Blood Utilization and Waste Following Implementation of Thromboelastography

Article:
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Guest: Kaitlyn Shelton is a specialist in blood banking and is currently affiliated with Bloodworks Northwest in Seattle, Washington.

Randye Kaye: Hello and welcome to this edition of *JALM* Talk, from *The Journal of Applied Laboratory Medicine*, a publication of the Association for Diagnostics & Laboratory Medicine. I'm your host, Randye Kaye.

Thromboelastography, known as TEG, is a viscoelastic testing method that provides real-time assessment of blood coagulation. TEG offers a dynamic view of clot formation and dissolution that goes beyond traditional coagulation testing. This technology has gained attention for its potential to guide transfusion decisions more effectively, particularly in high risk settings such as trauma care and complex surgeries, where rapid and accurate evaluation of hemostasis is critical. Conventional transfusion protocols often lead to unnecessary blood product use, increasing costs and waste, as well as risks to patients. By integrating viscoelastic testing into clinical workflows, healthcare teams may aim to optimize blood utilization and enhance patient outcomes.

The November 2025 issue of *JALM* features an article that explores the impact of implementing TEG at a level II trauma center. The authors compared blood utilization and waste pre- and post- TEG implementation, including for massive transfusion protocol cases. The study focused on the emergency department, trauma surgery, and cardiothoracic surgery services.

Today we're joined by the article's corresponding author, Kaitlyn Shelton. Kaitlyn is a specialist in blood banking and is currently affiliated with Bloodworks Northwest in Seattle, Washington, where she serves as Blood Bank Program Coordinator and Immunohematology Instructor. Welcome, Kaitlyn. Firstly, what is the value in implementing and studying viscoelastic testing methods such as TEG?

Kaitlyn Shelton: Yeah, so I think we can all agree that blood is a precious resource. As a blood banker, I have a keen interest in developing processes that can help safeguard the blood supply while also protecting patients. Viscoelastic testing and other platforms have benefits of directly helping patients through early detection of coagulopathies and a better

understanding of transfusion needs, but they also have indirect benefits such as lower rates of transfusion. We need to safeguard blood because it is a limited resource, but also because over transfusing patients leads to complications and there's always a risk of adverse effects when transfusing, even if the unit is needed. So, if TEG meets its intention of directing transfusions, that is a boon for both inventory management and patient outcomes.

Randye Kaye: Can you summarize how your study was designed, and what were your objectives?

Kaitlyn Shelton: With the study, we wanted to address the overarching idea: is TEG actually helping from a transfusion service standpoint? When we broke down what helping means, a few questions became clear to me, and these became the objectives for the study. So, first, did implementing TEG lead to a reduction in blood utilization? For this, we looked at weekly transfusion rates, two years pre- and post- TEG implementation for our selected service lines and compared the means using a *t*-test. We split this up by product type and by service line.

The second question was: did implementing TEG lead to less product being thrown away? For this, we looked at blood discard reports and excluded units that were recalled by the blood supplier or that were split for neonates. Then we compared mean blood waste pre- and post-implementation to see if there were differences.

Third, we asked: did implementing TEG affect blood utilization in massive transfusion? To measure this, we looked at how much blood was transfused to our MTP [massive transfusion protocol] patients and then how much blood was returned to the blood bank unused. We looked at 80 cases pre- and post-TEG to see if we were using less blood and whether product return changed.

Randye Kaye: Kaitlyn, what were the major findings of your study?

Kaitlyn Shelton: The findings of our study were mixed. The MTP data showed no significant changes after implementation in the utilization or returns. So that was curious. Overall blood utilization increased for RBCs and platelets, which I think is more due to confounding factors than to TEG. Our most compelling piece was plasma utilization, which isn't surprising since other studies show the same trend with viscoelastic testing. Even when blood utilization overall went up, such as in our emergency department group, plasma utilization actually significantly decreased. Decreased plasma utilization is great, but there is a potential issue we found in our blood waste data. Plasma waste in the study period significantly increased in the post-TEG group.

When we broke down the waste further, we noted that a larger portion of the waste was thawed plasma as opposed to liquid plasma. This suggests that more plasma is being thawed but then not used and is expiring after its shorter five-day shelf life. It's hard to say whether this is connected with the decreased plasma utilization, but it's certainly worth investigating.

Randye Kaye: All right, thank you. So, in the article you mentioned that the impact of blood availability during the COVID pandemic should be considered a confounding variable. Can you tell us more about this?

Kaitlyn Shelton: Yeah, I think this is a really important takeaway from our study. Since this was a retrospective study, we didn't really get to choose when the methodology was implemented. It had already been implemented before we started the study. The TEG testing went live at the study site in 2021, which means a lot of our pre-TEG data came from the midst of the COVID pandemic. We all know that the pandemic wreaked havoc on the supply chain, and that definitely carried over to the blood supply. There are plenty of days when we were looking at empty shelves. And so, we had to rein in our blood utilization. We also had to make calls about where the limited resource went. So, our pre-TEG period looked really restrictive and had restrictive use of blood. As the blood supply recovered in 2021, '22, and '23, these restrictions lightened a bit and more blood could leave the transfusion service. So, our increase in blood utilization that we saw in the study is likely due to this confounding factor. It's hard to say without more data in the area, but I do think that this really affected our results for the study.

Randye Kaye: Was there anything you wanted to include in your study that you were not able to?

Kaitlyn Shelton: Yeah, there's a lot I could talk about here. I think more could be done with looking at case severity and patient outcomes with TEG. I also wish we could dig further into blood waste, particularly if it could have helped us find a way to reduce that uptake in plasma waste we saw. I think one thing I would have loved to include is an examination on whether TEG reduced the duration of MTPs. In the beginning of this study, we looked at comparing case duration pre- and post-TEG, but the documentation was too unreliable to use in good faith. Massive transfusion is such an interesting topic. It's in many ways the most dynamic situation you encounter in the transfusion service. It speaks to your first question, actually, why study these methods. If we could find a way to improve that process of massive transfusion, that's a good thing.

We also found ourselves asking, does decreased plasma utilization that we found in this study lead to a decrease in

transfusion reactions such as TRALI [transfusion-related acute lung injury] and TACO [transfusion-associated circulatory overload]. We know that plasma is often implicated in these reactions. So, if we're seeing a decrease in plasma utilization, is another benefit of that a decrease in transfusion reactions?

Randye Kaye: Finally, do you have any advice for other institutions that plan to implement viscoelastic testing? What do you think are the keys to successful implementation?

Kaitlyn Shelton: Yeah, we did have to wonder how much provider ordering habits affected the study's outcome. We did look at the frequency of TEG orders for MTP, and we found that only 40% of providers were ordering a TEG. And to be fair, it isn't always feasible or even possible to get labs drawn on these really critically ill patients. But I think we would like to see a higher number of these TEGs ordered to know if it's really helping out in these populations. So I think there's a benefit to building the TEG into possibly the MTP order set or protocolizing it in some way. We weren't really able to collect data on provider ordering outside of MTP, but I believe it's very beneficial to have provider education when onboarding a protocol like this so they know what is available and when to use it.

Randye Kaye: That was Kaitlyn Shelton from Bloodworks Northwest, describing the *JALM* article "Blood Utilization and Waste Following Implementation of Thromboelastography." Thanks for tuning in to this episode of *JALM* Talk. See you next time, and don't forget to submit something for us to talk about.