Management of Thromboembolism in COVID-19 Patients

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Background: Since March 2020, the understanding and treatment of COVID-19 has continually evolved as the scientific community uncovered the pathology of this global pandemic. After more than two years, it is well established that COVID-19 increases patients' risk of venous thromboembolism. Elderly, obese, and hospitalized patients are at a higher risk for development of thromboembolism and have higher rates of mortality. Microthrombi are seen extensively in the lungs of many COVID-19 patients and can also be detrimental to lung function. The prevalence of thromboembolism is between 10-35% among patients in the intensive care setting, and up to 60% in autopsy reports. Also, the use of steroids is standard of care in hospitalized COVID-19 patients who require oxygen. Dexamethasone can increase CYP3A4 activity and induce P-glycoprotein, which has the potential for interacting with direct oral anticoagulants. The clinical significance of this interaction varies in animal data and case reports.

Objective: To evaluate anticoagulation use, adverse events, and associated pharmacist interventions in COVID-19-infected patients who were hospitalized with acute thromboembolism on a dedicated medical unit.

Methods: This was a descriptive medication class review of anticoagulants in non-critically ill COVID-19 patients. A report was generated to find anticoagulation orders for patients admitted to a dedicated COVID-19 unit between May 1, 2020 and April 30, 2021. Patients 18 – 89 years of age were screened for receiving treatment doses of anticoagulants, diagnosis of a thromboembolism, and diagnosis of COVID-19 on admission or within the month prior to admission. Patients were excluded if they had a history of clotting disorders, were pregnant, or incarcerated. Data collection included patient characteristics, specific treatment of thromboembolism, adverse effects from anticoagulation, anticoagulant drug interactions, mortality, discharge anticoagulation, pharmacist interventions, and rates of recurrent thromboembolism.

Preliminary Results: Forty-eight patients were included in this review. The average patient age was 63.8 years, the average BMI was 33.9kg/m^2, and the most common comorbidity was hypertension, seen in 63% of patients. The most prevalent types of thromboembolisms included pulmonary embolisms in 58% of patients, deep vein thromboses in 13% of patients, pulmonary embolism in combination with a deep vein thrombus in 13% of patients, and embolic strokes in 10% of patients. The majority of these were diagnosed on admission. For their anticoagulation, 56% of patients were started on IV heparin, 26% of patients were started on enoxaparin, and 5% of patients were started on apixaban. There was a potential anticoagulant drug interaction in 29% of the 28 patients who received dexamethasone during their admission. Two patients developed additional thromboembolism during admission, but neither had a drug interaction with their anticoagulation. Bleeding events occurred in 10% of patients, 80% of which were major bleeds. Pharmacist interventions occurred on 34 of the 48 patients, with an average of 8 interventions per patients. The most common interventions were daily lab monitoring, which occurred in 94% of patients, followed by education, which occurred in 74% of patients. The average length of stay was 10.6 days, and 86% of patients survived their admission. On

discharge, 98% of patients continued on anticoagulation. Apixaban was prescribed in 68% of patients, followed by warfarin in 20%, and rivaroxaban in 10%. Recurrent thromboembolism occurred in 10% of patients within three months of discharge. Of the patients with recurrent thromboembolism, 75% were on apixaban and 25% were on warfarin.

Conclusion: The treatment of VTE in our population was consistent with the standard of care for patients with COVID-19. Pharmacist monitoring and intervention occurred in over 80% of patients and pharmacists provided anticoagulant education for 60% of patients prior to hospital discharge. The potential drug interaction between dexamethasone and direct oral anticoagulants, which was a theoretical concern during the study period, did not produce a clinically significant effect on patients as none of our patients on concurrent dexamethasone experienced worsening or recurrent thromboembolism.