ACUTE MANAGEMENT OF ATRIAL FIBRILLATINO IN HEART FAILURE WITH REDUCED EJECTION FRACTION IN THE EMERGENCY DEPARTMENT– Michael Hasbrouck PharmD, Tammy Nguyen, PharmD, BCPS; Virginia Commonwealth University Health System, Richmond, VA

Introduction: Atrial fibrillation (AF) with rapid ventricular rate (RVR) is an acute condition which results in more than 450,000 emergency department (ED) visits each year. In patients who present in AF with RVR (> 120 bpm), current guidelines recommend heart rate control with intravenous (IV) non-dihydropyridine calcium channel blockers or beta-blockers for acute management. However, for patients with concomitant heart failure with a reduced ejection fraction (HFrEF) calcium channel blockers are not recommended, due to their potential negative inotropic effects. A recent prospective trial evaluated diltiazem versus metoprolol for acute rate control in patients with an EF $\leq$ 40% and found no differences in successful rate control at 30 minutes. The primary objective of this study attempts to identify the incidence of adverse effects of diltiazem, metoprolol, and amiodarone in patients with HFrEF, which has not been fully evaluated up to this point.

Methods: This single center, retrospective review from January 2018 – December 2019 included adult patients with HFrEF who presented to the ED in AF with RVR and received at least one dose of diltiazem, metoprolol, or amiodarone in the ED. The primary outcome was adverse effects of therapy, defined as: 1) hypotension (systolic blood pressure <90 mmHg requiring fluid bolus or vasopressors) or bradycardia (heart rate <60 bpm) within 60 minutes of medication administration 2) worsening heart failure symptoms defined as increased oxygen requirement or inotropic support within 48 hours. Secondary outcomes included the incidence of rate control failure, patient disposition, ED length of stay, hospital length of stay, and in-hospital mortality.

Results: One hundred and thirty-nine patients met inclusion criteria, with 68 receiving metoprolol, 57 receiving diltiazem, and 14 receiving amiodarone for atrial fibrillation treatment. Overall adverse effects for diltiazem, metoprolol, and amiodarone were similar with rates of 32%, 21%, and 29% respectively ($p = 0.366$). However, there was a significantly higher rate of worsening HF symptoms with diltiazem (33% vs 15% vs 29%, $p = 0.046$). The incidence of rate control failure was high for diltiazem, metoprolol, and amiodarone and rates did not differ significantly between groups (51% vs 62% vs 79%, $p = 0.136$).

Conclusions: In patients with HFrEF who present to the emergency department in AF with RVR, although overall adverse events were similar, diltiazem (in comparison to metoprolol and amiodarone) was associated with more heart failure exacerbations, and thus should be avoided in this population.

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COMPARISON OF SODIUM ZIRCONIUM CYCLOSILICATE AND SODIUM POLYSTYRENE SULFONATE FOR ACUTE HYPERKALEMIA

Historically, sodium polystyrene sulfonate (SPS) was the only resin binder therapy available. Recently, Sodium zirconium cyclosilicate (SZC) was approved and has proven effective at achieving normokalemia. Due to literature-based efficacy, improved safety profile, and quicker onset of action, SPS was replaced with SZC on formulary in May of 2020. This study evaluated the efficacy and safety of SPS and SZC on reduction of serum potassium.

This retrospective, single-center cohort evaluation included adult patients admitted with serum potassium value(s) ≥ 5.5 mmol/L and received oral SPS or SZC. Exclusion criteria included renal replacement therapy between SPS or SZC dose and potassium level re-check, a hemolyzed sample, or level checked via a point of care machine. The primary endpoint was the difference in the reduction of serum potassium within 12 hours post-administration between groups. Secondary endpoints include incidence of repeat resin binder dose and incidence of adverse events associated with SPS and SZC. Continuous data are represented as means, analyzed with two-sample t-test, and categorical data are represented as frequencies, analyzed with Fisher's exact test.

A total of 77 patients were included, 49 receiving SPS and 28 SZC. There was no difference in baseline characteristics between groups. The mean baseline potassium value was similar in both groups (6.1 mmol/L SPS vs 6.0 mmol/L SZC). The difference in reduction of serum potassium post-administration was similar between groups (-0.8 SPS vs -0.7 SZC, p=0.84). Approximately one third of patients received repeated doses in both groups (33% SPS and 39% SZC). There was an overall low incidence of adverse events. Edema was common in both groups.

There was no difference in effectiveness and safety between SPS and SZC in reducing serum potassium. Sodium zirconium cyclosilicate will continue to be the formulary resin binder at this institution. Future studies with a larger sample size and at additional study sites are needed to validate the findings of this study and to determine if utilizing one drug compared to the other reduces the adverse effects associated with resin binders while maintaining similar potassium reduction.

Title: INITIAL FIXED VS WEIGHT-BASED ENOXAPARIN WITH ANTI-FACTOR XA DOSE ADJUSTMENT FOR VTE PROPHYLAXIS IN TRAUMA PATIENTS

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Introduction: Venous thromboembolism (VTE) is a common complication after major trauma. A fixed-dose enoxaparin dosing strategy is commonly used for VTE prophylaxis in the trauma setting. Recent data have shown subtherapeutic anti-factor Xa (anti-FXa) levels frequently occur with this protocol and suggests a weight-based dosing strategy may improve time to desired prophylactic anti-FXa range (0.2-0.5 units/mL) with minimal adverse effects and lower VTE rates.

Methods: This was a single-center, retrospective, quasi-experimental study of adult trauma patients receiving fixed-dose protocol (30 mg twice daily) between March 1, 2017 and July 31, 2017 and weight-based protocol (0.5 mg/kg twice daily) between January 23, 2020 and July 13, 2020. Trauma surgery patients were included if they received a twice daily enoxaparin dosing strategy and had at least one peak anti-FXa level documented. Outcomes included initial attainment of goal prophylactic anti-FXa level, time to goal prophylactic peak anti-FXa level, mean enoxaparin dose associated with goal prophylactic anti-FXa level, and adverse events. Data was analyzed using descriptive statistics, Chi-square and Kruskal Wallis tests.

Results: 183 patients were included in the study, of which 90 received fixed- and 93 received weight-based enoxaparin dosing strategies. In the fixed-dose group, 48.9% of patients achieved an initial goal prophylactic peak anti-FXa level, compared to 74.2% of patients in the weight-based group ($p < 0.001$). Median time to goal prophylactic peak anti-FXa range was 65 hours in the fixed dose group and 29 hours in the weight-based group ($p < 0.001$). Median enoxaparin dose associated with goal peak prophylactic range was 0.42 mg/kg and 0.50 mg/kg, respectively. No difference was noted in rates of thrombotic events, major bleeding, ICU length of stay, or in-hospital all-cause mortality. Rates of minor bleeding and hospital length of stay were significantly higher in patients who received a fixed dosing strategy ($p < 0.001$).

Conclusions: In this study, initial weight-based enoxaparin dosing of 0.5 mg/kg twice daily with anti-FXa-based dose adjustment led to increased attainment of initial goal prophylactic peak anti-FXa level and shorter time to goal prophylactic peak anti-FXa level with no increased risk of adverse effects.

Patients Who Decompensate and Trigger Rapid Response Immediately Upon Hospital Admission Have Higher Mortality Than Equivalent Patients Without Rapid Responses

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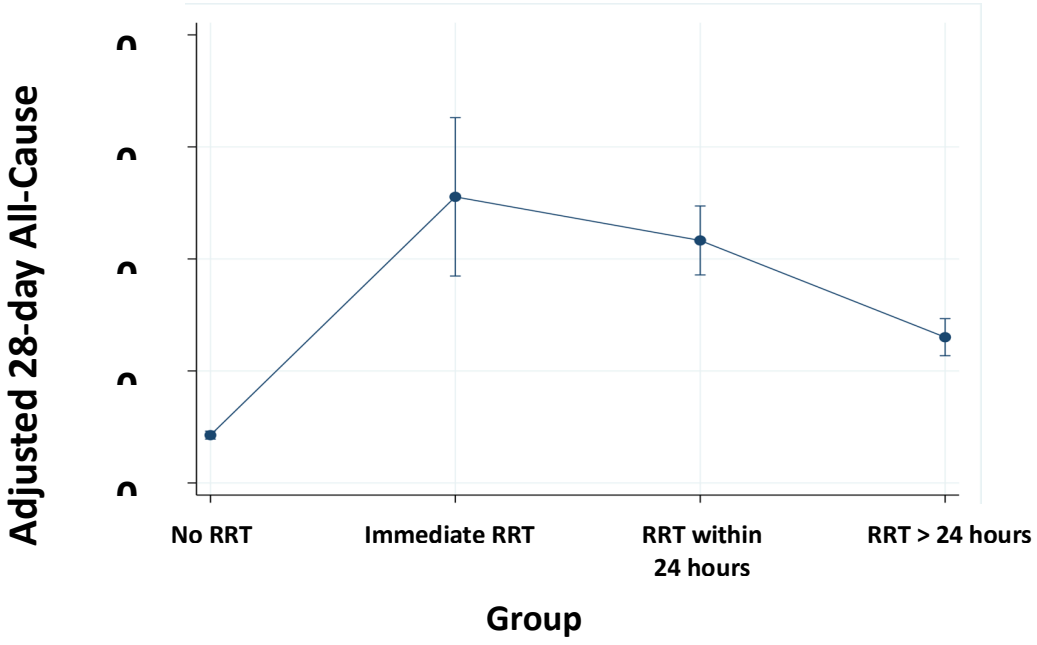
Abstract:

Background: Rapid-response teams (RRTs) have impacted management of decompensating patients, potentially improving mortality. Few studies address the significance of RRT timing relative to hospital admission. We aim to identify outcomes of adult patients who trigger RRT activation within 4 hours of admission, compare these to patients who trigger RRT later in admission or do not require RRT activation, and identify risk factors that predispose towards immediate RRT activation.
Methods: A retrospective case-control study was performed using an RRT activation database, comprising 201,783 adult inpatients at an urban, academic, tertiary care hospital. This group was subdivided by timing of RRT: within the first 4 hours of admission (immediate RRT), 4-24 hours after admission (early RRT), and after 24 hours. Primary outcome was 28-day all-cause mortality. Individuals triggering immediate RRT were compared with demographically-matched controls. Mortality was adjusted for age, qSOFA score, ICU admission, and Elixhauser Comorbidity Index.
Results: Patients who triggered immediate RRT had adjusted 28-day all-cause mortality of 7.1% (95% CI 5.6-8.5%) and death OR of 3.27 (95% CI 2.5-4.3) compared to those who did not (mortality 2.9%, 95% 2.8-2.9%; $p < 0.0001$). Patients triggering immediate RRT were more likely to be Black/African American, older, and have higher qSOFA scores than those who did not trigger RRT activation.
Conclusion: Patients who require early escalation of care may have critical illness not found on hospital admission and have higher 28-day all-cause mortality. Through identification of early decompensation, hospitals may target interventions and more appropriately triage these patients, improving morbidity and mortality.



Title: Evaluation of Clinical Outcomes of High-Dose vs. Low-Dose Kcentra in Perioperative and Postoperative Cardiac Surgery Patients

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Purpose/Background: Cardiac surgery has one of the highest rates of blood cell transfusions; accounting for 10% of all packed red blood cell (PRBC) transfusions. This is important as patient mortality is directly proportional to the number of units of PRBC transfused.[1] Limiting blood product administration after cardiac surgery is challenging due to perioperative and postoperative bleeding. Kcentra provides factors at a lower volume than fresh frozen plasma (FFP), can be more rapidly administered, and has less risk of allergic reactions.[2] When compared against FFP in cardiac surgery patients, a recent meta-analysis showed Kcentra administration was associated with reduced perioperative blood transfusions without increased thromboembolic events or other adverse reactions.[3] The dosing of Kcentra for perioperative or postoperative cardiac surgery bleeding varies in the literature available.[4,5]

Objective: This study aimed to compare clinical outcomes of cardiovascular surgery patients receiving high dose (50 units/kg) vs low dose (25 units/kg) of Kcentra in the perioperative and/or postoperative setting.

Methods: This was an Institution Review Board approved, retrospective, chart review within a community teaching hospital. Patients were included if they were at least 18 years old, underwent a coronary artery bypass graft (CABG), valve replacement, or mixed procedure, and received Kcentra for perioperative or postoperative for bleeding. Patients were excluded if they were older than 89 years or pregnant. The primary outcome was the prevalence of PRBC administration within 24 hours (hrs) of Kcentra administration. Secondary outcomes included the prevalence of blood product administration, thromboembolic events, re-sternotomy, administration of additional Kcentra, thoracostomy tube output, length of stay, duration of mechanical ventilation, and cost of Kcentra therapy.

Results: Forty-seven of 69 patients screened met inclusion criteria. Twenty-seven patients received Kcentra 25 units/kg and 20 patients received Kcentra 50 units/kg. Baseline characteristics were similar among groups. Patients who received Kcentra 25 units/kg received a median of 3.0 units PRBC (IQR 0.5-6.6) and patients who received 50 units/kg received a median of 4.8 units (PRBC IQR 2.0-8.6). Twelve patients (44.4%) in the 25 units/kg group and 10 patients (50%) in the 50 units/kg group required a resternotomy. Thomboembolic events occurred in 3 vs. 1 patient in the 25 units/kg and 50 units/kg group respectively.

Conclusion: The Kcentra 25 units/kg group required fewer PRBC in the first 24 hrs after Kcentra administration. Additional studies are needed determine the optimal dosing strategy after cardiovascular surgery.

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