

Emergency and Critical Care



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Acute Coronary Syndromes
Basic ECG Interpretation
Christine L. Sommers

Objectives

- Review components of an electrocardiogram (ECG)
- Describe a method of ECG interpretation
- Discuss the management of cardiac dysrhythmias
- Discuss the management of Acute Coronary Syndromes

- Read the following:
 - Pelter, M.M, et al (2006). ECG changes during induced hypothermia after cardiac arrest. *American Journal of Critical Care*, 15(6), 631-632.
 - Write out the 9 steps to evaluate ECG
- Helpful websites with additional information
 - http://www.mhprofessional.com/downloads/products/0071592830/01-jenkins_ch01_p01-026.pdf
 - <http://www.rn.org/courses/coursematerial-187.pdf>

- Review the following:
 - Rhythm packet document
 - Basic ECG Interpretation
- Answer the following questions:
 - What is a P wave?
 - What is a QRS complex?
 - What is a QT interval?
 - What information does the T wave give us?
 - How is atrial fibrillation different from ventricular fibrillation?
 - How is sinus tachycardia different from ventricular tachycardia
 - What information does a 12 lead ECG give us?

- Review the ACLS Handout
- **Write** out the medications used for
 - Cardiac arrest – Shockable Algorithm
 - Cardiac arrest – Non Shockable Algorithm
 - Bradycardia Algorithm
 - Tachycardia Algorithm

- Review MegaCode Case Studies

- Watch:

<http://www.youtube.com/watch?v=h6Jlx1m7LbI>

Questions

- I know that you have them!
- Please bring questions to class



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- Read the following
 - Marshall, K. (2011). Acute coronary syndrome: diagnosis, risk assessment and management. *Nursing Standard* 25(23), 47-57.
- In your own words, write out the answers to the questions in the article and bring to class.
 - You may work together or individually to answer the questions.

Acute Coronary Syndrome (ACS)



- Acute phase of coronary heart disease (CHD)
- Frequent presenting symptom is chest pain
- Caused by atherosclerosis
 - What is atherosclerosis?
 - What are the risk factors for developing?

- Atherosclerotic plaque forms in coronary artery vessels
- The plaque ruptures or a thrombus forms
- Results in narrowing or occluding of coronary artery

Signs and Symptoms

- Chest discomfort
 - Pain
 - Pressure
 - Fullness
 - Squeezing
- Light headedness, dizziness, fainting
- Sweating
- Nausea or vomiting
- Unexplained sudden shortness of breath

- 12 lead ECG!
- ECG Interpretation
 - ST Elevation MI (STEMI)
 - ST Depression, T wave inversion (UA/NSTEMI)
 - Normal, nondiagnostic changes (Intermediate/low-risk UA)

- History
- Physical Assessment
 - Good baseline
 - Rule out non-cardiac or non-ischemic causes of chest pain
- 12 Lead ECG will need to be repeated
- Biochemical markers
 - Troponin is preferred biomaker
 - Cardiac specific

- TIMI (*Thrombolysis In Myocardial Infarction*)
 - Age > 65
 - ≥ 3 risk factors for CHD
 - Aspirin use in last seven days
 - Recent, severe symptoms of angina
 - Elevated cardiac markers
 - ST deviation ≥ 0.5 mm
 - Prior coronary artery stenosis $\geq 50\%$

- GRACE (*Global Registry of Acute Cardiac Events*)
 - Age
 - Heart Rate
 - Systolic Blood Pressure
 - Creatinine levels
 - Congestive Heart Failure
 - Cardiac arrest on admission
 - ST segment deviation
 - Elevated cardiac enzymes or markers

- 12 lead ECG
- IV access
- MONA
 - Morphine
 - Oxygen
 - Nitroglycerin
 - Aspirin
- Vital Signs
- Chest X-ray

- Goal is early reperfusion therapy
 - Percutaneous coronary intervention (PCI) within 90 minutes

OR

- Administration of fibrinolytics within 30 minutes
 - Requires completion of fibrinolytic checklist
 - What are contraindications?
- Consider Beta-blocker if no contraindications
- Consider heparin

- Troponin elevated or high-risk patient: Consider invasive intervention
- Aspirin
- Heparin
- Consider
 - Beta blockers
 - Clopidogrel
 - Glycoprotein IIb/IIIa inhibitors
- Ace inhibitor
- Statin Therapy
- Monitored bed

- Consider admission for monitoring
 - Monitor serial cardiac markers
 - Repeat ECG
 - Consider noninvasive diagnostic test

- Cardiac Rehabilitation
- Continued drug therapy
- Management of cardiovascular risk factors

- Prevention of major adverse cardiac events (MACE)
 - Death
 - Non-fatal Myocardial infarction
 - Urgent postinfarction revascularization
 - Cardiogenic shock
- Treatment of life-threatening complications
 - VF/Pulseless VT
 - Symptomatic bradycardias
 - Unstable tachycardias

- Detection of rise and fall of cardiac biomarkers (preferably troponin) and at least one of the following:
 - Symptoms of ischemia
 - ECG changes of ischemia (ST-T changes or new LBBB)
 - Development of Q waves on ECG
 - Imaging evidence of loss of viable myocardium or new regional wall-motion abnormality

Myocardial Infarction management



- Same as STEMI
- Monitored bed
- Relieve pain: nitro and morphine
- Treating symptoms
- Health teaching
- Communication with patient and family

Cardiogenic shock

- Heart cannot pump enough blood to supply the amount of oxygen needed
- Causes
 - MI
 - Cardiomyopathy
 - Valvular damage
 - Cardiac tamponade
 - Dysrhythmias
- Signs and Symptoms
 - Tissue hypoperfusion
 - Dysrhythmias

Cardiogenic shock management



- Correct underlying cause
- Oxygen
- Pain management
- Hemodynamic monitoring
- Fluid status monitoring
- IV fluids
- Intra-aortic Balloon pump

References

- American Heart Association (2010). *2010 Handbook of Emergency Cardiovascular Care for Healthcare Providers*.
- American Heart Association (2011). *Advanced Cardiovascular Life Support: Provider Manual*.
- Critical Care Choices 2003. (2003). ACLS pointers: Acute pulmonary edema, hypotension, and shock algorithm. *Critical Care Choices 2003* (33), 26-27.
- Marshall, K. (2011). Acute coronary syndrome: diagnosis, risk assessment and management. *Nursing Standard* 25(23), 47-57.
- Pelter, M.M, et al (2006). ECG changes during induced hypothermia after cardiac arrest. *American Journal of Critical Care*, 15(6), 631-632.
- Smeltzer, S.C., Bare B.G. (2003). *Brunner and Suddarth's Textbook of Medical-Surgical Nursing, 10th Ed.*
- Woodruff, D.W. (2006). Take these 6 easy steps to ABG analysis. *Nursing Made Incredibly Easy, Jan/Feb*, 4-7.