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Letter to the Editor

TEG R-Time Guided Plasma Transfusion: R We There Yet?

To the Editor:

We appreciate the insightful comments by Drs. Markham and Pivalizza.[1] We agree that viscoelastic testing is well-described and commonly used in the management of perioperative cardiac surgical bleeding. Implementation of viscoelastic-based transfusion protocols has been associated with reduced perioperative transfusions and associated complications. The same is also true for transfusion protocols based on standard tests of coagulation; hence, any standardized transfusion protocol is likely better than no protocol at all. As described in our manuscript, elevations in International Normalized Ratio (INR) and also increasing plasma transfusion volumes were associated with worse clinical outcomes.[2] Although thromboelastography (TEG) testing was performed in some patients, the limited sample size made inferential conclusions related to such data challenging. Nonetheless, the authors ask the legitimate question, "If the R-time was utilized to guide transfusion, would plasma transfusions and associated adverse outcomes have been avoided?"

This question is challenging to answer for several reasons. First, all patients in the cohort received plasma transfusion; hence, we were unable to compare outcomes in patients with similar INR or R-time values who did not receive transfusion. Second, although the retrospective study design made it difficult to evaluate the granular details of each transfusion event, the utilized transfusion algorithm was activated in the presence of microvascular bleeding. Therefore, many patients experienced microvascular bleeding despite R-time values falling within a normal reference range, suggesting that "normal" values may need to be reconsidered in this population. More importantly, transfusion avoidance in the presence of microvascular bleeding with elevated INR but normal R-time has not been evaluated but may be associated with more blood loss and downstream complications than if transfusion was given. Indeed, greater reductions in INR after any given plasma transfusion volume were associated with improvement in outcomes, suggesting that complete transfusion avoidance may be unfavorable in the setting of microvascular bleeding. Third, it is assumed that the TEG R-time has predictive value for perioperative bleeding in cardiac surgery. Although studies have shown that certain components of the TEG (ie, maximum amplitude) correlate well with postoperative bleeding in cardiac surgery, the relationships with the R-time are less robust, questioning its use as the optimal trigger to guide plasma or factor replacement therapy.[3-5] Notably, the Prothrombin time/INR has been shown to correlate with bleeding in this patient population,[3-5] though this does not imply superiority over other testing strategies. Ultimately, there is no shortage of enthusiasm to adopt viscoelastic-based algorithms, however, data suggesting superiority over other transfusion algorithms are limited.[6]

It is clear there is still much to learn about perioperative bleeding, coagulation testing, and optimal transfusion approaches in cardiac surgery. Well-designed prospective studies are needed to assess which tests of coagulation (or combination of tests) best predict altered hemostasis and beneficial responses to transfusion therapies. Enthusiasm for viscoelastic testing remains high, though vigorous study is needed before superiority can be declared over transfusion algorithms based on traditional coagulation tests.

Conflict of Interest

The authors have no relevant conflicts of interest to disclose.

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