The golden hour of shock – how time is running out: prehospital time intervals in Germany—a multivariate analysis of 15, 103 patients from the TraumaRegister DGU®

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ABSTRACT

Objectives Although prehospital treatment algorithms have changed over the past years, the prehospital time of multiple trauma patients of some 70 min and the on-scene-treatment time (OST) of some 30 min have not changed since 1993. The aim of this study was to critically assess specific interventions and conditions at the scene in relation to their impact on prehospital rescue intervals.

Methods We performed a retrospective data analysis of all multiple injured patients from the TraumaRegister DGU (German Trauma Society) from January 1993 to December 2010. Exclusion criteria were missing or implausible data regarding prehospital timelines. With OST as an independent variable, different models of multivariate regression were performed to identify parameters with relevant impact on the OST.

Results 15 103 datasets were included in this study. Based on the mean OST of 32.7 (±18.6) min and a constant absolute term of 16.2 (±1.5) min, we identified seven procedures and nine environmental parameters with significant impact on OST. Intubation (9.3±0.8 min) and being a car occupant (8.0±0.8 min) were associated with the most prolonged OSTs. A Glasgow Coma Scale ≤8 (4.5±0.7 min) and cardiopulmonary resuscitation (≥2.8±1.7 min) resulted in its most relevant reduction. Admission to a Level II trauma facility led to a reduced overall prehospital time (60.0±24.6 min) compared with Level I (70.0±28.5 min) and II (66.8±27.4 min) trauma centres.

Conclusions This study identified characteristic interventions and conditions with significant impact on prehospital treatment times. Current treatment concepts should be re-evaluated with respect to these results.

INTRODUCTION

Time is considered to be one of the most crucial factors in the early care of severely injured patients and there is no doubt that an effective and well-structured management at the site of the accident and a fast transport to the most appropriate facility is beneficial for trauma patients. In the late 1970s, the term ‘golden hour’ for prehospital rescue efforts has been established to describe the association between preferably early and fast treatment of seriously injured patients and favourable outcome.1,2

To date, time management at the scene has been implemented as a major goal of several guidelines for prehospital trauma management.3 For example, the Prehospital Trauma Life Support programme stresses to emergency medical services (EMS) personnel that definitive care for trauma patients cannot be delivered in the field and therefore quick transport to the nearest and most appropriate facility is suggested following basic initial stabilisation.4

The German EMS system is based on a ‘rendezvous model’, this means in all cases of suspected life-threatening illnesses or severe trauma an emergency physician is brought to the scene additional to the ambulance. The decision whether an emergency physician is sent out or not is made by the rescue centre based on specific keywords, for example, loss of consciousness, serious traffic accident, multiple trauma or cardiac arrest. Additionally, all helicopters of the Helicopter Emergency Medical Service (HEMS) are manned with an emergency physician in general. According to this, the German physician-based EMS differs substantially from the widely used paramedic-based system and the frequently discussed paradigms of ‘stay and play’ versus ‘scoop and run’ regarding the best practice for prehospital care of multiple trauma patients have been modified to a rather ‘treat and run’ approach over the last years in Germany.5

Interestingly, mean prehospital and on-scene-treatment times (OST) consistently have not changed substantially over the last decades with prehospital times ranging above the golden hour (figure 1) as documented by the annual reports of the TraumaRegister DGU (available on: http://www.traumaregister.de; DGU: Deutsche Gesellschaft für Unfallchirurgie; English: German Trauma Society) (TR-DGU). Over the past, different studies have attempted to identify potentially time-consuming factors, thus prolonging prehospital rescue times.6–8 Although Dissmann and Le Clerc could not find any differences in OSTs when comparing initial management by emergency physicians or paramedics in the UK, the German physician-based EMS system differs from the system in the UK and therefore the results of studies from those countries cannot be transferred to the German EMS system.7 To date, there is no detailed information to what extent specific interventions at scene or patient- and accident-related conditions may prolong or reduce prehospital rescue time intervals.

The aim of this study was to critically assess specific interventions and conditions either performed or present at the scene of accident in relation to...