Dear EHRA member,
Dear Colleagues,

As you know, the EHRA Accreditation process is becoming increasingly recognised as an important step for clinical practice within the EU.

This slide kit contains examples of questions from the past EHRA accreditation exam in Cardiac Pacing. At the end of this file you will find the list of correct answers so you may test your skills.

More information on EHRA accreditation may be found at: http://www.escardio.org/bodies/associations/EHRA/accreditation/
1 - Which of the following statements best characterizes P-wave amplitudes in a given population of patients.

a. - Amplitudes improve with active and passive lead maturation  
b. - Amplitudes change with different activities and postures  
c. - Amplitudes measure higher in the unipolar configuration  
d. - Amplitudes tend to be better in sinus node disease versus AV-block patients  
e. - None of the above
2 - The purpose of a capacitor in an electrical circuits is to:
   a.- Convert AC to DC current
   b.- Store electrical charge
   c.- Rapidly switch battery voltage on or off
   d.- Limit current flow to a single direction
   e.- None of the above
The long term threshold record of the figure was obtained from a patient with ischemic cardiomyopathy, LEVF of 23%, asystolic complete heart block whose DDD pacemaker was inserted in March 2001. The capture threshold has been absolutely stable until recently. He presented on July 7th with deterioration of his congestive heart failure and was noted to be in atrial fibrillation. On that day, his medical regimen was altered and he was scheduled to return to the office one month later.

What was probably done on July 7th?

a.-Carvedilol was started
b.-Potassium supplementation and his diuretic were increased
c.-Dofetilide was started
d.-Amiodarone was started
e.-Flecainide was started.

LEVF = Left Ventricular Ejection Fraction
Q3 Figure
9. Which of the following underlying rhythms is illustrated by the ECG?

a. First degree heart block
b. Second degree heart block type I
c. Second degree heart block type II
d. Third degree heart block
e. Atrial flutter
11. ECG and pacemaker programming are shown in the figure below. What is the problem?

a. Atrial undersensing
b. R-wave oversensing
c. Electromagnetic interference
d. Loss of ventricular capture
e. None of the above

AV = atrioventricular; DDD = dual chamber; (A) = Atrium; (V) = Ventricle. Paced AV delay = 175ms, Mode = DDD. Upper rate limit = 125. (A) impulse duration = 0.5ms. (A) sensitivity = 1.0mV. (A) refractory period = 275ms. (V) output = 2.5mV. (V) impulse duration = 0.5ms. (V) sensitivity = 2.0mV. (V) refractory period = 250ms.
A 72 year old asymptomatic patient is scheduled for prostate surgery. You are called to interpret his ECG and make a clinical decision on what action to take. Please indicate the best action or statement

a.- Normal ECG
b.- Implant a DDD pacemaker after surgery
c.- Heart rhythm is abnormal but does not prevent to proceed to surgery
d.- Implant an AAI pacemaker before surgery
e.- Implant a DDD pacemaker before surgery
21. What does this ECG from a patient with a DDD pacemaker show?
a. Atrial exit block
b. Ventricular undersensing
c. Normal function
d. Intermittent P-wave undersensing
e. None of the above
25. What is meant by "intention to treat" analysis in a randomized control trial?

a.-Patients are analysed in the groups they were randomised to, regardless of whether they complied with the treatment given
b.-Patients are analysed in the groups they were randomised to, only if they were actually receiving treatment
c.-Patients are analysed in the groups they were randomised to, unless they crossed-over into another treatment arm
d.-Patients are only included in the analysis whose treatment was at least somewhat effective
e.-None of the above
27 - Which of the following programmed settings would be the safest and most efficient for a threshold measured at 2.0 V and 0.5 ms PW

a. - 4.0 V & 0.5 ms PW
b. - 2.0 V & 1.5 ms PW
c. - 4.0 V & 1.0 ms PW
d. - 2.5 V & 0.6 ms PW
e. - None of the above

PW = Pulse Width;
29. A patient with non-sustained ventricular tachycardia and myocardial infarction 3 months ago is being assessed. The echocardiogram shows an LVEF of 30%, LVEDD 60 mm, NYHA class III and QRS width 156 ms. What action should be taken?

a. None  
b. Implant biventricular ICD  
c. Implant biventricular pacemaker  
d. Implant an ICD  
e. b or c

LEV = Left Ventricular Ejection Fraction; LVEDD = Left Ventricular Diastolic Diameter
37. How do you interpret the ECG in this patient with a dual chamber pacemaker with a bipolar atrial lead and a unipolar ventricular lead implanted 3 years ago?

a. Appropriate DDD pacing and ventricular ectopies
b. T-wave sensing
c. Loss of atrial capture, bigeminy related to P-wave sensing
d. Undersensing of P-waves
e. None of the above

Mode=DDD. Hysteresis=60. Paced AV delay=96 ms. (A) output=2.5 V. (A) impulse duration=0.4 ms. (V) output=2.5 V. (V) impulse duration=0.4 ms. (A) Sensitivity=0.4 mV. (V) (A) PVARP=240 ms. (V) V-Blank=48 ms
50. You are asked to advice on a 24h. Holter recording of a 28 year-old man. This event occurs at 03:58: what should you do?

a. Implant an AAI pacemaker
b. Perform EP study
c. Implant a DDD pacemaker
d. None of the above
e. a, b or c
58. In a normal person, by which % does stroke volume increase during exercise?

a.- 20%
b.- 50%
c.- 100%
d.- 200%
e.- None of the above
61. The number of motor vehicle accidents for ICD patients is:

a. Lower than the general population
b. Higher than the general population
c. Unable to be defined
d. Significantly higher than the general public
e. Same as the general public
63. When cardioverting a pacemaker patient, the defibrillator paddles should be positioned:

a. Anterior / posterior
b. Parallel to the pacing system
c. Adjacent to the pacing system
d. Pacemaker patients should not be cardioverted
e. Internal cardioversion is preferred
28. A 27 year old woman with a family history of sudden cardiac death and with a history of fainting episodes, was resuscitated and is brought to your ward. What do you do?

a. Implant a defibrillator and give betablockers  
b. Give betablockers  
c. Implant a DDD pacemaker  
d. Implant a VVI pacemaker  
e. Perform EP study
65. -The basic unit of capacitance is:

a.- Joule  
b.- Farad  
c.- Henry  
d.- Coulomb  
e.- None of the above
Shortly after dual-chamber pacemaker implantation, a 73 year old patient complains about newly evolved chest pain and dyspnea. The ECG and chest X-ray are shown in figures. What is the most probable source of the patient’s symptoms?

a.- New manifestation of angina because of augmented heart rate after pacemaker implantation and underlying coronary artery disease.
b.- Myocardial perforation of atrial active fixation lead with hemopericard
c.- Phrenicus stimulation
d.- Pneumothorax
e.- Pacemaker syndrome because of ineffective atrial stimulation

(see figures next two slides)
Q104 - figure 1
105 - The EEG shows:
a. Ventricular exit block
b. Atrial exit block
c. Ventricular undersensing
d. Atrial undersensing
e. Ventricular oversensing
109.- AV sequentially paced patients with frequent ventricular ectopy should have the following parameters programmed to decrease the change of competition:

a.- Short blanking period
b.- Slower base rate
c.- Increased ventricular refractory period
d.- None of the above
e.- B or C
## Answers

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