Ensuring Safe Administration of Dofetilide Therapy for Atrial Fibrillation

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Background

Dofetilide is an oral class III antiarrhythmic approved for the conversion of atrial fibrillation and preservation of sinus rhythm. Dofetilide's mechanism allows for suppression of reentrant arrhythmias; however can also result in prolongation of the QT interval on an EKG (Roukos & Saliba, 2007). This prolongation can cause proarrhythmic effects, potentially resulting in lethal rhythms, such as torsades de pointes (Jaiswal & Goldbarg, 2014). The potential for these rhythms substantiates the need for staff education on:

- This medication and it's side effects
- Proper administration, maintenance, and monitoring of the drug and pertinent lab values and tests.
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Approximately 380,000 to 450,000 adverse drug events (ADEs) occur in the United States in hospitalized patients (Khoo et al., 2013), giving significance to the importance of remaining attentive to medication safety. Hewitt, Tower, and Latimer (2015) reported that knowledge-based mistakes, poor communication, and poor medication assessment were potential causes for medication errors.

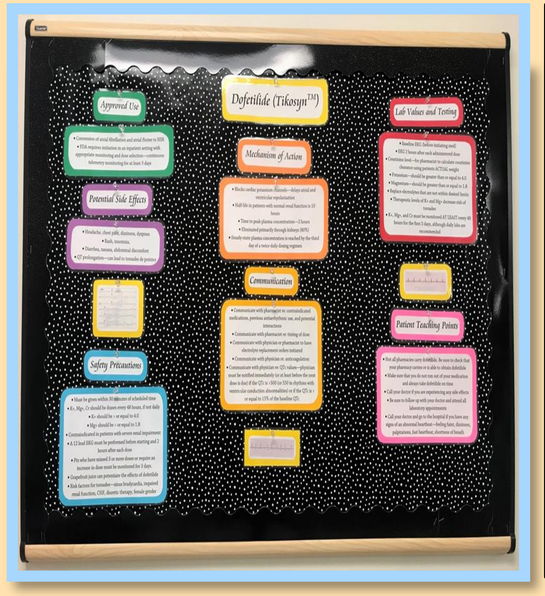
Due to the potential for side effects when using this drug, 5HH is the only unit at Sentara Norfolk General Hospital to initiate dofetilide therapy. As a result of increased turnover, the unit became staffed with a large number of novice nurses; requiring more frequent education. New graduate nurses (less than one year general nursing experience) comprised 42% of the team and "new-to-cardiac" nurses (less than one year of cardiac experience) encompassed 11%, leaving less than half the staff as seasoned nurses.

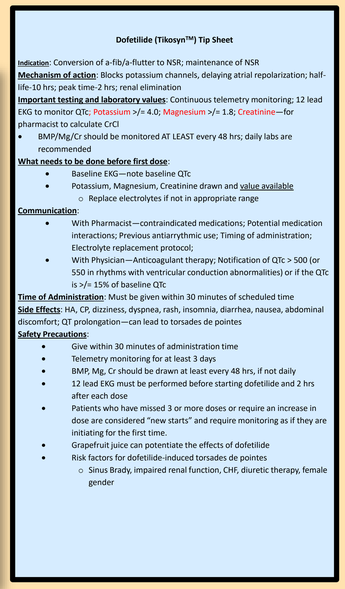
Methodology

Using Sentara's Dofetilide Initiation and Monitoring Guidelines and information from the FDA's website, education materials were developed which included a bulletin board, pretest, posttest, and tip sheets. Interprofessional collaboration was accomplished by meeting with the unit pharmacist.

The tip sheets were created with important information employees would need when administering dofetilide to their patients and laminated for sturdiness. The bulletin board was designed to be prominently displayed on the unit for staff and patient education.

Staff education was conducted individually and accomplished over approximately two weeks. Posttests were distributed for employees to complete one week after they were educated.





Dofetilide (Tikosyn™) Tip Sheet

Indication: Conversion of a-fib/a-flutter to NSR; maintenance of NSR
Mechanism of action: Blocks potassium channels, delaying atrial repolarization; half-life-10 hrs; peak time-2 hrs; renal elimination
Important testing and laboratory values: Continuous telemetry monitoring; 12 lead EKG to monitor QTc; Potassium >/= 4.0; Magnesium >/= 1.8; Creatinine—for pharmacist to calculate CrCl

- BMP/Mg/Cr should be monitored AT LEAST every 48 hrs; daily labs are recommended

What needs to be done before first dose:

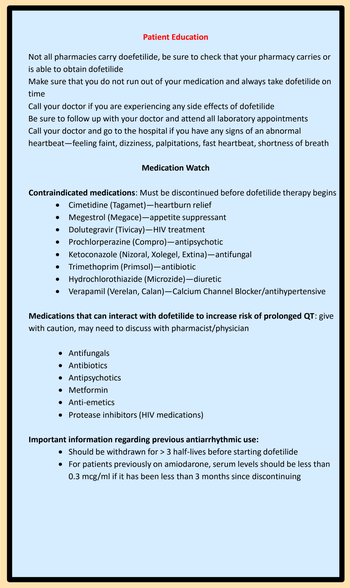
- Baseline EKG—note baseline QTc
- Potassium, Magnesium, Creatinine drawn and value available
  - Replace electrolytes if not in appropriate range

Communication:

- With Pharmacist—contraindicated medications; Potential medication interactions; Previous antiarrhythmic use; Timing of administration; Electrolyte replacement protocol;
- With Physician—Anticoagulant therapy; Notification of QTc > 500 (or 550 in rhythms with ventricular conduction abnormalities) or if the QTc is >/= 15% of baseline QTc

Time of Administration: Must be given within 30 minutes of scheduled time
Side Effects: HA, CP, dizziness, dyspnea, rash, insomnia, diarrhea, nausea, abdominal discomfort; QT prolongation—can lead to torsades de pointes
Safety Precautions:

- Give within 30 minutes of administration time
- Telemetry monitoring for at least 3 days
- BMP, Mg, Cr should be drawn at least every 48 hrs, if not daily
- 12 lead EKG must be performed before starting dofetilide and 2 hrs after each dose
- Patients who have missed 3 or more doses or require an increase in dose are considered "new starts" and require monitoring as if they are initiating for the first time.
- Grapefruit juice can potentiate the effects of dofetilide
- Risk factors for dofetilide-induced torsades de pointes
  - Sinus Brady, impaired renal function, CHF, diuretic therapy, female gender



Patient Education

Not all pharmacies carry doefetilide, be sure to check that your pharmacy carries or is able to obtain dofetilide
Make sure that you do not run out of your medication and always take dofetilide on time
Call your doctor if you are experiencing any side effects of dofetilide
Be sure to follow up with your doctor and attend all laboratory appointments
Call your doctor and go to the hospital if you have any signs of an abnormal heartbeat—feeling faint, dizziness, palpitations, fast heartbeat, shortness of breath

Medication Watch

Contraindicated medications: Must be discontinued before dofetilide therapy begins

- Cimetidine (Tagamet)—heartburn relief
- Megestrol (Megace)—appetite suppressant
- Dolutegravir (Tivicay)—HIV treatment
- Prochlorperazine (Compro)—antipsychotic
- Ketoconazole (Nizoral, Xolegel, Extina)—antifungal
- Trimethoprim (Primsol)—antibiotic
- Hydrochlorothiazide (Microzide)—diuretic
- Verapamil (Verelan, Calan)—Calcium Channel Blocker/antihypertensive

Medications that can interact with dofetilide to increase risk of prolonged QT: give with caution, may need to discuss with pharmacist/physician

- Antifungals
- Antibiotics
- Antipsychotics
- Metformin
- Anti-emetics
- Protease inhibitors (HIV medications)

Important information regarding previous antiarrhythmic use:

- Should be withdrawn for > 3 half-lives before starting dofetilide
- For patients previously on amiodarone, serum levels should be less than 0.3 mcg/ml if it has been less than 3 months since discontinuing

Expected Outcomes

The expected outcome of the project was an increase in nursing knowledge of dofetilide therapy, with the following objectives:

- Define the FDA **approved use** of dofetilide.
- Describe the **mechanism of action** of dofetilide.
- Identify the **potential side effec**ts of dofetilide.
- Define the importance of **timely administration** of dofetilide.
- Identify the channels to participate in **interdisciplinary communication** regarding dofetilide administration.
- Explain the important **safety precautions** needed for nursing management of dofetilide.
- Define important **patient teaching points** for dofetilide.

References:

Hewitt, J., Tower, M., & Latimer, S. (2015). An education intervention to improve nursing student's understanding of medication safety. *Nurse Education in Practice, 15*, 17-21.

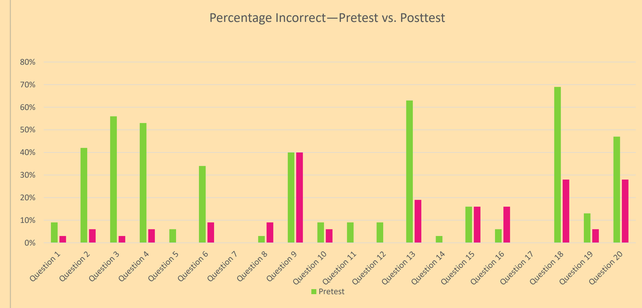
Jaiswal, A., & Goldbarg, S. (2014). Dofetilide induced torsade de pointes: Mechanism, risk factors and management strategies. *Indian Heart Journal, 66*, 640-648.

Khoo, A. L., Teng, M., Lim, B.P., Tai, H. Y., & Lau, T. C. (2013). A multicenter, multidisciplinary, high-alert medication collaborative to improve patient safety: The singapore experience. *The Joint Commission Journal on Quality and Patient Safety, 39*(5), 205-212.

Roukoz, H., & Saliba, W. (2007). Dofetilide: a new class III antiarrhythmic agent. *Expert Review of Cardiovascular Therapy, 5*(1), 9-19.

Results

Overall, pre-education, the entire nursing staff scored 71.5%. After education, the combined groups scored 92.5%.



Both groups did substantially better on the posttest.

There were several questions that stood out on the posttest that would suggest more education is needed on those particular subjects:

- Physician notification of QTc
- Side effects of dofetilide
- Risk factors for dofetilide-including torsades de pointes.

Consistent staff education decreases potential adverse drug events caused by unsafe medication administration or monitoring. Individual education permitted each nurse to ask questions and the tip sheet and bulletin board allowed for hands on referral. The nurses' enhanced knowledge will improve their ability to educate the patients and their families.

Future considerations

Orientation packets provided to new hires on the unit will include the education template and tip sheets. The study material provided assists them achieve the best possible orientation to the unit and allows them to be extremely well prepared. The addition of this new education on dofetilide will further increase their knowledge about the unit and the patients we care for. Annual education and assessment will be implemented as well.

In addition, increased nursing education regarding dofetilide could potentially decrease costs due to prevention of adverse drug reactions that could occur if dofetilide were not administered or monitored correctly.

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