Policy and Procedure	
Title: Cardiac Monitoring Protocol **Department:** Emergency, ICU, CPCU, Medical Surgical	**Function Team:** Provision Of Care **Author:** Wayne Ruppert **Effective Date:** 12/2012
Date(s) Reviewed: 4/2014, 9/2017	**Date(s) Revised:** 4/2013
Approvals: ____P&T _____ EOC _____IC _____MEC _____BOT	
References/Other: AHA/ ACC, **"Standardization and Interpretation of the ECG," Circulation.** 2009; **119:** e241-e250 **"Practice Standards for ECG Monitoring in Hospital Settings," Circulation 2004;110:2721-2746,** **Institute for Health Care Improvement, The Joint Commission "Sentinel Event Alert" issue 50, 4/8/2013** **"12 Lead ECG Interpretation in ACS with Case Studies from the Cardiac Cath Lab," W Ruppert, 2010**	

POLICY STATEMENT:
All patient care units where monitoring of the patient's ECG is performed should practice evidence based guidelines that assure maximal sensitivity in capturing myocardial ischemia, infarction and dysrhythmias, while minimizing the potential for the development of "alarm fatigue."

SCOPE:
All nursing and other medical professionals who are responsible for initiating ECG monitoring and continuous ECG rhythm interpretation will be trained in, and will be expected to adhere to these guidelines.

PURPOSE: Since it is well established scientifically that changes to a patient's J point, ST segment and T wave typically occur during episodes of myocardial ischemia and infarction, and there is strong evidence correlating specific ECG leads to specific regions of the heart, in cases of suspected or established Acute Coronary Syndrome (ACS), we will monitor the ECG lead(s) that view the region of suspected myocardial ischemia / infarction.   This policy also identifies ECG indicators when immediate patient evaluation, intervention and physician notification should be considered.
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PROCEDURE:

1. **Obtain Baseline 12 Lead ECG:**
2. **ECG Lead Selection, patients with suspected or diagnosed ACS**:
   a. **Abnormal** baseline 12 Lead ECG: Select ECG lead(s) with the most profound J-point, ST-Segment and/or T wave abnormalities for Continuous ST-Segment monitoring.
   b. Normal or non-diagnostic 12 Lead ECG:
      i. Monitor leads III and V3.
3. **ECG Lead Selection for post-PCI patients**:
   a. Post-STEMI Alert patients:
      i. Monitor ECG lead(s) which presented with the most abnormal ST Elevation during STEMI episode.
   b. Post-PCI (patient NOT a STEMI Alert):
      i. Monitor ECG lead(s) with most abnormal presentation of J point / ST-Segment / T waves.
      ii. If ECG is normal or non-diagnostic, follow this general guideline for selecting leads for continuous ECG monitoring:
         1. Left Anterior Descending (LAD) or Diagonal artery stent: **monitor Lead V3**.
         2. Circumflex or Obtuse Marginal artery stent: **monitor Leads III and V5**
         3. Right Coronary Artery or Posterior Descending Artery: **monitor Lead III**
      iii. If uncertain as to which artery underwent PCI, and the 12 Lead ECG is normal or non-diagnostic: **monitor leads III and V3.**
4. **Non-ACS Patients, General Dysrhythmia Identification**: Monitor Limb Lead II and/or Lead V2 (gives same benefits as V1 but typically displays more accurate QT interval / U waves).
5. **Patients with Atrial Fibrillation / Atrial Flutter**: Limb Lead II
6. **Patients with actual / suspected Long QT syndrome**:   Monitor Lead(s) which demonstrate the greatest QT interval duration. If QT interval is consistent in all leads, select Lead V3; this lead typically displays highest U wave amplitudes.   Prolonged QT Intervals are present when the QTc exceeds 450ms for male and 460ms for female patients. (An accurate QTc can be obtained from the 12 Lead ECG computerized printout). QTc "panic values" are when the QTc exceeds 500ms.

7. **Automated ST Segment Monitoring**. In units with ECG monitoring systems which are capable of the continuous, automated evaluation of ST Segments, the following guidelines should be practiced:

       a.   <u>Patients with suspected or diagnosed ACS</u>, alarm limits should be set for 1mm above and below the patient's baseline at the J point + 60ms.

       b.   <u>Patients without ACS</u>: alarm limits should be set for 2mm above and below patient's baseline ST level.

8. **Automated Heart Rate Alarms**.   Set rate customized to patient's needs.   At beginning of shift, rate limits may be adjusted, and as patient's status changes (e.g. waking vs. going to sleep).   Setting lower and upper limits within 15 beats per minute of a currently stable patient's resting heart rate is reasonable.

9. **Automated Lethal Dysrhythmia Alarms**.   Do not disable lethal dysrhythmia / cardiac arrest alarms unless patient is DNR status and is expected to deteriorate.

10. "**ECG Alert Values**:" When any of the following ECG disturbances are noted, a nurse should immediately assess the patient for hemodynamic compromise and determine need to activate Rapid Response.   A STAT 12 Lead ECG should be obtained (unless Code Blue status), and the Physician should be notified.
    a.   Acute change in heart rate <40 or greater than >130
    b.   New QT Interval prolongation
    c. 2nd or 3rd Degree Heart Block
    d.   Sinus Arrest with periods of Asystole ("Pause")
    e.   New Onset Atrial Fibrillation or Atrial Flutter
    f.   Premature Ventricular Contractions that are Multifocal, 2 or more coupled together, R on T, or greater than 6 per minute
    g.   Ventricular Tachycardia or Wide QRS Tachycardia of unknown origin
    h.   **Torsades de Pointes***
    i.   Ventricular Fibrillation or Asystole
    j.   Pacemaker spikes without QRS (Failure to Capture)
    k.   Changes in QRS width (new onset Bundle Branch Block)
    l.   Changes to the J Point, ST Segment and/or T waves

<u>*CRITICAL ALERT: when run(s) of Torsades de Pointes (TdP) is noted</u> on a patient's ECG, in addition to taking all other appropriate actions, the nurse should immediately note if the patient is currently receiving any medications known to prolong the QT interval. If the patient is currently receiving an IV infusion of medications known to prolong the QT interval, the medication should immediately be DISCONTINUED and the physician called STAT.   A STAT 12 Lead ECG should be obtained, and the patient's QT and QTc should be noted.   "Bordline" measurements for prolonged QT intervals are: males, 450ms; females, 460ms.   "Panic Value" QTc intervals are any QTc 500ms or more for all patients.