Patterns of early resuscitation associated with mortality after penetrating injuries

A. Wafaisade, T. Paffrath, R. Lefering, C. Ludwig, M. Fröhlich, M. Mutschler, M. Banerjee, B. Bouillon, C. Probst, and the Committee on Emergency Medicine, Intensive Care and Trauma Management of the German Trauma Society (Section NIS)

Background: Penetrating injuries are rare in European populations so their management represents a particular challenge. The aim was to assess early therapeutic aspects that are associated with favourable outcomes in patients with penetrating trauma.

Methods: Patients with penetrating injuries documented from 2009 to 2013 in the TraumaRegister DGU® were analysed. Patients with a primary admission and an Injury Severity Score (ISS) of at least 9 were included. The Revised Injury Severity Classification (RISC) II score was used for mortality prediction, and a standardized mortality ratio (SMR) calculated per hospital. Hospitals with favourable outcome (SMR below 1) were compared with those with poor outcome (SMR 1 or more).

Results: A total of 50 centres had favourable outcome (1242 patients; observed mortality rate 15.7 per cent) and 34 centres had poor outcome (918 patients; observed mortality rate 24.4 per cent). Predicted mortality rates according to RISC-II were 20.4 and 20.5 per cent respectively. Mean(s.d.) ISS values were 22(14) versus 21(14) (P = 0.121). Patients in the favourable outcome group had a significantly shorter time before admission to hospital and a lower intubation rate. They received smaller quantities of intravenous fluids on admission to the emergency room, but larger amounts of fresh frozen plasma, and were more likely to receive haemostatic agents. A higher proportion of patients in the favourable outcome group were treated in a level I trauma centre. Independent risk factors for hospital death following penetrating trauma identified by multivariable analysis included gunshot injury mechanism and treatment in non-level I centres.

Conclusion: Among penetrating traumas, gunshot injuries pose an independent risk of death. Treatment of penetrating trauma in a level I trauma centre was significantly and independently associated with lower hospital mortality.

Introduction

In Germany and most other European countries, a minority of injured patients suffer penetrating injuries, so their management represents a particular challenge. In the USA, 11,078 homicides and 53,738 non-fatal assaults were committed with firearms in 2010, whereas the numbers of firearm-related deaths and injuries were drastically lower in Europe; national crime statistics reported 42 deaths and 1244 injuries in the UK (2011), and 142 deaths and 823 injuries in Germany (2013). In rural areas of Europe this trauma mechanism is virtually absent, and trauma care providers lack experience in dealing with such injuries. Furthermore, the penetrating mechanisms are heterogeneous, with relatively small numbers of gunshot and stab wounds, but higher frequencies of other accident-related injuries with sharp objects. According to recent data from Germany, suggest that penetrating trauma per se is associated with worse outcomes.

The aim of the present study was to assess the association between treatment patterns and outcomes in patients with penetrating trauma.