A Retrospective Cohort Study for Heparin Infusion Initiation and Monitoring Quality Improvement

Purpose:
The purpose of this retrospective cohort study was to: 1) identify the number of patients admitted to SLHS with recent direct oral anticoagulant (DOAC) exposure and inappropriately initiated on a continuous heparin infusion and 2) evaluate the number of patients with recent DOAC exposure initiated on heparin infusion with inappropriate monitoring (i.e. use of anti-factor Xa assay).
Methods:
A retrospective, single center electronic record review was performed on patients with recent DOAC exposure initiated on a continuous heparin infusion from September 1, 2018 to April 30, 2019. Prior to admission (PTA) DOAC, DOAC indication, timing of last DOAC dose, CHADsVASc score, heparin indication, anti-factor Xa assay collection timing, anti-factor Xa assay critical levels, signs and symptoms of bleeding, anticoagulation reversal, and administration of blood product transfusion were collected through the electronic medical record. Patients were included in the study if they had recent DOAC exposure and were initiated on a continuous heparin infusion inappropriately. Secondary endpoint included patients with recent DOAC exposure initiated on a continuous heparin infusion with inappropriate monitoring. Recent DOAC exposure was defined as less than twelve hours for apixaban and less than twenty-four hours for rivaroxaban. A supra-therapeutic anti-factor Xa assay was defined as >0.7 IU/mL. A critical anti-factor Xa assay was defined as >1.1 IU/mL.
Results:
A total of n= 42 patients in the medical center were reviewed. Among those reviewed, 9.5% (n= 4) were initiated on a continuous heparin infusion inappropriately. Among the patients on an inappropriate continuous heparin infusion, no patients experienced bleeding or required reversal of anticoagulation. Among those reviewed, 59.5% (n= 25) were initiated on a continuous heparin infusion with inappropriate monitoring. Among the patients on a heparin infusion with inappropriate monitoring, 44% (n= 11) had a supra-therapeutic anti-factor Xa assay and 8% (n = 8) had a critical anti-factor Xa assay.
Conclusions:
In this small retrospective cohort study, the incidence of inappropriate continuous heparin infusion was infrequent and did not result in any adverse outcomes during the study period. However, the incidence of inappropriate monitoring during continuous heparin infusion post-DOAC exposure was significant. This study indicates a need for further investigation into a larger patient population over a longer period as well as practice changes to the Saint Luke's continuous heparin order sets to facilitate more appropriate monitoring when transitioning patients from a DOAC to continuous heparin infusion.