EVALUATION OF ECMO BIVALIRUDIN PROTOCOL

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Traditionally, unfractionated heparin was the systemic anticoagulant used during extracorporeal membrane oxygenation (ECMO). Recently, there has been increasing evidence to use bivalirudin, a direct thrombin inhibitor (DTI), due to fewer complications. A medication use evaluation of all ECMO patients who received bivalirudin was previously conducted at Carilion Roanoke Memorial Hospital, which resulted in a P&T approved addition of an ECMO Addendum in the pharmacy-directed DTI Protocol. The intent of this study was to evaluate the efficacy and safety of bivalirudin for systemic anticoagulation during ECMO support post protocol initiation.

This was a retrospective, single-center, quasi-experimental, pre-post study. The pre-group data collected previously was utilized. The post-protocol group comprised of adult patients on ECMO support for at least 24 hours and who received bivalirudin between May 1, 2019 and June 30, 2021.

There were 38 patients in the pre- and 35 patients in the post-group. The primary outcome, median time to two consecutive aPTTs within therapeutic range for the initial goal range, was 8.9 hours in the pre- and 14.2 hours in the post-group (p=0.517). Removing nine COVID-19 patients from analysis, the median time in the post-group was 8.6 hours (p=0.615). After obtaining two consecutive therapeutic aPTTs, the median percentage of aPTTs that were outside the therapeutic range for non-COVID patients was 9.1%. Major bleeding and systemic VTE occurred in 31.4% and 5.7% of the post-group, respectively. There was less circuit VTE in the post-group (89.5% vs. 68.6%, p=0.027). In a subgroup analysis of patients with and without COVID-19 in the post-group, the primary outcome was higher in patients with COVID-19 (26.5 vs. 14.2 hours, p=0.018).

Bivalirudin dosing is safe and effective after initiation of a pharmacy-driven protocol. Patients with COVID-19 on ECMO had less predictable dosing and took longer to reach two consecutive aPTTs within therapeutic range. Per our protocol, once two consecutive aPTTs are achieved, the monitoring interval may be extended from every two or four hours, depending on renal function, to every six hours to align with ECMO labs. However, based on the consistency of aPTTs maintained at goal, it can be changed to once daily monitoring as is currently done with the pharmacy-directed non-ECMO DTI protocol to reduce nursing, phlebotomy, lab, and pharmacy workload.