Policy, Procedure and Protocol	Bayfront Health Dade City
Policy Title: QTc Interval Monitoring **Department: Pharmacy**	**Function Team: Medication Management** **Effective Date: 11/15**
Prepared by: William Parker, PharmD, CGP, Derek Harmeson, RN, BSN; Wayne Ruppert, CVT, CCCC	
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Approvals: __X__P&T __X__MEC	

1. PURPOSE:

   1.1. To establish a protocol and process by which the Pharmacy and Nursing departments can monitor QTc intervals in patients at high risk for QTc prolongation and subsequently decrease the risk for sudden cardiac death

2. POLICY:

   2.1. The Policy, Procedure and Protocol will be utilized selectively and appropriately by the Pharmacy and Nursing staff in order to evaluate and monitor patients at high risk for QTc prolongation and decrease their risk for arrhythmias and sudden cardiac death

3. PROCEDURE:

   3.1. PHARMACIST ASSESMENT

      3.1.1. Assessment for the need to monitor and report patients' QTc Intervals will be conducted by Pharmacy on a daily basis
      3.1.2. All patients receiving two or more scheduled medications known to cause and/or exacerbate QTc Interval prolongation will be evaluated by the Pharmacist daily
      3.1.3. The Pharmacist will determine based on the patient's condition, drugs ordered, dose, route, frequency and interactions whether or not QTc Interval monitoring is warranted
      3.1.4. If based on the Pharmacist's assessment, QTc Interval monitoring is warranted, then the Pharmacist shall obtain a QTc interval is available
      3.1.5. If a QTc is not available then the Pharmacist shall contact a physician and obtain an order for the "QTc Interval Monitoring Protocol"

   3.2. NEW ORDER FOR QTc INTERVAL MONITORING
      3.2.1. Whenever the "QTc Monitoring Protocol" is ordered by Pharmacy, the nurse shall measure the patient's baseline QTc interval utilizing the "QTc Interval Monitoring Protocol"

   3.3. QTc INTERVAL MONITORING PROTOCOL

      3.3.1. SPECIFIC ECG MEASUREMENT CRITERIA
         3.3.1.1. The ECG tracing should
            3.3.1.1.1. Be recent - obtained within the past 24 hours (ideally past ONE hour)
                  AND
            3.3.1.1.2. ideally be obtained from the 12 lead ECG: the value displayed for the "QTc" should be used.
                  --OR--
            3.3.1.1.3. **IF** telemetry ECG is used, tracings from the limb leads (I, III, III, AVF, AVL and AVF) and a tracing from Modified Chest Lead (MCL) 2 or 3 should be obtained. To obtain MCL 2, the brown lead must be positioned in the V2 location (4th Intercostal space to the LEFT of the

sternum) or V3 position (half way between V2 and V4 [5th intercostal space, mid-clavicular]). The lead which shows ***the longest QT interval*** should be used for both ***QTc calculation*** and for ***continuous QT Interval monitoring***. Lead MCL2 should be evaluated for the presence of a significant U wave.

3.3.1.2. If a U Wave is visible on the ECG tracing, it must be included in the QT interval measurement if any of the following criteria is met:

3.3.1.2.1. The U wave is the same amplitude (size) of the T wave or is larger

3.3.1.2.2. U wave is 1mm or more in vertical amplitude.

3.3.1.2.3. U wave is merged with the T wave.

3.3.2. QTc Prolongation Criteria

3.3.2.1. The QTc Interval is considered to be **prolonged** if any of the following criteria are present:

3.3.2.1.1. **QT Prolongation**: is present when the QTc Interval exceeds 450ms in male patients or 460ms in females. Caution and continuous QTc interval monitoring utilizing rhythm strips per protocol shall be used with these patient populations prior to initiation/continuation of QTc prolonging medications

3.3.2.1.2. **Critical QT Prolongation**: when the QTc is 500ms or greater, it is generally considered a contraindication for therapy with QT prolonging medications. Additionally, if the QT Interval is greater than ½ of the R-R interval in patients with normal heart rates and normal QRS duration (HR 60-100 and QRSd< 120ms), then the QTc interval is generally considered prolonged and the administration of QTc prolonging medications may be considered a contraindication to therapy

3.3.2.1.3. If the telemetry obtained ECG yields an unclear or questionable result, it is appropriate to obtain a 12 Lead ECG for a more clear measurement. The Pharmacist may order a 12 Lead ECG per protocol for the purpose of obtaining a more accurate QTc interval

3.3.2.1.4. To obtain a value for the QTc when "rhythm strips" are used for QT interval assessment, Bazett's formula is used: The QTc is equal to the measured QT interval divided by the square root of the R-R interval. (Bazett's Formula: $QTc=QT/\sqrt{RR}$).

3.3.3. INTERVENTION

3.3.3.1. If the QTc is determined to be >500ms based on the criteria above, then the Pharmacist shall contact the Nurse caring for the patient or the Charge Nurse and order that the medication be **withheld** (if not yet started) or that the medication be **immediately discontinued** (if it had already been started).

3.3.3.2. The Pharmacist will assess the patient and then will call the prescribing physician to discuss findings and make recommendations based on the patient's current condition.

3.3.4. PROCESS

3.3.4.1. Pharmacist assessment

3.3.4.2. QTc Interval Monitoring Protocol ordered

3.3.4.3. Nurse assesses the baseline QTc interval and reports the value to the Pharmacist

3.3.4.4. Pharmacist assesses the value and determines which course of action to take per protocol:

3.3.4.4.1. No further monitoring is necessary

3.3.4.4.2. Continuous telemetry monitoring with periodic QTc interval measurements once a shift by the Nurse.

3.3.4.4.3. Baseline 12 Lead ECG followed by Continuous telemetry monitoring with periodic QTc interval measurements once a shift by the Nurse

3.3.4.4.4. Pharmacist shall call the provider with recommendations if a change in therapy is needed

3.3.4.5. Pharmacist will follow up with the Nurse once a day to obtain and interpret the QTc interval value

3.3.4.6. Pharmacist may discontinue the QTc Interval Monitoring Protocol according to Clinical Judgement

3.4. Medications known to prolong the QTc interval that are used at this facility. These medication will be programed into the Sentri7 software program that will be monitored by Pharmacy on a daily basis

Albuterol	Lithium
Amiodarone	Memantine
Amitriptyline	Methadone
Aripiprazole	Metronidazole

Atropine	Mirtazapine
Azithromycin	Nortriptyline
Baclofen	Octreotide
Budesonide	Olanzapine
Bupivacaine	Ondansetron
Celecoxib	Oxybutynin
Chlorpromazine	Oxycodone
Cilostazol	Paroxetine
Cinacalcet	Perphenazine
Ciprofloxacin	Prednisone
Citalopram	Prednisolone
Clarithromycin	Procainamide
Clonidine	Prochlorperazine
Disopyramide	Propafenone
Donepezil	Propofol
Doxepin	Quetiapine
Dronedarone	Quinidine
Droperidol	Quinine
Erythromycin	Risperidone
Famotidine	Rocuronium
Flecainide	Ropivacaine
Fluconazole	Salmeterol
Fludrocortisone	Sertraline
Fluoxetine	Sevoflurane
Formoterol	Sotalol
Fosphenytoin	Sumatriptan
Furosemide	SMZ/TMP
Galantamine	Terbutaline
Glycopyrrolate	Thiothixene
Haloperidol	Tiotropium
Hydrocodone	Tizanidine
Ibutilide	Trazodone
Imipramine	Trifluoperazine
Ketoconazole	Venlafaxine
Levalbuterol	Voriconazole
Levofloxacin	Ziprasidone

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