Evaluation of Antiplatelet and Antihyperlipidemic Agent Dosing on Thrombotic and Bleeding Events in Left Ventricular Assist Device (LVAD) Patients

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Purpose: Left ventricular assist devices (LVAD) are utilized to enhance survival and improve hemodynamics in patients with advanced heart failure. Device therapy comes with a high risk of serious side effects including bleeding and ischemic events due to physiological changes that occur from the continuous blood flow and tissue-pump interactions. To mitigate ischemic and thrombotic risks, guidelines recommend systemic anticoagulation and antiplatelet therapy, however, the optimal strategy to balance the risks is unknown due to the paucity of data in this population. All continuous-flow LVAD manufacturers (HeartMate 2, HeartMate 3, and HeartWare) recommend warfarin with a goal INR of 2 to 3 in combination with aspirin, however, there is variation in recommended aspirin dosing.

A post hoc-analysis of the MOMENTUM 3 trial showed similar rates of bleeding and thrombotic events in HeartMate 3 LVAD patients on aspirin 81 mg and 325 mg. Due to the unknown etiology of ischemic events (atherosclerosis, thrombosis) HMG-CoA reductase inhibitors can be used in patients with LVAD and history of ischemic events to prevent recurrence. However, targets for low-density lipoprotein and their efficacy in preventing recurrent strokes in this population is unknown. The purpose of this evaluation is to determine if current standard medical therapy is effectively balancing the risk of bleeding and thrombotic in LVAD patients.

Methods: A retrospective chart review was performed on patients implanted with a continuous-flow LVAD between 1/1/15 and 9/1/20. Patients were excluded for the following reasons: HeartMate 2 device, transplantation, transfer of care to another LVAD center, and death during the study window. The primary outcome was the occurrence of a serious bleeding event or thrombotic event.

Results: 65 patients with centrifugal continuous-flow devices were included in the analysis (HeartWare (HW), n=36; HeartMate 3 (HM3), n=29). There were no statistical differences in baseline demographics or risk factors prior to implantation. Most patients were discharged with aspirin 325 mg at index hospitalization (32 patients HW, 23 patients HM3; p=0.29). There were no statistical differences in total bleeding events between the two groups (13 events HW, 7 events HM3; p=0.42). Following a bleeding event, the most common medical intervention was a reduction in antiplatelet dose. There was a statistically significant difference in total thrombotic events between the two groups (11 events HW, 1 event HM3; p=0.008). Following a thrombotic event, the most common intervention was antiplatelet therapy intensification (addition of clopidogrel or dipyridamole). There were 3 patients who had an indication for statin therapy who were not on appropriate intensity therapy at the time of an ischemic event.

Conclusions: Patients implanted with a HeartMate 3 device had a significantly lower incidence of thrombotic events. Decreasing the antiplatelet intensity may balance the risks more effectively as thrombotic risk is low and bleeding risk is sustained throughout the duration of HeartMate3 pump support. Additionally, pharmacy support to ensure statin therapy is optimized in all LVAD patients may be a future opportunity.