Impact of Abnormal Electrolytes on Dofetilide (Tikosyn) Initiation: A Pilot Study

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Background:

Dofetilide (Tikosyn®) is an antiarrhythmic medication commonly prescribed for supraventricular arrhythmias such as atrial fibrillation and atrial flutter. Due to the risk of life-threatening ventricular arrhythmias, dofetilide must be initiated in a hospital setting where patients are observed for a minimum of three days. This risk increases in the presence of severe renal impairment, QTc prolongation, hypokalemia or hypomagnesemia. At our institution, pharmacists monitor baseline labs and relay abnormal electrolyte findings to the cardiology provider, as pharmacists currently do not have a protocol to independently order electrolyte replacement. Previous research and local facility experience have shown this process can delay electrolyte replacement, dofetilide administration, and lead to prolonged hospital stays. The purpose of this study was to investigate whether patients admitting with low baseline serum electrolytes experienced a delay in administration of the first dose of dofetilide when compared to patients admitting with normal serum electrolytes.

Methods:

A retrospective, descriptive chart review was performed using a community hospital electronic health record to identify patients 18 years or older with a diagnosis of supraventricular arrhythmia who were admitted between 01/01/2017 to 01/01/2020 for initiation of dofetilide. Patients were excluded if they were continuing home doses of dofetilide or had a contraindication to using dofetilide such as prolonged QTc interval (> 440 msec and not approved by cardiologist), creatinine clearance < 20 ml/min, or heart rate < 50 beats per minute. The primary outcome compared time from hospital admission to first dose of dofetilide for patients with low baseline magnesium (< 2 mg/dL) and/or potassium (< 4mEq/L) levels to those with normal levels. Secondary outcomes included comparing hospital length of stay, number of dofetilide doses administered prior to discharge, and readmission rates between the two groups. An *a priori* power calculation was performed and indicated that 88 patients total (44 per group) were needed to meet 90% power. Student T-tests were conducted to analyze differences in time to first dose of dofetilide, number of doses of dofetilide given, and hospital length of stay. A chi squared test was used to analyze hospital readmissions between the two groups.

Results:

After reviewing 143 patient charts, only 46 patients were eligible for study analysis. Power was not met as only 24 patients were included in the abnormal electrolytes at baseline group and 22 patients were included in the normal electrolytes at baseline group. The primary outcome of the average time to first dose of dofetilide was not statistically different; 6.05 hours in the study group vs 4.92 hours in the control group (p=0.181). The secondary outcomes of average length of stay and average number of dofetilide doses given before discharge were also not statistically significant (p=0.722 and p=0.502, respectively). Only one patient in the study group was readmitted within 30 days of discharge and no patient was readmitted in the control group.

Conclusions:

The results did not show a significant difference between the two groups but did show that the study group had a slight delay in dofetilide initiation compared to the control group. This delay, while not statistically significant, may still have an impact on patient satisfaction as patients may view delays in administration of the medication they were admitted for as suboptimal management of their care. Limitations of this study include the retrospective design, and small sample size which lead to power not being met meaning that a statistically significant difference could still exist. Only 143 patient charts were available for review during the set time frame. Of these patients, 97 patients were excluded with the most common reason for exclusion being continuation of home medication. Expanding the time frame beyond 01/01/2020 could have provided a larger sample size and the inclusion of more patients may have shown a more significant delay in dofetilide initiation. While the study was not able to show a significant difference, it does indicate that the current monitoring process for dofetilide initiation can be improved to standardize how and when electrolytes are replaced. A pharmacist-driven protocol for electrolyte replacement in setting of dofetilide initiation could provide standardization and relieve the burden on the cardiology team. Further direction will include initiation of such an electrolyte replacement protocol that will allow pharmacists to order potassium or magnesium supplementation for patients admitted for dofetilide initiation and evaluation of the impact of this protocol on improving dofetilide initiation process.