Massive transfusion is relatively uncommon in cardiac surgery—thankfully. The goal of testing is to predict a risk of bleeding and guide therapy so that massive blood loss does not occur. This lecture will review the mounting evidence that viscoelastic tests are predictive of blood loss and can be used. The audience should consider how human systems (our laboratories and hospital support systems) can give us as much information as possible quickly and allow us to use appropriate coagulation algorithms (decision trees) to make the best decisions. Also, the wording “standard” coagulation tests somehow connotes that viscoelastic tests are not standard. Nothing is farther from the truth (thousands of papers are published upon them— they are standard). We as a group should stop using this incorrect nomenclature and fight back against the past jargon that perpetuates bad medicine.

Viscoelastic tests utilize whole blood. These tests have included thromboelastography (TEG), Rotational Thromboelastometry (ROTEM) and Platelet Elastic Modulus (Hemodyne Inc). Whole blood clot strength is quite important. But equally important (perhaps) is the speed at which clot formation occurs as well as whether the clot stays intact or breaks down (fibrinolysis). The viscoelastic tests do assess each of these key parts of coagulation. But one can and should argue that the PT and aPTT might under some circumstances get better information with regards the onset of clot formation. Other tests, now available, such as the Verify Now (Accumeterics) PFA-100, Platelet Works and others (automated platelet aggregometry, or flow cytometry) can tell a great deal more about both native platelet dysfunction, inhibition or drug effects on platelets.

A useful study was small in size (only 26 Patients) but examined ROTEM and “standard coagulation tests (PT, aPTT, fibrinogen level, ATIII, thrombin generation and platelet count). The ROTEM is more robust than the TEG and does have pre-packaged cuvettes with activators for the extrinsic system (EXTEM0 and the intrinsic system INTEM). In contrast to the above study, it makes sense that using the right activator when comparing PT and aPTT is critical. In addition the ROTEM has the capability of examining the fibrinogen level through use of platelet blocking agents (FIBTEM). All of these types of studies can be performed with the TEG but to do so requires the user to pipette and measure reagents. The ROTEM is supplied with these cuvettes and is therefore partially automated to create this data analysis.

In conclusion, there is gathering data that viscoelastic test could replace “standard” coagulation tests, but we cannot fully claim that yet. Furthermore, there is so much data showing that the use of coagulation algorithms in conjunction with all types of coagulation testing and particularly ROTEM and r-TEG not only makes sense, decreases blood utilization and may improve morbidity and mortality. Indeed the STS/SCA guidelines for blood transfusion in heart surgery call for such algorithm usage. That
should be our stress- that all centers institute the guidelines and embrace real time, fast as complete as possible coagulation monitoring.

**Recommended Reading:**