Prehospital administration of tranexamic acid in trauma patients

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Abstract

Background: Evidence on prehospital administration of the antifibrinolytic tranexamic acid (TXA) in civilian trauma populations is scarce. The aim was to study whether prehospital TXA use in trauma patients was associated with improved outcomes.

Methods: The prehospital database of the ADAC (General German Automobile Club) Air Rescue Service was linked with the TraumaRegister of the German Trauma Society to reidentify patients documented in both registries. Primarily admitted trauma patients (2012 until 2014) who were treated with TXA during the prehospital phase were matched with patients who had not received prehospital TXA, applying propensity score-based matching.

Results: The matching yielded two identical cohorts (n = 258 in each group), since there were no significant differences in demographics or injury characteristics (mean Injury Severity Score 24 ± 14 [TXA] vs. 24 ± 16 [control]; p = 0.46). The majority had sustained blunt injury (90.3% vs. 93.0%; p = 0.34). There were no differences with respect to prehospital therapy, including rates of intubation, chest tube insertion or both administration of i.v. fluids and catecholamines. During ER treatment, the TXA cohort received fewer numbers of red blood cells and plasma units, but without reaching statistical significance. Incidences of organ failure, sepsis or thromboembolism showed no significant differences as well, although data were incomplete for these parameters. Early mortality was significantly lower in the TXA group (e.g., 24-h mortality 5.8% [TXA] vs. 12.4% [control]; p = 0.01), and mean time to death was 8.8 ± 13.4 days vs. 3.6 ± 4.9 days, respectively (p = 0.001). Overall hospital mortality was similar in both groups (14.7% vs. 16.3%; p = 0.72). The most pronounced mortality difference was observed in patients with a high propensity score, reflecting severe injury load.

Conclusions: This is the first civilian study, to our knowledge, in which the effect of prehospital TXA use in trauma patients has been examined. TXA was associated with prolonged time to death and significantly improved early survival. Until further evidence emerges, the results of this study support the use of TXA during prehospital treatment of severely injured patients.

Keywords: Trauma, Bleeding, Coagulopathy, Tranexamic acid

Background

Exsanguination remains the leading cause of early mortality in trauma patients [1] and recent research has elucidated the role of acute trauma-associated coagulopathy in aggravating haemorrhage [2–4]. Resuscitation strategies for severely injured patients with massive blood loss include several key components, such as transfusion of blood components to reestablish perfusion and coagulation function [5]. Furthermore, several commercially available haemostatic agents are commonly applied as adjuncts to support coagulation [6]. Since clot degradation by early hyperfibrinolysis has been reported to play a major role in traumatic coagulopathy and massive bleeding, recent clinical research has been focused on the antifibrinolytic substance tranexamic acid (TXA) [7]. However, only one large randomised controlled trial—Clinical Randomisation of an Antifibrinolytic in Significant Haemorrhage 2 (CRASH-2)—has examined the effect of...