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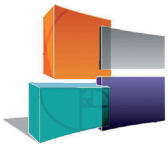

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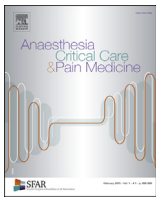

Editorial

The Twilight Zone: Ten beliefs about viscoelastic tests

In this issue of *Anaesthesia Critical Care and Pain Medicine*, Guth et al. provide additional evidence that viscoelastic tests (VET) change the management of severe trauma patients [1]. Protocols for VET-guided therapies have been implemented in several trauma centres but their generalisation remains debated. Ongoing discussions about VET usefulness still exist in the trauma community, with dogmatic positions. Here, we propose to answer common beliefs about VET with a pragmatic approach.

1. Viscoelastic tests are expensive

True. Compared to other point of care devices, consumables for VET, in particular the last generation, are expensive. The acquisition of the device itself is comparable to other high-end laboratory devices. It is well documented that VET use reduces blood product consumption [2]. Assuming a reduction of red blood cell or plasma consumption by one unit each in severely bleeding patients with VET use, this reduction allows compensating for the purchase of a device in a centre with a medium trauma activity over one to two years.

2. VET take time and is cumbersome

False. The last generation devices (TEG™ 6S, ROTEM™ Sigma and Quantra™) are fully automatised and reduce the need for user manipulation to a minimum. This makes their use comparable to other point of care tests, reducing time considerably. They all generate meaningful and predictive results for blood product need within 5 to 10 minutes [2], making their use highly competitive compared to standard laboratory tests. Future research should attempt to compare rapid centrifugation versus POC VET.

3. The device should be located in the lab, because it requires a trained and dedicated technician

False. Although conceived as bedside POC devices, previous VET generations required some level of expertise and could be perceived as too cumbersome to perform and repeat under time pressure and in the heat of a complex resuscitation, in particular in small trauma teams. In previous device generations, some reports showed a lower level of validity if manipulation was performed by clinical and not laboratory staff [3]. These observations do not seem to apply to the last generation of devices.

4. VET are hard to interpret

False. As any test, they require familiarisation with the test principle and limitations. In essence, all VET provide four types of information: fibrinogen levels, platelet function, plasma need and fibrinolysis. One only has to focus on a few parameters supported by user-friendly visual graphs. A recent publication based on prospective data provided evidence-based thresholds [4].

5. VET do not change the management of a severely bleeding patient

This depends on the management objectives. Sufficient evidence exists to suggest use of VET reduces blood product consumption, in particular plasma use [1], and allows correction of deranged parameters earlier. VET use also allows earlier detection of TIC, useful in patients with clinically occult haemorrhage. There is no current evidence to prove that VET use causes harm. Existing evidence is insufficient though to suggest a change in outcome.

6. VET do not change TXA use

Yes and no. Some reports suggest that VET may detect hyperfibrinolysis, and some groups opine the concept of a so-called *fibrinolysis shutdown* challenging the systematic use of TXA. However, VET perform actually poorly in the fibrinolysis exploration [5]. Furthermore, the evidence in favour of TXA to be given early is currently so strong, that the attempts to obtain VET results should not delay TXA administration. If VET demonstrate hyperfibrinolysis, repeating TXA should be considered. This is subject to future research.

7. Thresholds depend on devices and setting

True. TEG, ROTEM and Quantra have specific thresholds to diagnose prothrombin time and fibrinogen concentration. The technology used for clot exploration is different from one company to another. However, within the same company, these devices seem to be interchangeable with same reliable thresholds [6].

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8. VET do not predict blood product consumption or need for massive transfusion

False. There is sufficient evidence to show VET-derived parameters predict red blood cell transfusion [7], massive transfusion [8] , mortality [9] and hypofibrinogenemia [10].

9. Other POC devices, which are cheaper and easier to use, can also show coagulopathy

False. Several studies have investigated the use of POC devices developed to monitor INR level for oral anticoagulation. Overall, they appear unreliable and INR is not a good target to monitor and detect traumatic coagulopathy [11,12].

10. Viscoelastic tests save patients from bleeding based on hard evidence

We do not know. Currently apart from observational data, we do not dispose of sufficient evidence except for one randomised trial with considerable limitations [13]. Further evidence from a completed international prospective randomised trial [4] is eagerly awaited.

Disclosure of interest

The authors declare that they have no competing interest.

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