or end of the follow-up period (31 December 2009).

39,798 patients were identified with 9,393 (23.6%) regional and remote presenters. In multivariable models, regional and remote presentation was associated with reduced rates of revascularisation (OR 0.30 95%CI 0.28-0.32; $p<0.001$), no impact on overall mortality (HR 1.04 95%CI 0.99-1.02; $p=0.11$), but with increased mortality for patients presenting with STEMI (HR 1.14; 95% CI 1.06-1.23; $p<0.001$). The propensity analysis was consistent with these findings.

Conclusions

Presentation to a regional and remote hospital was associated with lower revascularisation rates following AMI, but with a higher long-term mortality if presenting with ST segment elevation.

Keywords

Myocardial infarction • Epidemiology • Revascularisation • Mortality • Statistics

Introduction

Ischaemic heart disease remains the leading cause of death worldwide and a large consumer of health resources [1,2]. The prevalence of ischaemic heart disease risk factors, such as obesity and diabetes, continue to rise, with higher rates reported in rural populations [3]. These populations have

significantly poorer outcomes in diseases such as cancer, but the impact of regional and remote healthcare is less well characterised for ischaemic heart disease [4–7].

Acute presentations of ischaemic heart diseases or acute myocardial infarction (AMI), by virtue of their rapidity of onset and the proven value of timely intervention, are likely to be especially susceptible to the impact of geography upon

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outcomes [7,8]. US Medicare population data has shown markedly lower revascularisation rates and higher short-term mortality with AMI in rural hospitals [9–11]. Scandinavian data has shown lower revascularisation rates with increasing distances from services, but the distances are relatively small [12]. The vast landmass and low population density of Australia is likely to be the setting most susceptible to any impact of remoteness upon health service access and patient outcomes. Recent Australian studies, focussing upon the impact of Indigenous race upon AMI treatment, have shown lower revascularisation rates and higher mortality in non-urban hospitals [13–15]. Other Australian registry analyses have also shown lower revascularisation rates in patients in regional and remote locations but have not been of a scale to compare the effect of location of presentation on health service utilisation and survival post AMI [16–18]. The impact of the lower revascularisation rates on long-term outcomes in contemporary regional and remote populations are lacking.

Australia has a universal health care system providing access to population-wide data and also has a large regional and remote population. The challenges of delivering high quality care over vast distances, provides an ideal scenario to assess long-term outcomes in regional and remote populations.

Given that a third of the Australian population (7.3 million) live in New South Wales (NSW) and, of these, 27% live in regional and remote areas, we used patient level data from the NSW state-wide hospitalisation cohort, to examine the impact of regional and remote hospital presentation upon revascularisation rates, and long-term patient survival, in contemporary non-Indigenous patients with AMI.

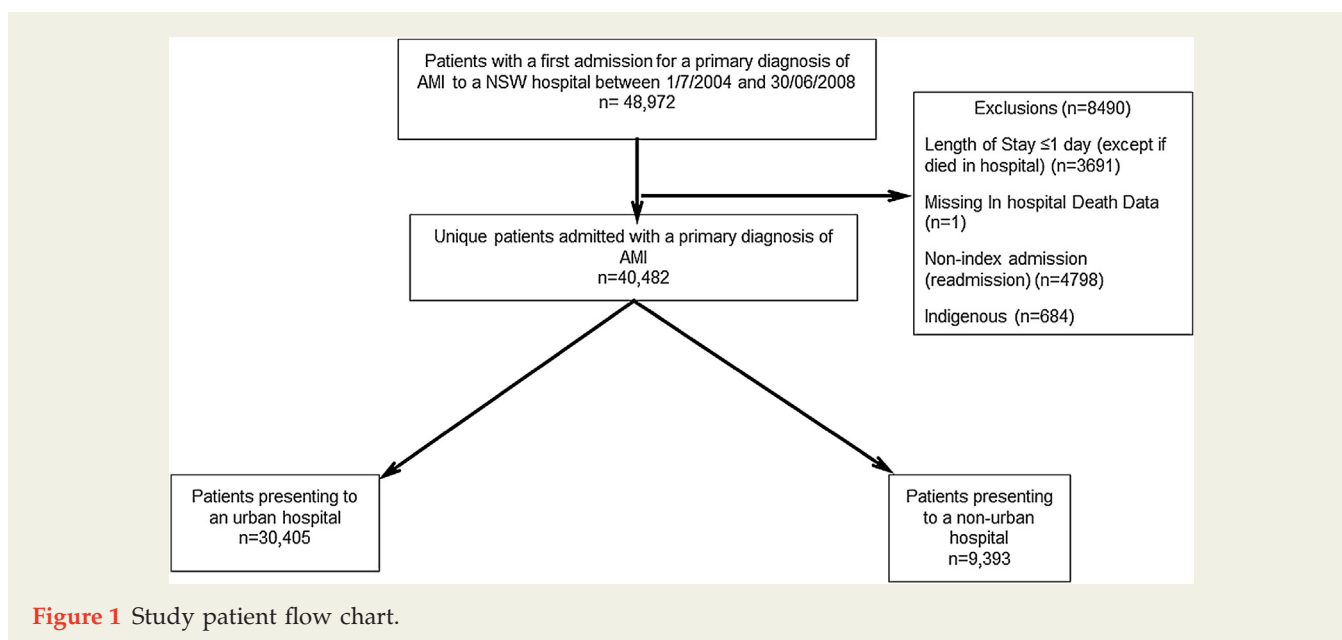
Material and Methods

Study Population

Probabilistic matching with demographic variables was used to create a linked dataset between the NSW Admitted Patient Data Collection (APDC) and the NSW Registry of Births Deaths and Marriages (RBDM) [19,20]. The APDC records admissions for all patients presenting to a NSW healthcare facility and uses the International Classification for Diseases – 10 Australian Modification (ICD10-AM) to code for diagnoses, procedures and co-morbidities. The RBDM is the state-wide death registry. The study was granted ethical approval by the NSW Population and Health Services Research ethics committee (Approval number: 2009/11/199).

Selection Criteria

All unique patients over the age of 18 admitted with a diagnostic code for AMI using the ICD10-AM codes: I21.0–I21.3 and I21.4 between the 1st of July 2004 and the 30th of June 2008 as the primary diagnosis were included. A first admission longer than 24 hours after the 1st of July 2004 was defined as the index admission. Patients were excluded if the admission length was less than 24 hours without evidence of in-hospital death, as they were likely incorrectly coded as an AMI [21]. Records with missing data and re-admissions were excluded (Figure 1). Inter-hospital transfers were identified using date of admission, date of separation and hospital. An admission to a different acute care hospital for the same patient during or within ≤ 24 hours of discharge from the presenting hospital for the index hospitalisation was defined as an inter-hospital transfer. Inter-hospital transfers



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