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MCQs

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Angina: Contemporary Diagnosis and Management3 **Authors:** Thomas J Ford ^{1,2}, Colin Berry ^{1,2}4 **Institutions:** ¹ West of Scotland Heart and Lung Centre, Golden Jubilee National Hospital,5 UK; ² British Heart Foundation Glasgow Cardiovascular Research Centre, Institute of

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8 **Q1. Which of the following statements best describes coronary flow reserve**

9 **(CFR):**

10 A. CFR is a specific quantitative metric to assess coronary microvascular function

11 B. CFR reflects endothelial dependent coronary vasorelaxation

12 C. CFR is a ratio of maximal achievable myocardial blood flow to resting blood flow

13 D. CFR is a more reproducible test of coronary function compared to fractional flow reserve

14 (FFR)

15 E. None of the above

16 **Answer: C**

17 CFR can be thought of as the capacity of the coronary circulation to dilate and thus increase
18 flow following an increase in myocardial metabolic demands. CFR is inherently variable and
19 less reproducible than FFR due to its association with resting haemodynamics. Invasive
20 assessment of CFR is typically performed before and after adenosine induced hyperaemia – it
21 predominantly reflects endothelial independent function.

22 **Q2: Which of the following best describes typical stable angina**

23 A. Chest discomfort occurring at rest with a fixed duration

24 B. Recent onset angina occurring with a fixed amount of exertion relieved with rest

25 C. Retrosternal chest discomfort occurring with a fixed amount of exertion rapidly relieved
26 with rest or GTN

27 D. Angina occurring with a fixed amount of exertion that has recently required less exertion
28 to bring about symptoms

29 E. Exertional presyncope and dyspnoea

30 **Answer: C**

31 Diamond criteria for typical (definite) angina has three components¹:

32 1. Substernal chest discomfort with a characteristic quality and duration

33 2. Provoked by exertion or emotional stress

34 3. Relieved by rest or nitro-glycerine

35 These features of angina are incorporated into the ESC guidelines on management of stable
36 angina.²

37 **Q3: Which of the following investigations is most sensitive for the diagnosis of**
38 **coronary artery plaque**

39 A. Coronary angiography

40 B. Exercise stress ECG

41 C. Exercise stress echo

42 D. CT coronary angiography

43 E. Stress perfusion magnetic resonance imaging

44 **Answer D**

45 CT coronary angiography is the most sensitive tool for the diagnosis epicardial coronary
46 artery plaque.³ In correlation study with histology, the diagnostic accuracy of CT to detect

47 calcified plaque was 83%.⁴ Invasive angiography may miss epicardial plaque without luminal
48 obstruction – this is frequently due to Glagov’s phenomenon whereby positive remodelling
49 without lumen encroachment occurs until approximately 50% plaque burden by cross
50 sectional area. Functional testing is more specific for the ischaemic potential of epicardial
51 coronary artery disease but is insensitive for the diagnosis of coronary artery plaque.

52 **Q4: 54-year-old female with angina and abnormal stress ECG undergoes coronary**
53 **angiography and is found to have non obstructive coronary artery disease. Which**
54 **of the following is true?**

- 55 A. Cardiovascular risk is similar to an asymptomatic age/sex matched control
56 B. Angina pectoris is excluded
57 C. Preventative cardiovascular medicines should be stopped (statin)
58 D. Coronary vasomotion disorder should be considered
59 E. Antianginal therapy should cease

60 **Answer D**

61 This scenario of a patient with symptoms and/or signs of ischaemia and no obstructive
62 coronary artery disease (INOCA) is increasingly recognised. Diffuse but non obstructive
63 plaque disease is associated with an increased cardiovascular risk which is more
64 pronounced in women more than men.⁵ Coronary vasomotion disorders should be
65 considered as a unifying diagnosis for this lady with primary microvascular angina the
66 most common cause of INOCA. She should be treated with beta-blockers in the first
67 instance.⁶

68 **Q5: Which of the following meets diagnostic criteria for definite vasospastic**
69 **angina?**

- 70 A. Nitrate responsive angina without obstructive coronary artery disease
- 71 B. Angina with diurnal variation, transient ischaemia on ECG monitoring and transient
72 total or subtotal coronary artery occlusion (>90% constriction) with provocation
73 during angiography
- 74 C. Atypical chest pain, negative stress ECG but T wave inversion and 50% LAD
75 constriction with ACh during coronary angiography
- 76 D. Unexplained cardiac arrest preceded by chest pain with irregular non obstructive
77 lesion on coronary angiogram
- 78 E. Atypical chest pain and dyspnoea during mental stress

79 **Answer B**

80 The first international standardised guidelines on diagnosis of VSA state: ‘Definitive
81 vasospastic angina’ is diagnosed if nitrate-responsive angina is evident during
82 spontaneous episodes and either the transient ischaemic ECG changes during the
83 spontaneous episodes or coronary artery spasm criteria are fulfilled. Spasm criteria
84 require >90% constriction of epicardial coronary artery spontaneously or in response to
85 acetylcholine with reproduction of angina and ischaemic ECG changes⁷. Calcium
86 channel blockers are very effective first line therapy in over 90% of cases.

87 **Q6: Which of the following statements regarding myocardial revascularisation is**
88 **correct?**

- 89 A. Improves prognosis for certain patient groups or specific subsets of coronary anatomy

- 90 B. Has no proven benefit unless CAD involves the left main coronary artery
- 91 C. Visual assessment of the coronary angiogram is the gold standard for determining
- 92 whether revascularisation of a coronary stenosis is appropriate
- 93 D. Patients should be on at least three concurrent antianginal agents before considering
- 94 revascularisation
- 95 E. All patients with coronary artery disease should be discussed at a heart team
- 96 (multidisciplinary meeting) before undergoing myocardial revascularisation.

97 **Answer A.**

98 Recent evidence shows that compared to medical therapy alone, CAD patients

99 randomised to coronary revascularisation with either stents⁸ or coronary artery bypass

100 grafting (CABG)⁹ have more effective angina reduction and lower risk of major adverse

101 cardiac events. The ESC guidelines on management of stable coronary artery disease

102 support myocardial revascularisation to improve symptoms in haemodynamically

103 significant coronary stenosis with insufficient response to optimized medical therapy.

104 Patient wishes should be taken into account regarding the intensity of anti-anginal

105 therapy. Revascularisation for asymptomatic ischaemia may be considered in patients

106 with large ischaemic burden (left main/proximal left anterior descending artery stenosis

107 >50%) or two/three vessel disease in patients with presumed ischaemia cardiomyopathy

108 (LVEF <35%).² The visual assessment of a coronary angiogram may be misleading and

109 invasive physiological interrogation of a stenosis may help to determine the ischaemic

110 potential of a lesion. Not all patients with CAD need discussed at heart team meetings

111 (e.g. single vessel disease with simple anatomy).

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