Trauma: The Burden of a Preventable Problem

JM Plummer, H Brown, K Jones, D Fearon-Boothe, N Meeks-Aitken, AH McDonald

ABSTRACT

Trauma is a leading cause of morbidity and mortality in developing countries and we reviewed the demographics and cost of trauma in a Jamaican population. This is a retrospective, descriptive analytical study of all trauma patients aged 25 to 29-years who presented to the University Hospital of the West Indies (UHWI) during the study period, January 2001 to December 2005. Data were extracted from the Trauma Registry and analysed. Seven hundred and fifteen patients were included in the specified age group over the five-year period. The median age of the patients was 27 years and the median hospital stay was 3 days. There was a 4:1 ratio of males to females and 49.7% of injuries were caused by penetrating wounds. Motor vehicle accidents occurred in 22.4% of cases. Head injuries occurred in 13.6% of cases, long bone fractures in 16.5% and internal injury to chest or abdominal organs in 15.9% of cases. Craniotomy or thoracotomy was undertaken in 4% of cases, Open Reduction Internal Fixation (ORIF) or bone immobilization in 11% and laparotomy in 8% of cases. The mean injury severity scores (ISS) was 4 while 5% of patients had ISS greater than 15. More than 60% of patients underwent diagnostic X-rays, 8% had abdominal imaging (CT scan or ultrasound) and 9.5% underwent head CT scan. The in-hospital mortality was 4.2%. The median hospital bill charged was US$320.00 and the median amount paid by the patients was US$50.00. At the start of the new millennium, penetrating trauma accounted for almost 50% of cases at UHWI with the majority of costs associated with trauma-care being state funded.

Keywords: Penetrating trauma, investigations, costs

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RESUMEN

El trauma es una de las causas principales de morbosidad y mortalidad en los países en vías de desarrollo. Aquí examinamos la demografía y el costo de los traumas en una población jamaicana. Éste es un estudio retrospectivo, analítico-descriptivo de todos los pacientes traumados de 25 a 29 años de edad que acudieron al Hospital Universitario de West Indies (UHWI) durante el periodo del estudio, a saber, de enero del 2001 a diciembre del 2005. Se extrajeron y analizaron los datos del Registro de Traumas. Setecientos quince pacientes fueron incluidos en el grupo etario especificado en el período de cinco años. La edad mediana de los pacientes fue de 27 años y la mediana de la estadía hospitalaria fue de 3 días. Hubo una proporción 4:1 de varones a hembras, y el 49.7% de lesiones fueron causadas por heridas penetrantes. Los accidentes automovilísticos ocuparon el 22.4% de casos. Las lesiones de cabeza ocurrieron en el 13.6% de casos; las fracturas de huesos largos en el 16.5%; las lesiones interiores del pecho y los órganos abdominales en el 15.9% de los casos. Se requirió craniotomía o toracotomía en el 4% de casos, reducción abierta y fijación interna (ORIF) o la inmovilización de huesos en el 11% de los casos, y laparotomía en el 8% de los casos.

El promedio de la puntuación de la severidad de la lesión o puntuación ISS fue 4, mientras que el 5% de pacientes tuvo un ISS mayor de 15. Más del 60% de los pacientes recibieron examen diagnóstico mediante rayos x; el 8% recibió examen abdominal mediante imágenes (TC scan o ultrasonido) y al 9.5% se le practicó un TAC de la cabeza. La mortalidad intrahospitalaria fue de 4.2%. La mediana de

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la cuenta a pagar por gastos hospitalarios fue $320.00 USD y la mediana de la cantidad pagada por los pacientes fue $50.00 USD. En el comienzo del nuevo milenio, el trauma penetrante representaba casi el 50% de los casos atendidos en HUWI, con respecto a lo cual cabe señalar que la mayor parte de los costos asociados con la atención a traumas, están subvencionados por el Estado.

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Palabras claves: Trauma penetrante, investigaciones, costos

INTRODUCTION

Trauma is a major social problem that affects many societies. It is the leading cause of death in the young worldwide and is a major cause of permanent disability in this population resulting in loss of work-hours and productivity. Several papers have described the demographics of trauma in the Jamaican population. However, little work has been done on the actual hospital costs, largely because of difficulty in obtaining this information. We present a current and updated review of the demographics of trauma at the University Hospital of the West Indies (UHWI) between January 2001 and December 2005 in 25 to 29-year olds. In addition, the direct cost to the hospital's budget is documented which is eye-opening especially in the setting of a diminishing health dollar.

SUBJECTS AND METHOD

This is a descriptive analytical study using data from 'The Trauma Registry' which is administered and maintained by the Department of Surgery, Radiology, Anaesthesia and Intensive Care, The University of the West Indies. The data are prospectively collected and transferred by research nurses to the Trauma! Software programme (Cales & Associates). We examined Registry data from January 2001 to December 2005 in patients aged 25 to 29-years who were admitted as a result of trauma. Descriptive data were obtained for number, age, mechanism of trauma, nature of injuries, injury severity scores, diagnostic and therapeutic procedures employed, length of hospital stay and outcome.

Data on hospital charges and patient payment to date were obtained from the (UHWI) Accounts Department.

Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 12.0 for Windows software programme.

RESULTS

Seven hundred and fifteen patients were included in the trauma registry aged 25 to 29-years over the five-year period. The median age of the patients was 27 years. The median hospital stay was three days (interquartile range 1 day, 7 days) with a minimum stay of 0 days and a maximum stay of 369 days. There was a 4:1 ratio of males to females.

Penetrating wounds accounted for 49.7% of injuries. This included gunshot wounds, stab wounds and foreign body wounds. Motor vehicle accidents occurred in 22.4% of cases, including motor cycle accidents, motor car drivers and passengers.

Injuries were classified into multiple categories including cerebral injuries, facial and other skull bone fractures, spinal cord injury and spinal fractures, long bone fractures, chest and abdominal trauma including solid organ injury, soft tissue injury, burns, crush injury, poisoning and injuries not otherwise specified. Head injuries occurred in 13.6% of cases, long bone fractures in 16.5%, internal injury to chest or abdominal organs in 15.9% of cases and burns in 4.6% of cases. The injury severity scores ranged from 1–75 with a median of four. Five per cent of patients had severe injuries (ISS > 15).

Craniotomy was undertaken in 2% of cases, ORIF or bone immobilization in 11%, thoracotomy in 2% and laparotomy in 8% of cases. More than 60% of patients underwent diagnostic X-rays, 8% had abdominal imaging Computed Tomography (CT) scan or ultrasound and 9.5% underwent head CT scan.

The in-hospital mortality was 4.2%; 94.3% of patients were discharged home and two patients (representing 0.3%) were discharged to a rehabilitation facility.

The hospital bill charged was available for 91.5% of patients and the amount paid available for 55.8% of patients. The median hospital bill charged was US$320.00 (interquartile range $140.00, $940.00) and the median amount paid by the patients was $50.00 (interquartile range $20.00, $200.00). The median percentage of hospital charges actually paid for by the patients was 25.7%.

DISCUSSION

The causes and consequences of trauma in the Jamaican society and its strain on the health sector are well documented, with Jamaica having the highest motor vehicle accident fatality in the Caribbean region and one of the highest homicide rates in the world (1). Trauma care comprises 30 to 50% of all public hospital practice and 30 to 75% of the surgical workload at UHWI (2). The age group, 25–29-years was targeted in the present study as this group had been previously documented as high risk and targeting this group with intervention, might achieve the best reward. The male dominance of this disease pattern is expected and well documented (3–5). Median hospital stay of three days with ISS of 4 is almost identical to other developing countries (6) and is no different from the general trauma population (2). Still just about 5% of this population suffered severe and, as a result, life-threatening injuries. Penetrating injuries accounted for 50% of cases reflecting the importance of the gun and knives as favourite weapons in this population.

Motor vehicle accidents, the leading cause of trauma admissions in developed countries accounted for 22% in the population in the present study. The patient population in this study is skewed towards penetrating trauma, as opposed to a predisposition towards blunt trauma in developed countries. Clearly this should also impact the way in which the health dollar is spent and the social interventions which may be necessary to stem this problem.

Of patients requiring surgical intervention, long bone fractures dominate with 16.5% needing fixation. Penetrating trunk injuries was equally as important accounting for 15.9%, with 10 % of all trauma admissions in this group needing tube thoracostomy for treatment of blood or air in the pleural space. Mortality of 4.2% was almost identical to prior reports (7) and within the reported range of 0.5% and 6% worldwide. It was expected that this group of patients would have been subjected to more severe trauma and higher ISS but this is not the case. In fact, they are almost identical to a randomly selected group of the Jamaican population and perhaps indicate the dominance of this age group in influencing trauma statistics or the even distribution of the disease across the various groups.

The mean cost charged to the patients during this period was approximately US$300.00, a 400% increase in the average cost of caring for each trauma patient from an earlier study (8). While this increase most likely results from the fact that the study population consisted of admitted patients only, it also reflects the increased cost associated with trauma care with now nearly 1 in 5 patients being subjected to major radiological investigations. Although this is a subsidized fee, yet only 25% of this amount was paid by the patients. Given that it is estimated that 14% of the UHWI budget goes directly to the care of trauma patients and that at the Kingston Regional Hospital trauma cases utilize 75% of the operative time (1), it has been suggested that consideration be given to centralizing trauma care to the latter institution, a wholly government funded hospital. The resultant savings could then be directed to improving equipment and infrastructure at other institutions.

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