



Assessment of trauma patients

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KEYWORDS

Trauma;
Assessment;
Management;
Primary survey;
Secondary survey

Abstract Trauma is a major contributor to global mortality and morbidity with a notable difference between low income countries (LIC) and high to moderate income countries (HMIC). The modality of trauma differs globally; however, the most notable cause is pedestrian vs. vehicle and road traffic collision respectively. It is imperative that patients who have sustained a traumatic injury are managed in an appropriate and timely manner. Part 1 of the article will address the aetiology and demographic distribution of trauma globally and part 2 of the article will provide information about structured assessment and management of trauma patients.

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Editor comments

This paper is the second in our assessment series and focuses on assessment of the patient who has suffered trauma. The paper comprises two parts with the first part focusing on the aetiology and demography of trauma globally and provides a really useful insight into how geography and socio-demographic factors influence the incidence and type of injuries. The second part of the paper aims to provide information about how to systematically assess a patient with trauma and the importance of excellent team working to facilitate the best possible outcomes. The paper also provides an excellent evidence-based overview of how to manage key issues in trauma care because essentially assessment and management in trauma emergencies must occur concurrently to optimise patient survival. The authors of the paper have worked together to provide an international perspective to optimise relevance for the journal's readership, with one author based in the UK and the other in Sweden.

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Part 1 – Aetiology and demographics of trauma

The aim of the first part of this article is to provide an update on global issues in trauma, including aetiology, demographics and prevention and management strategies. Trauma is a major global health concern with high mortality rates and accounts for a significant contribution to the global burden of disease – which affects not only the patient and related significant others but also the development of a country. In contrast to many non-curable diseases, fatal trauma can be prevented or at least reduced with adequate resources and implementation of accident prevention strategies. The definition of a trauma¹ is “a bodily lesion at the organic level resulting from acute exposure to energy in amounts that exceed the threshold of physiological tolerance”, but also includes when “the injury results from insufficiency of a vital element” where mechanical, thermal, radioactive energy are not present (Baker et al., 1984).

Globally, trauma causes more deaths than HIV/AIDS, tuberculosis and malaria combined, even when intentional self-harm is not considered (Naghavi et al., 2015). Of the 55 million people that died during 2013, 4.8 million (8.7%) deaths were attributed to trauma (both unintentional and intentional) which has increased by 10.4% compared to 1990. However, since the global population has increased since then, calculating with age standardised deaths per 100,000 people; trauma related deaths have in fact decreased by 21% compared to 1990. Even if a median percentage decrease is observed, the decrease is less than for other leading causes of death globally such as cardiovascular and chronic respiratory diseases. An estimated 1.5 million people died in traffic collisions and road related accidents during 2013. When YearsLifeLost (YLL) is calculated, there has been a 15% increase since 1990. Death by trauma has moved up the ranking scale from 9th to 5th place globally. The most common causes of death in Road Traffic Accidents (RTAs) are attributed to accidents were pedestrians are struck by a vehicle (n = 36%), motor vehicle road injuries (n = 33%) and motorcycle accidents (n = 17%) (Naghavi et al., 2015).

The proportion of mortality due to trauma is unevenly disproportional when comparing high income countries (HIC) and low to middle income countries (LMIC). Approximately 90% of all people who die from trauma related injuries live in LMIC; although aetiology varies between LMIC. In the Western Pacific

region, the biggest cause of death is road accident, although in South America it is interpersonal violence (WHO, 2014). The numbers of deaths in developing countries are expected to rise even further due to increased urbanisation, use of motor vehicles and industrialisation (Nantulya and Reich, 2002). According to Mathers and Loncar (2006) trauma mortality rates in road related accidents are projected to increase globally by 2030 due to development and industrialisation in LMIC. However, trauma related deaths in road accidents continue to drop in HIC due in part to legislation and accident prevention strategies. Preventive work has been implemented and sanctioned via the legal system and regulations are now in place to cut the number of deaths from road traffic collisions. This includes for example compulsory wearing of seatbelts in the car, helmets when riding a motorbike and guardrails on busy roads. The use of child seats has reduced the risk of fatal injury in the US by 71% for infants and 54% for toddlers (National Highway Traffic Safety Administration (US), 2012).

The incidence of trauma differs between HIC and LMIC as well as between gender. Males are at increased risk of sustaining a traumatic injury with a fatal outcome compared to females (WHO, 2014). Higashi et al. (2015) identified that more than 50% of the patients involved in road accidents died before reaching the hospital in LMIC regions and injury secondary to interpersonal violence carried 66% mortality for patients living in lower LMIC. People who live in a lower socioeconomic class are at greater risk of premature death due to trauma (Wilkinson and Pickett, 2011). There is a dearth of research regarding what preventive measures can be taken to address this problem but when implementing health promotion strategy and improving traffic safety, all citizens will reap the benefit – across the social strata (Laflamme et al., 2009).

The distribution of mortality rates at the scene of the accident remains true to Trunkey's (1983) study in which the distribution of death was described as *trimodal* – 50% of patients die immediately at the scene, 20% of patients die within the first 24 hours and 30% of patients die days to weeks after the incident. Common causes of death at the scene of the accident were attributed to head trauma with intracranial lesions, spinal cord injuries and exsanguinating haemorrhage. Early deaths were secondary to uncontrolled haemorrhage and the late deaths were due to sepsis, multiorgan failure and disseminated intravascular coagulation (Trunkey and Lim, 1974). Advancements in the management of the pre-hospital poly-trauma patient – together with a structured approach to assessment of the injured patient – has led to a bimodal distribution of causes

¹ Trauma in this paper is equated with injury as presented in Global Burden of Disease study (GBD).

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