

Update in Anesthesia and Intensive Care

Daniela FILIPESCU, MD, PhD

Department of Cardiac Anesthesia and Intensive Care

Emergency Institute for Cardiovascular Diseases "Prof. Dr. C.C. Iliescu" Bucharest

Trauma is a major cause of death worldwide. The major cause of trauma-related death is hemorrhage which can also contribute to multi-organ failure-associated death. It is known that antifibrinolytic agents reduce peri-operative blood loss and the need of transfusion (1). Because the haemostatic responses to surgery and trauma seem to be similar, it was supposed that tranexamic agent, an antifibrinolytic agent, might reduce mortality due to bleeding in trauma patients. In a randomized controlled trial (CRASH-2) which included 20,211 adult trauma patients from 274 hospitals in 40 countries it was demonstrated that patients with significant clinical bleeding, assigned to receive tranexamic acid (1 g over 10 min and then infusion of 1 g over 8 hours) within first 8 hours from injury, had a significant reduced all-cause mortality and mortality due to bleeding, without an increase in vascular occlusive events (myocardial infarction, stroke, and pulmonary embolism) or multi-organ failures (2).

It is known that hyperfibrinolysis is a common feature of early coagulation abnormalities in trauma (3) and it was thought that tranexamic acid could operate via this mechanism. However, due to the fact that transfusion was not reduced substantially in trauma patients, additional beneficial effects to inhibiting plasmin, beyond clot lysis, might be involved (4). Plasmin exhibits a broad spectrum of pro-inflammatory responses that could result in multi-

organ failure and these pathophysiological effects might be attenuated by antifibrinolytics drugs.

Further sub-group analysis of the CRASH-2 trial results showed that the effect of tranexamic acid on death due to bleeding depends on the time between injury and onset of treatment and that tranexamic acid should be given as early as possible to bleeding trauma patients, preferably in the first 3 hours after injury (5). These results are consistent with the results of studies showing early increased fibrinolytic coagulopathy in trauma (6). However, it is very important to know if late administration does cause harm, as many bleeding trauma in low- and middle-income countries have longer than 3 hours pre-hospital times.

CRASH-2 is a landmark study as it showed that a cheap and easy to administer drug can safely reduce the risk of death in bleeding trauma patients. It is thought that thousands of lives can be saved using tranexamic acid in patients with bleeding trauma. The authors of CRASH-2 trial recommend that tranexamic should be included on the WHO List of Essential Medicines and should be available in all countries.

The knowledge that tranexamic acid reduces the risk of death from traumatic hemorrhage raises the hope that it might also be effective in other situations in which bleeding can be life threatening, such as traumatic brain injury or postpartum-hemorrhage.

Address for correspondence:

Daniela Filipescu, MD, Department of Cardiac Anesthesia and Intensive Care Emergency Institute for Cardiovascular Diseases "Prof. Dr. C.C. Iliescu", 258, Soseaua Fundeni, Bucharest
e-mail: Filipescu@clicknet.ro

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