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Invited Commentary

Prehospital Tranexamic Acid
STAAMP of Approval or Return to Sender?

Ryan P. Dumas, MD; Matthew J. Martin, MD

Controversy is only dreaded by the advocates of error.
Benjamin Rush[1]

For trauma patients and practitioners alike, the race against time starts the moment after injury. Although prehospital procedures may delay definitive hospital care, evidence that prehospital transfusion saves lives is increasing. In addition to blood products, tranexamic acid has become another tool in the armamentarium. There is increasing level 1 evidence that supports the use of tranexamic acid in the hospital setting[2,3] and widespread current use on the battlefield.[4,5] In the prehospital environment, however, the picture is less clear. Although prehospital tranexamic acid use would seem to be advantageous given the increased benefits associated with earlier administration, its use in this setting remains controversial because of concerns about proper patient selection, dosing, and adverse effects.[6] Despite the lack of high-quality evidence, recent national guidelines endorsed by the American College of Surgeons Committee on Trauma recommend prehospital tranexamic acid administration in selected patients.[7] In this issue, Guyette et al[8] report the results of the Study of Tranexamic Acid During Air and Ground Medical Prehospital Transport (STAAMP) trial, a robust and high-quality randomized clinical trial that will greatly help to inform this area but that will also undoubtedly generate significant controversy and debate in parsing the results.

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In interpreting the STAAMP trial, it is crucial to look at not only the results, effect sizes, and probabilities but also the degree of agreement and consistency with the existing tranexamic acid literature. The primary finding of no reduction in 30-day mortality for the entire sample is not surprising, given the known small size of the mortality benefit from the larger CRASH-2 (Clinical Randomisation of an Antifibrinolytic in Significant Haemorrhage) trial[3] and the smaller sample size of this study. More intriguing are the findings of a mortality benefit among subgroups with severe shock who received earlier administration (within 1 hour) and suggestive trends among those receiving transfusion or massive transfusion. All these findings are also consistent with results in previous trials of which patient populations are likely to benefit from tranexamic acid. Most intriguing, in our opinion, is the clear benefit demonstrated in the repeat bolus arm (2-g total bolus and 1-g infusion) vs standard dosing. Although higher dosing was not stud-

ied in the CRASH trials, this finding is consistent with a recently completed US randomized clinical trial of prehospital tranexamic acid administration in patients with traumatic brain injury that found a benefit with a 2-g bolus dose vs the standard 1-g bolus approach.[9] Of note, a simplified 2-g prehospital bolus protocol has also now been adopted by the Committee on Tactical Combat Casualty Care for battlefield use. Whether the higher tranexamic acid dose provides a more consistent effect and outcome benefit remains to be seen, but having a simpler single 2-g bolus is certainly more attractive and practical for the prehospital setting. In addition, although critics of tranexamic acid consistently cite concerns of thrombotic and other complications, this study again confirms the highly consistent finding in prospective tranexamic acid trials of no increase in thrombotic or other adverse events in the tranexamic acid arms.

Limitations of this study must of course be considered, including the sample size and relatively smaller numbers of deaths involved in the subgroup analyses. Only one-third of patients had bleeding that required transfusion, although again there is some evidence of possible tranexamic acid benefit unrelated to bleeding or its antifibrinolytic effect. The role and contribution of the tranexamic acid bolus vs continuous infusion are also unclear, and whether the infusion can be omitted in favor of simple bolus dosing needs further study. However, for the present, we believe this study provides strong support in favor of establishing prehospital tranexamic acid administration protocols. Similar to the recent Committee on Tactical Combat Casualty Care guidelines, we would favor a simplified 2-g bolus approach delivered as early as possible in the prehospital phase of care. Now let the debates begin!

ARTICLE INFORMATION

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Correction: This article was corrected on December 2, 2020. In the first sentence referring to the CRASH trials, the acronym was incorrectly expanded as "Corticosteroid Randomisation After significant head Injury." The sentence now specifies the CRASH-2 trial, and the acronym has been corrected to read "Clinical Randomisation of an Antifibrinolytic in Significant Haemorrhage."

Conflict of Interest Disclosures: Dr Martin reported receiving a stipend for service as a member of their surgeon advisory board of Z-Medica LLC outside the submitted work. No other disclosures were reported.

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