International Emergency Nursing 23 (2015) 17–21

Contents lists available at ScienceDirect

International Emergency Nursing

journal homepage: www.elsevier.com/locate/aaen

Ten years of trauma in the 'top end' of the Northern Territory, Australia: A retrospective analysis

Christopher J. Gowing BSc(Hons) (Trauma Research Project Officer) [a,*], Kathleen M. McDermott RN, BNurs, DipHSc, GCertNurs(Anaes,RecRm), MPH (Trauma Research Data Manager) [a], Linda M. Ward BAppSci, MMedSci (Biostatistician) [b], Bronte L. Martin RN, BNurs, GDipNursSci(Emerg), CritCare, MNurs (Trauma Coordinator) [a]

[a] National Critical Care and Trauma Response Centre, Royal Darwin Hospital, PO Box 41326, Casuarina, NT 0811, Australia
[b] Menzies School of Health Research, PO Box 41096, Casuarina, NT 0811, Australia

ARTICLE INFO

Article history:
Received 18 February 2014
Received in revised form 24 September 2014
Accepted 25 September 2014

Keywords:
Trauma
Australia
Northern Territory
Top end
Royal Darwin Hospital
Mechanism of injury
ISS
Indigenous

ABSTRACT

Aim: To examine characteristics of traumatic injury in adults and children at the Royal Darwin Hospital (RDH) over a 10 year period.
Method: A retrospective review of the RDH Trauma Registry data from 1 January 2003 to 31 December 2012, with analysis of patient demographics, mechanism of injury, Injury Severity Score (ISS), and outcome.
Participants: Two thousand seven hundred twenty-five patients with an ISS greater than or equal to 9 and met all other study inclusion criteria.
Results: Motor vehicle crashes, assaults and falls consistently remained the three most common mechanisms of injury throughout the 10 year period. Indigenous admissions showed a significant downward trend ($p = 0.009$). Upward trends were noted in presentations from patients aged greater than 44 ($p = 0.002$), all-terrain vehicle accidents ($p < 0.001$), and hangings ($p = 0.003$). No other trends were noted to significant at a $p < 0.05$ level. Admitted Indigenous patients were significantly more likely to be present due to assault ($p < 0.001$) and female patients were more likely to present due to assault, falls and motor vehicle crashes ($p < 0.01$) than their counterparts.
Conclusion: Presentations for traumatic injury to Royal Darwin Hospital have remained in the most part, consistently stable for the period of 2003–2012. Though there were some increases/decreases in regard to specific demographics and mechanisms, few were found to be statistically significant at a $p < 0.05$ level.

1. Introduction

The specialised care provided by Trauma Centres has consistently been demonstrated to lead to improved outcomes in patients with major traumatic injuries (Celso et al., 2006; Lansink and Leenen, 2007), as well as patients with less severe injuries (Helling et al., 2005). As injury is the fourth most common cause of death in Australia, the value of the specialised trauma systems is self-evident (Curtis et al., 2012a). In comparison with some other countries however, the geographical landscape of Australia provides unique challenges, referring specifically to the sporadic distribution of the population relative to the vastness of the landmass. The differences in the populations density throughout Australia consequently leads to impeccable trauma care centred on the urban populations, necessitating individuals injured in rural or remote Australia to be transferred to the urban centres for definitive trauma care (Croser, 2003).

This aspect is especially emphasised in the Northern Territory (NT), Australia. Geographically speaking, the NT is colloquially divided into two regions, the northern 'Top End' and central 'Red Centre'. Compared with states such as New South Wales (NSW), where multiple level 1 trauma centres and numerous lower level centres in rural areas are available (Curtis et al., 2012b), the 'Top End' has only one major trauma centre, situated in Darwin. Major traumatic injuries throughout the entire 'Top End' of the NT are transferred to Royal Darwin Hospital (RDH) for definitive care. The RDH, a 360 bed tertiary referral hospital is the only major trauma centre for 3000 km, servicing the Top End of the NT, and also areas of Western Australia and South East Asia. The 'Top End' consists of approximately three quarters of the total NT population (~150 000) (Australian Bureau of Statistics, 2013) and has a geographical area covering approximately 550 000 square kilometres. This area includes Darwin, the Katherine region to the south as well as the Arnhem region. The vast majority of the Top End population resides within the urban

* Corresponding author. National Critical Care and Trauma Response Centre, Royal Darwin Hospital, PO Box 41326, Casuarina NT 0811, Australia. Tel.: +61 08 8922 6158; fax: +61 08 8922 6966.
E-mail address: christopher.gowing@nt.gov.au (C.J. Gowing).

http://dx.doi.org/10.1016/j.ienj.2014.09.006
1755-599X/

area, with the rest of the population dispersed between the distant rural and even more distant remote areas (Australian Bureau of Statistics, 2013).

Also unique to the NT is the large Indigenous population, representing 30% of the total NT population (Australian Bureau of Statistics, 2013), as opposed to other states and territories where Indigenous people represent less than 4% of the respective populations (Australian Bureau of Statistics, 2006). The high Indigenous population presents the NT with unique health challenges. In addition to the typical remoteness of residence, Indigenous Australians are at considerably more risk than Non-Indigenous Australians to poor lifestyle choices such as smoking or alcohol abuse (Whelan and Wright, 2013), a fact that is often reflected in overall health outcomes. The Indigenous population is also more at risk of certain injuries, such as assault, than non-Indigenous Australians (Irie et al., 2012). Asides from the previously stated issues, perhaps the most challenging and important aspect of Indigenous care is ensuring the cultural sensitivity of healthcare providers, ensuring that the care provided is compatible with the patient's cultural and spiritual beliefs (Plani and Carson, 2008).

This study aims to examine demographic and injury trends for the period of 2003–2012. The importance of understanding the context and epidemiology of trauma in the NT cannot be overestimated. Various demographic factors have been known to influence the outcome of a patient, particularly evident factors such as gender (Haider et al., 2009), ethnicity (Schoenfeld et al., 2013) or age-group (Edridge, 2008) result in drastically different injury patterns and health outcomes. Demographics aside, it is self-evident that knowing the relative increase of specific mechanisms of injury would undoubtedly result in greater preparedness to receive presentations of specific injury types. The recognition and recording of current demographic and injury trends can be only of benefit to stakeholders across the spectrum of trauma from injury prevention to definitive trauma care.

2. Method

A retrospective review of incidents of moderate to critical trauma in the RDH Trauma Registry was performed for the period between 1 January 2003 and 31 December 2012. Data were examined in regard to patient demographics, injury type and mechanism, Injury Severity Score (ISS), and outcome. Ethics approval for the study was obtained from the Human Research Ethics Committee of the Northern Territory, Department of Health, Menzies School of Health (HREC 2010-1480). Data for the trauma registry were collected solely from RDH, this includes any interstate/overseas patients transferred in from their location of injury. ISS was calculated from the Abbreviated Injury Scale 2005–2008 update (Association for the Advancement of Automotive Medicine, 2008). During the years examined, there were changes in practice in regard to the data collection and inclusion of patients with isolated neck of femur (NOF) fractures resulting from mechanical falls, and thus such cases were excluded from the study. In regard to outcome, data were only collected for the period during which the patient was admitted to RDH, so cases wherein an individual died after being transferred to an interstate facility for subspecialty care would not be reflected in the data.

Analysis was performed using Stata/IC 13.1. Descriptive statistics were run for each of the identified factors, multivariate Poisson and logistic models were used to adjust for the confounding effects of age, ethnicity, gender and mechanism.

3. Results

There are 4649 trauma admissions recorded in the RDH Trauma Registry for the period between the 1 January 2003 and the 31 December 2012. Of the 4649, 1878 presentations had an ISS of less than 9 and were excluded from the study. An additional 46 admissions were excluded due to having an isolated NOF fracture resulting from a mechanical fall. After applying the exclusion criteria, 2725 admissions were eligible for the study.

A summary of demographic and injury data is presented in Table 1. A summary of the logistic regression analyses is presented in Table 2.

3.1. Demographics

Males are consistently overrepresented, accounting for 75.6% ($n = 2059$) of all trauma admissions ($n = 2725$) over the 10 year period. Indigenous presentations account for 33.9% ($n = 923$) of all trauma admissions over the 10 year period. A Poisson regression analysis demonstrated that there was a downward trend in regard to the proportion of yearly admissions that were Indigenous ($p = 0.009$). When tested against the proportion of the NT population that is Indigenous (≈30%; Australian Bureau of Statistics, 2013), only admissions from 2004 were higher than expected from the population ($p = 0.050$). Paediatric patients, (less than 14 years of age) account for 10.7% ($n = 292$) of total admissions, with elderly patients (greater than 65 years of age) accounting for 5.7% ($n = 154$) of total admissions. A Poisson regression analysis also demonstrated a significant increase in presentations from patients greater than 44 years of age ($p = 0.002$). No other demographic variables demonstrated a significant trend.

3.2. Paediatric and elderly profiles

3.2.1. Elderly profile

Elderly presentations (greater than or equal to 65 years of age), account for 5.7% ($n = 154$) of all trauma admissions over the 2003–2012 period. The median ISS of elderly patients was 11 ($Q1 = 9$, $Q3 = 22$). Over the period there were 90 (58.4%) elderly patients with an ISS between 9 and 15, 31 (20.1%) between 16 and 24, 27 (17.5%) between 25 and 39, and 6 (3.9%) between 40 and 75. The three most common mechanisms of injury in elderly patients were falls ($n = 88$, 57.1%), motor vehicle crashes ($n = 31$, 20.1%) and assault ($n = 8$, 5.2%). No trends over time were identified in regard to total elderly presentations ($p = 0.088$).

3.2.2. Paediatric profile

Paediatric admissions (equal to or less than 14 years of age) account for 10.7% ($n = 292$) of all trauma admissions over the 2003–2012 period. The median ISS of paediatric patients was 9 ($Q1 = 9$, $Q3 = 15$). Over the period there were 219 (75%) paediatric patients with an ISS between 9 and 15, 43 (14.7%) between 16 and 24, 29 (9.9%) between 25 and 39, and 1 (0.3%) between 40 and 75. The three most common mechanisms of injury in paediatric patients were falls ($n = 78$, 26%), immersion, ($n = 40$, 13.7%) and motor vehicle crashes ($n = 38$, 13%). A Poisson regression model demonstrated a decrease in paediatric admissions (OR = 0.94, $p = 0.003$).

3.3. Injury profiles (blunt/penetrating/immersion/burns)

3.3.1. Blunt injuries

Blunt injuries accounted for 86.4% ($n = 2352$) of total injuries. The three most common mechanism for blunt injuries were motor vehicle crashes ($n = 606$, 25.4%), falls ($n = 538$, 22.9%) and assault ($n = 389$, 16.5%). The median ISS for blunt injuries was 12 ($Q1 = 9$, $Q3 = 19$). There were 1470 (61.3%) blunt injuries with an ISS between 9 and 15, 485 (20.2%) between 16 and 24, 321 (13.4%) between 25 and 39, and 76 (3.2%) between 40 and 75.