

The impact of inter-hospital transfers in acute coronary syndrome, in Perth WA

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Introduction

Cardiovascular disease is recognised as the leading cause of death and disability in Australia and in 2002 Acute Coronary Syndrome (ACS) alone accounted for 18.1% of deaths in Western Australia (Draper et al. 2005). Timely reperfusion of the culprit coronary artery, from either thrombolytic therapy and/or invasive coronary intervention is essential for minimising permanent myocardial damage (Bhatt et al. 2013) and mortality rates can be reduced by half if treatment is initiated within the first hour from symptom onset (Lambert et al. 2012; Finn et al. 2007; Boersma et al. 1996; Aliprandi-Costa et al. 2011). Pre-hospital delays are considered to be the largest component with the timeliness of patient recognition of symptoms and physical transport times contributing to the delay. As such reduction of avoidable hospital delays is crucial for minimising time-to-treatment. The American College of Cardiology (ACC) and the American Heart Association (AHA) have established guidelines in order to quantify an emergency department's performance during emergency cardiac events, namely door-to-balloon time of 90 minutes or less in 75% of presentations and door-to-ECGs times within 10 minutes for all presentations (Anderson et al. 2007).

Australia faces a somewhat unique situation in that rural communities are often characterised by geographical isolation combined with typically smaller health services and poorer access to the advanced medical facilities of major metropolitan areas. As such, rural and remote populations are more at risk of adverse outcomes following an acute coronary event due to the sheer distance and associated travel times to attend appropriate medical facilities within manageable timeframes. Furthermore these patients are likely to be transferred via smaller hospital or medical outpost settings before making it to a facility with invasive coronary intervention capabilities.

Aims

With all rural and remote western Australian ACS patients requiring transfer to metropolitan hospitals for primary interventions, the study aimed to look at the impact of being transferred to a hospital capable of primary interventions on key performance indexes (door-to-balloon, door-to-ECG times), length of stay and in-hospital mortality.

Methods

De-identified primary hospital data were collected from one tertiary hospital in Perth WA between 01/06/2013 and 31/12/2013. Data collected were age, sex, postcode of residence, primary diagnosis, primary procedure, date of presentation, time of symptom onset, time of arrival to referral hospital, time departed referral hospital, time of arrival to tertiary hospital, time of ECG, time of activation of cardiac catheterisation lab, procedure length, discharge date, mode of arrival, disposal code and length of stay. Data were analysed using SPSS Statistics.

Relevance

This study is a preliminary needs-analysis of the challenges associated with rural and remote populations receiving equitable and timely management during an ACS event.

Results

The cohort consisted of 106 WA patients, with a mean age of 59.72 years (range = 35-87 years), 81.1% were male, in-hospital mortality was 5.7% and the median length of stay was three days (0-32 days range). There was a statistically significant difference between transferred and direct-presentation patients ($p \leq 0.0009$) with experiencing door-to-balloon times within the recommended 90 minutes.

Conclusions

Key performance indices were poorer in the transferred cohort, particularly door-to-balloon times. This study was not able to assess the effect of transfers on mortality rates due to the small sample size.

The rationale of achieving door-to-ECG and door-to-balloon times within recommended time frames is due to previous findings of improved survival. The higher median times experienced by transferred patients could potentially be associated with more adverse outcomes.

References

- Aliprandi-Costa, B., I. Ranasinghe, V. Chow, S. Kapila, C. Juergens, G. Devlin, J. Elliott, J. Lefkowitz, and D. B. Brieger. 2011. "Management and Outcomes of Patients with Acute Coronary Syndromes in Australia and New Zealand, 2000-2007." *Medical Journal of Australia* 195 (3): 116-121.
- Anderson, Jeffrey L., Cynthia D. Adams, Elliott M. Antman, Charles R. Bridges, Robert M. Califf, Donald E. Casey Jr, William E. Chavey Li et al. 2007. "Acc/Aha 2007 Guidelines for the Management of Patients with Unstable Angina/Non–St-Elevation Myocardial Infarction: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines for the Management of Patients with Unstable Angina/Non–St-Elevation Myocardial Infarction) Developed in Collaboration with the American College of Emergency Physicians, the Society for Cardiovascular Angiography and Interventions, and the Society of Thoracic Surgeons Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation and the Society for Academic Emergency Medicine." *Journal of the American College of Cardiology* 50 (7): E1-E157.
- Bhatt, Neel S., Amirreza Solhpour, Prakash Balan, Armin Barekatin, James J. McCarthy, Stefano Sdringola, Ali E. Denktas, Richard W. Smalling, and H. Vernon Anderson. 2013. "Comparison of in-Hospital Outcomes with Low-Dose Fibrinolytic Therapy Followed by Urgent Percutaneous Coronary Intervention Versus Percutaneous Coronary Intervention Alone for Treatment of St-Elevation Myocardial Infarction." *The American Journal of Cardiology* 111 (11): 1576-1579.
- Boersma, Eric, Arthur C. P. Maas, Jaap W. Deckers, and Maarten L. Simoons. 1996. "Early Thrombolytic Treatment in Acute Myocardial Infarction: Reappraisal of the Golden Hour." *The Lancet* 348 (9030): 771-775. doi: 10.1016/s0140-6736(96)02514-7.
- Draper, G, E Unwin, S Serafino, P Somerford, and S Price. 2005. *Health Measures 2005: A Report on the Health of the People of Western Australia*. Perth.
- Finn, Judith C., John H. Nick Bett, Trevor R. Shilton, Carol Cunningham, Peter L. Thompson, and National Heart Foundation of Australia Chest Pain Every Minute Counts Working Group. 2007. "Patient Delay in Responding to Symptoms of Possible Heart Attack: Can We Reduce Time to Care?" *Medical Journal of Australia* 187 (5): 293-8.
- Lambert, Cameron, Seth Vinson, Frances Shofer, and Jane Brice. 2012. "The Relationship between Knowledge and Risk for Heart Attack and Stroke." *Journal of Stroke and Cerebrovascular Diseases*. doi: 10.1016/j.jstrokecerebrovasdis.2012.02.002.

Presenter

Rene Forsyth is a PhD candidate from Curtin University in WA, with a primary goal of highlighting any disparities in rural and remote patient outcomes following an acute myocardial infarction, compared to metropolitan counterparts. Rene has a background in Radiography (Bachelor of Science) and continues to work part-time in this field. She was awarded the APA Scholarship in 2012 to commence this study. Having grown up in rural areas, Rene has a passion for rural health which has sparked her interest in research benefiting such communities.