Viscoelastic Studies: Effective Tools for Trauma and Surgical Resuscitation Efforts 2.1 CE

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Purpose/Goal

To provide the learner with knowledge of best practices related to the use of viscoelastic studies, such as thromboelastography (TEG) and rotational thromboelastometry (ROTEM), to manage patients with trauma-induced coagulopathy (TIC) in the OR.

Objectives

1. Discuss the importance of effectively managing hemorrhage and TIC in the OR.
2. Describe the pathophysiology of TIC.
3. Explain the benefits of using TEG and ROTEM technology in the OR.
4. Compare and contrast TEG and ROTEM technology.

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Dagoberto Salinas, MSN, ACCNS-AG, CNOR, LCDR, NC, USN, has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.

The behavioral objectives for this program were created by Kristi Van Anderson, BSN, RN, CNOR, clinical editor, with consultation from Susan Bakewell, MS, RN-BC, director, Perioperative Education. Ms Van Anderson and Ms Bakewell have no declared affiliations that could be perceived as posing potential conflicts of interest in the publication of this article.

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ABSTRACT

Trauma-induced coagulopathy (TIC) is an abrupt disruption of all hemostatic components of coagulation resulting from severe tissue injury and hypoperfusion. The effective management of TIC has remained elusive to clinicians using traditional laboratory methods, challenging efforts to improve outcomes related to uncontrolled bleeding. Recent initiatives have aimed to reduce TIC-associated morbidity and mortality, further invoking trauma experts to explore innovative modalities in the field of viscoelastic studies, such as thromboelastography (TEG) and rotational thromboelastometry (ROTEM). These tests are able to guide proper blood product administration more effectively during trauma and surgical resuscitation compared with conventional laboratory tests. Although TEG and ROTEM are similar tests, inherent differences in their features produce variation in output results. This article calls on the perioperative clinician to evaluate TEG and ROTEM tests and consider their implementation based on the benefits of their application to clinical practice. *AORN J* 105 *(April 2017) 370-383. Published by Elsevier, Inc, on behalf of AORN, Inc. http://dx.doi.org/10.1016/j.aorn.2017.01.013*

Key words: *viscoelastic studies, trauma-induced coagulopathy, thromboelastography, rotational thromboelastometry, massive transfusion.*

In the United States, trauma accounts for 41 million visits to the emergency department and an average of 2.3 million hospital admissions per year. Of these, approximately 192,000 traumatic injuries result in death,[1] and 30% to 40% of deaths from trauma can be attributed to hemorrhage.[2] Approximately one-quarter to one-third of trauma patients also exhibit trauma-induced coagulopathy (TIC), making them approximately eight times more likely to die within a 24-hour period.[3] Trauma-induced coagulopathy is an abrupt disruption of all hemostatic components of coagulation resulting from severe tissue injury and hypoperfusion.[4] Despite enhanced clinical awareness, hemorrhage continues to be the number-one preventable cause of death after injury[5] and remains a major complication during and after surgery.[6] This situation necessitates that traditional practices in the management of TIC undergo a clinical process transformation.

Traditional laboratory studies that assess coagulation, such as prothrombin time, international normalized ratio, partial thromboplastin time, and activated partial thromboplastin time, inaccurately describe the complex nature of TIC[7] and are limited in their ability to measure clot strength.[8] Clot strength is the best measure of hemostatic capacity and represents the interaction between platelets and fibrinogen, both of which are determinants of stable clot formation.[9] Viscoelastic point-of-care studies, such as thromboelastography (TEG) and rotational thromboelastometry (ROTEM), assess the tensile force of whole blood to provide a quick estimate of thrombin generation, platelet function, and clot

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