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Thromboelastographic characterization of the activated clotting system in children with sickle cell trait or sickle cell disease

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Abstract

Background: Recent epidemiological evidence suggests sickle cell disease (SCD) and sickle cell trait (SCT) is a risk factor for venous thromboembolism. The increased in-vivo markers of thrombin generation support the notion that such patients are in a chronic hypercoagulable state. In an attempt to better understand the underlying mechanism, global hemostatic assays including thrombin generation assay (TGA) and thromboelastography (TEG) have been utilized by several groups, but thus far, have shown inconsistent results either due to small sample size or technical differences.

Objectives: Global hemostatic characterization of children with SCD or SCT by using TGA and modified TEG methods.

Materials and methods: In this pilot study, we obtained TGA, TEG and other hemostatic data on specimens from 13 patients with SCD, 14 with SCT and 12 race-matched healthy controls (NC).

Results: R time and K time with modified TEG methods was significantly shorter in SCD when compared to SCT and NC. Alpha and MA did not show any significant differences between the groups. There was no difference seen between SCT and NC. TGA profiles did not show any difference between the three groups. As expected the in-vivo markers of thrombin generation and activation of fibrinolysis including D dimer and thrombin-antithrombin complexes were significantly higher in SCD subjects as compared to SCT and NC.

Conclusion: The modified TEG methods are able to detect the activated coagulation system for the SCD population but a larger and more homogenous SCT cohort needs to be studied for more conclusive results.