

Prehospital time and survival of trauma patients:

a systematic review



AMK Harmsen¹, GF Giannakopoulos², PR Moerbeek¹, EP Jansma³, HJ Bonjer¹, FW Bloemers¹

¹ Dept of Surgery VU university Medical Centre Amsterdam, The Netherlands

² Dept of Surgery Slotervaart Hospital Amsterdam, The Netherlands

³ Medical Library, VU university Medical Centre Amsterdam, The Netherlands

Background

Time is considered an essential determinant in the initial care of trauma patients. Salient tenet of trauma care is the 'golden hour', the immediate time after injury when resuscitation and stabilization are perceived to be most beneficial. Several prehospital strategies consist regarding time and transport of trauma patients. Literature shows little empirical knowledge on the exact influence of prehospital times on trauma patient outcome.

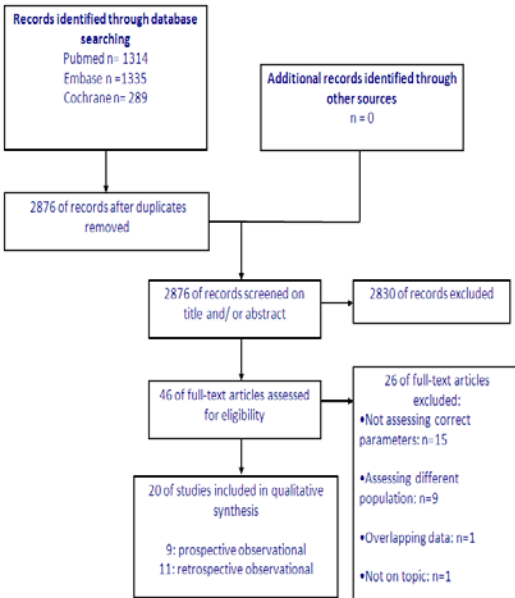
Aim

The objective of this study is to systematically examine and review the influence of different time intervals in the prehospital phase on outcome measurements for trauma patients. Our aim is to provide a thorough summary of the current relevant literature.

Materials & Methods

A systematic review was performed in MEDLINE, Embase and the Cochrane Library from inception to May 19th 2014. Studies reporting on prehospital time intervals for Emergency Medical Services (EMS), outcome parameters and potential confounders for trauma patients were included. The STROBE-statement was used to evaluate risk of bias.

Results



Of 2.938 potentially relevant articles, we discarded 2.830 after examining their title or abstract. The full-text articles of the remaining 46 were reviewed: 26 studies were excluded from further analysis. Finally, twenty studies were included in the review, analyzing a total of 281.980 trauma patients. The studies included were nine prospective observational and eleven retrospective observational studies. All studies were classified as level of evidence three. The selection of patients in all studies was by consecutively admitted trauma patients, ensuring appropriate representativeness and minimizing selection bias. The studies obtained data from either a government department concerned with Trauma care registry, hospital trauma registries, police motor vehicle crash data or outcomes of the consortium epidemiologic out-of-hospital trauma.

Results

Activation time (AT), time of distress call until deployment EMS.

Two studies report on AT, in total reviewing 4,344 patients. The studies report on patients suffering severe thoracic trauma and adult trauma patients in general. Both studies were unable to find a statistical significant effect of AT on mortality.

Response time (RT), time of dispatch EMS until arrival EMS on scene.

Six studies report on influence of the duration of RT on mortality. In total reviewing 52.330 patients. In general trauma patients a prolonged RT is associated with a higher mortality rate. For thoracic injured patients no correlation could be found.

On-Scene time (OST), time spend on scene by EMS.

Ten studies report on the influence of OST on mortality, reviewing a total of 75.995 patients. For general trauma patients an increased OST is not associated with an increased chance on mortality. Though two studies report that the OST was significantly higher for the non-survivor group. For the penetratingly injured there was no difference in OST between survivors and non-survivors. Though one study reports an increase OR on mortality for OST ≥ 20 minutes. For the patients suffering blunt force trauma or the thoracic injured patients no influence of increased OST was seen on mortality.

Transfer time (TrT), time between leaving the scene of accident until reaching the hospital.

Nine studies report on the influence of TrT on mortality. Reviewing a total of 80.812 patients. For general trauma patients deceased patients had a significantly shorter TrT. For the penetratingly injured no difference was found between survivors and the non-survivors. Though in subgroup analysis, hypotensive penetratingly injured patients did show an increased survival with shorter TrT. For the patients suffering blunt force trauma or the thoracic injured patients no influence of increased TrT was seen on mortality.

Total prehospital time (TpT), time elapsed between distress call until reaching the hospital.

Sixteen studies report on the influence of TpT on mortality. Reviewing a total of 231.111 patients. For general trauma patients an increase in survival is seen with an increase in TpT. For the hypotensive penetratingly injured patients chances of survival increase as TpT decreases. For the normotensive penetratingly injured patients chances of survival increase as TpT increases. For blunt force trauma patients no correlation is seen and for the Thoracic injured patient chances of survival increases as TpT increases.

Conclusions

Swiftness of transport is beneficial for patients suffering neurotrauma and the hemodynamically unstable penetratingly injured patient. For hemodynamically stable undifferentiated trauma patients, prolonged on-scene-time and total prehospital time does not increase odds of mortality. For undifferentiated trauma patient, focus should be on the type of care delivered prehospital and not on rapid transport.

