LUCAS COUNTY
DEPARTMENT OF EMERGENCY SERVICES

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TO: ALL LUCAS COUNTY PARAMEDICS

DATE: November 27, 2007

FROM: Brent Parquette, NREMT-P
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RE: **January 2008 Continuing Education: Pre-Course Material**

In the month of January we will once again spend time in review of the **12-Lead ECG in the setting of the Acute Coronary Syndromes**. The 12-Lead electrocardiogram continues to stand in the center of the decision making process when it comes to evaluation and treatment of our cardiac patients. Repetitious review of 12-Lead ECG signs indicative for injury, ischemia and imposter patterns will help you feel more comfortable with your interpretive skills in the field setting.

Additionally, within the month, we will continue to look at ePCR documentation. It is important that we continue to move towards uniformity with our field patient care documentation.

In preparation for class, please take time to review the 12-Lead ECG protocol in TAB 800 of your protocol disc. The attached pre-test will also help to identify for you other areas for your review. I have included the pre-test answer key so that you can self-evaluate your performance. Any questions related to the pre-test questions will be answered at classes during the month.

I look forward to seeing all of you in the New Year. If you have any questions or comments please feel free to contact me at 419.213.6508.

Review Questions: 12-Lead ECG
January 2008

1. The QRS interval should normally be _____or smaller.

    a. 0.20 sec
    b. 0.11 sec
    c. 0.18 sec
    d. 0.36 sec

2. The point at which the QRS complex meets the ST segment is known as the:

    a. Delta wave
    b. J Point
    c. End Point
    d. Vector

3. ST segment depression indicates:

    a. Myocardial ischemia
    b. Coronary vasospasm
    c. Prinzmetal's angina
    d. Chronic pericarditis

4. ST segment elevation is a primary indicator of:

    a. Ventricular atrophy
    b. Ventricular hypertrophy
    c. Myocardial injury
    d. Atrial aneurysm

5. ECG changes that may be anticipated as a result of myocardial ischemia, injury, and/or necrosis of the myocardial tissues include all of the following **EXCEPT**:

    a. PR Interval prolongation
    b. ST segment elevation
    c. ST segment depression
    d. Pathologic Q wave

6. ST segment depression may be evident on a 12-Lead ECG strip following both angina and strenuous exercise:

    a. True
    b. False

7. ECG changes of significance with myocardial ischemia include ST segment depression, T wave inversion, or:

    a. Depressed T wave
    b. Peaked T wave
    c. Peaked P wave
    d. Inverted P wave

8. Patient's experiencing an acute myocardial infarction will always complain of chest pain.

    a. True
    b. False

9. Inferior wall infarctions are associated most often with occlusions/lesions of the:

    a. Coronary sinus
    b. Bundle of His
    c. Left Coronary Artery
    d. Right Coronary Artery

10. Myocardial infarctions may be classified as either **transmural** or:

    a. Supraendocardial
    b. Subendocardial
    c. Endocardial
    d. Precardial

11. If ST segment elevation is noted in leads II, III and avF, this finding is indicative of:

    a. Anterior wall injury
    b. Lateral wall injury
    c. Septal wall injury
    d. Inferior wall injury

12. ECG leads that record abnormal electrical impulse formation in un-involved myocardial tissue directly opposite injured myocardial tissue are called:

    a. Facing leads
    b. Viewing leads
    c. Reciprocal leads
    d. Endocardial leads

13. If your patient is hypotensive and exhibiting ECG changes consistent with inferior wall injury, you should consider the possibility of:

    a. Right atrial infarction
    b. Left atrial infarction
    c. Right ventricular infarction
    d. Left ventricular infarction

14. Leads V_3 and V_4 visualize the _____wall of the heart's left ventricle.

    a. Inferior
    b. Anterior
    c. Lateral
    d. Posterior

15. To diagnose an acute septal wall MI, evidence of _____ must be present in Leads V_1 and V_2:

    a. ST segment depression
    b. ST segment elevation
    c. Pathologic Q waves
    d. None of the above

16. In the presence of an acute injury pattern, a right bundle branch block (RBB) will most often obscure ECG evidence of injury:

    a. True
    b. False

17. A 50-year-old male presents with classic signs of myocardial infarction. His 12-Lead ECG remains non-diagnostic throughout your assessment and serial ECG's. Which of the following statements is true regarding transport of this patient:

    a. A non-diagnostic ECG rules out the possibility of myocardial ischemia and the patient should be transported to the closest facility.
    b. A STEMI should **not** be declared but this patient should be transported to a STEMI hospital for the potential evolvement of his ECG to an injury pattern.
    c. A STEMI should be declared based upon the classic presentation of symptoms and the patient should be transported to a STEMI hospital.
    d. A STEMI should **not** be declared and the patient transported to the closest assigned facility.

18. LBBB and LVH patterns distort ST/T segments on the ECG. They mimic ischemic/injury events of the heart by creating:

    a. ST segment depression
    b. ST segment elevation
    c. Tall broad T waves
    d. T wave inversion
    e. All of the above

19. Hyperacute T waves and ST segment elevation in leads I and avL would signify what type of myocardial injury:

    a. Inferior wall
    b. Lateral wall
    c. Anterior wall
    d. Septal wall

20. A 12-Lead ECG revealing an acute anterior wall injury would most likely show reciprocal change in which of the following lead(s):

    a. II, III
    b. avR, avL
    c. V3 and V4
    d. I, III

21. Bundle branch block (BBB) can be distinguished in any monitored lead. The two (2) criteria for diagnosing BBB are:

    a. Ventricular rhythm and notched QRS complex
    b. Supraventricular rhythm and notched QRS complex
    c. Ventricular rhythm and QRS $\geq$ 120ms
    d. Supraventricular rhythm and QRS $\geq$ 120ms

22. A 42-year-old, 100kg male is complaining of a sudden onset of difficulty breathing and dizziness. His skin is pale and slightly diaphoretic to touch. P – 58 reg.; BP – 104/70; RR – 18 shallow. His 12-Lead ECG reveals an acute injury pattern in leads II, III and avF. Given his symptoms and presentation you would suspect:

    a. Extensive Anterior wall MI
    b. Acute Inferior wall MI with RVI
    c. Acute Septal wall MI
    d. Anterior wall MI with lateral extension

23. The two (2) most prevalent STEMI mimics in the field are:

a. Benign Early Repolarization and Pericarditis
b. Benign Early Repolarization and LVH
c. LVH and LBBB
d. Benign Early Repolarization and LBBB

24. Anticipating complications is important when treating the patient with an acute ischemic event of the heart. During interpretation of the 12-Lead ECG, understanding coronary artery anatomy lends important information for choosing the right treatment in the field. In 90% of the population, the _____ distributes most of the blood supply to the AV node and the inferior wall of the left ventricle making infarcts in this area prone to bradycardic rhythms:

a. Left main artery
b. Left anterior descending artery (LAD)
c. Right coronary artery (RCA)
d. Left circumflex artery (LCX)

25. Which of the following statements is true in distinguishing LVH from LBBB on the 12-Lead ECG:

a. LVH does not abnormally widen the QRS complex
b. LBBB does not abnormally widen the QRS complex
c. LBBB causes an abnormal height and depth of R waves and S waves
d. LBBB is caused by a thickening of the ventricular wall due to increased pressure within the ventricles

26. ECG findings indicative for "the process of injury," and presumptive evidence for AMI

a. ST segment depression
b. ST segment elevation
c. T wave inversion
d. Pathologic Q wave alone

27. Leads that "view" the Lateral wall of the left ventricle include:

a. I, II, III, avR
b. II, III, avF
c. I, avL, V5, V6
d. V3, V4, V5, V6

28. Lead V4R should always be evaluated when ECG evidence of _____ is found:

a. Anterior wall MI
b. Antero-Septal MI
c. Extensive Anterior MI
d. Inferior wall MI

29. Lead avR:

a. Is useful in recognizing large anterior wall infarcts
b. Has predominately positive complexes on the ECG
c. Is helpful in recognizing ventricular infarcts
d. None of the above

30. A distal occlusion of the Left Anterior Descending Coronary Artery would most often produce changes in the following leads:

a. II, III, avF
b. V5, V6
c. avL, avR, avF
d. V3, V4

31. Skin prep is important when acquiring a 12-Lead ECG because:

a. It can reduce artifact
b. It removes excessive skin oils for better patch adherence
c. It will help isolate the electrical signal from the heart
d. All of the above

ANSWER KEY

1. **C**
2. **B**
3. **A**
4. **C**
5. **A**
6. **A**
7. **B**
8. **B**
9. **D**
10. **B**
11. **D**
12. **C**
13. **C**
14. **B**
15. **B**
16. **B**
17. **D**
18. **E**
19. **B**
20. **A**
21. **D**
22. **B**
23. **C**
24. **C**
25. **A**
26. **B**
27. **C**
28. **D**
29. **D**
30. **D**
31. **D**