LEFT VENTRICULAR ASSIST DEVICE INDUCED COAGULATION AND PLATELET ACTIVATION AND EFFECT OF THE CURRENT ANTICOAGULANT THERAPY REGIMEN

ACC Moderated Poster Contributions
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Background: Left ventricular assist devices (LVADs) are mechanical pumps used to enhance cardiac function in heart failure patients. In this study platelet and coagulation activation was quantified to identify if the platelet and clot inhibiting drug regimen is effective.

Methods: Patients with implanted LVADs (n=7), 5 healthy adult controls, and 5 coumadin patients with normal ejection fraction were evaluated monthly for 3 months.

Results: Plateletworks (Helena; Beaumont, TX) showed a greater inhibition of collagen (31.8 vs 7.9% inh; p=0.004), arachidonic acid (30.9 vs 8.2% inh; p=0.001), and ADP (10.9 vs 6.1% inh; p=0.004) induced platelet aggregation in patients. PlateletMapping (Haemoscope; Niles, IL) using whole blood thrombelastography (TEG) showed an inhibition trend of ADP (p=0.091) mediated coagulation/platelet activation but a greater maximum amplitude of the blood clot in patients compared to normals (69.1 vs 64.9 mm; p=0.016). TEG showed inhibition of clot initiation time (R value: 8.81 vs 6.01; p=0.001) but no significant inhibition of coagulation rate (K value: p=0.840; angle: p=0.674). There was no difference in any parameter over the 3 months. von Willebrand factor (vWF) antigen levels (Zymutest; Hyphen Biomed, France), although remaining within the normal range, increased during the 3 month period in the LVAD patients (97.9 ± 16.0% to 111.2 ± 18.2% to 113.9 ± 17.4%; normals 106.5 ± 11.2%). LVAD patients also had a trend of vWF:vWF propeptide ratio indicating increased degradation of vWF (2.04 vs 1.44).

Conclusions: This study showed that coagulation and platelet activation caused by the LVAD pump and generated shear forces is suppressed to a measurable degree by 81 mg/day aspirin and 1.8 INR warfarin, similar to adult controls with normal cardiac ejection fraction but taking either warfarin or aspirin. No patient in this study experienced a thrombotic or hemorrhagic event. Having established the typical response of an LVAD patient, using such assays as those described could facilitate determination of a tailored dosing strategy for LVAD patients with increased or decreased hemostatic needs, thus reducing the risk of bleeding and thrombosis in this patient population.