

## Practice Exam 2017

### Case Study

A 58-year old professor presents himself to your clinic. He is apparently healthy, but his older brother had a heart attack at age 60, as did his father (age 62). He is clinically healthy but doesn't exercise more than working in his garden on weekends.

In addition to his family history of cardiovascular disease, and minimal activity, he is hypercholesterolemic and hypertensive, but is treated with medicines so that currently he has normal values for serum cholesterol and blood pressure. His physical examination is unremarkable. His resting ECG just before the exercise test is shown in Figure 1. His exercise ECG is shown in Figure 2 (for purposes of exam assume rate is 136). He is 185 cm in height, weighs 90 kg.

Figure 1

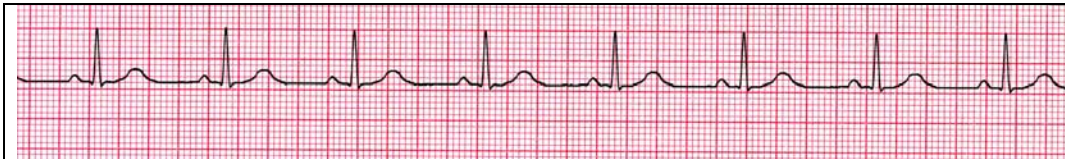


Figure 2



His exercise test is completed without symptoms or ECG changes, and has the following results:

Time	Power (W)	W/kg	METs	HR	BP	RPE	TalkTest
0	0	0	1.0	71	120/80	0	+
3	25	0.28		85	140/80	3	+
6	50	0.56		95	150/80	4	+
9	75	0.83		125	160/80	6	+/-
12	100	1.11		136	165/80	8	-
1Post	25	0.28		130	160/80	4	+/-
3Post	25	0.28		125	162	3.5	+

### ACSM Cycling Equation

$$VO_2 = (7 + (PO \text{ (kpm)} * 6.12 * 1.8)) / BW \text{ (kg)}$$

1. What is the primary indication for exercise testing?
  - a. Evaluate exertional discomfort
  - b. Evaluate palpitations
  - c. Screen for occult CHD
  - d. Exercise prescription
  
2. Given his exercise ability and resting ECG what kind of evaluation is appropriate to perform?
  - a. Exercise ECG
  - b. Exercise cardiolyte or echo
  - c. Pharmacologic stress test
  - d. None of the above is appropriate
  
3. What is his Body Mass Index (BMI)?
  - a. 24.0
  - b. 25.5
  - c. 26.3
  - d. 28.0
  
4. What is his target weight (kg) range at a BMI of 18-25?
  - a. 58.1-82.1
  - b. 61.6-85.5
  - c. 65.0-88.9
  - d. 68.4-92.3
  
5. What is his peak achieved exercise capacity?
  - a. 3.8 METs
  - b. 4.1 METs
  - c. 4.5 METs
  - d. 5.5 METs
  
6. What percentage of the expected exercise capacity for a 58-year old man did he achieve during his exercise test? Remember, the exercise capacity on the cycle is 90% of predicted treadmill exercise capacity.
  - a. 53%
  - b. 55%
  - c. 61%
  - d. 70%
  
7. What would be his target HR for training at 50-70% of HRR?
  - a. 98-105
  - b. 101-107
  - c. 102-112
  - d. 104-117

8. Assuming his gross  $\text{VO}_2\text{max}$  (liters/min) on the cycle could improve by 25% after 6 months of training, and his weight could decrease to 80 kg, what would be his maximal exercise capacity?
  - a. 5.5 METs
  - b. 6.6 METs
  - c. 7.7 METs
  - d. 8.8 METs
  
9. Approached from the standpoint of the Talk Test, during the exercise test that you performed what is estimated ventilatory threshold (VT)?
  - a. 3.8 METs
  - b. 4.0 METs
  - c. 4.6 METs
  - d. 5.3 METs
  
10. Assuming the exercise capacity from the Talk Test, what is a reasonable exercise training intensity based on translating the exercise capacity from incremental to steady state exercise (e.g. Last Positive -1)?
  - a. 25W
  - b. 50W
  - c. 75W
  - d. 100W
  
11. If he wanted to do interval training (such as 30 sec/60 sec @ Maximal Exercise Capacity/25W recovery), what PO would you recommend for the RCT segments.
  - a. 75W
  - b. 100W
  - c. 125W
  - d. 150W
  
12. Assuming that the expected Cardiac Output response is 5 liters/min + 5 liters/min of  $\text{VO}_2$ , what maximal stroke volume do you expect from him based on his exercise test?
  - a. 90 ml/beat
  - b. 100 ml/beat
  - c. 110 ml/beat
  - d. 120 ml/beat
  
13. What ECG rhythm does he present to the clinic with?
  - a. Normal sinus rhythm
  - b. Sinus tachycardia with rare PVC's
  - c. Atrial fibrillation
  - d. Second degree heart block (Wenkebach)
  
14. What ECG rhythm does he have at maximal exercise?
  - a. Normal sinus rhythm
  - b. Sinus tachycardia with rare PVC's
  - c. Atrial fibrillation
  - d. Ventricular tachycardia

15. You discover as part of the workup that he is anemic, with a [Hgb] of 10 gm/100 ml instead of 15 gm/100 ml. Using a 17 liters/min as a value for cardiac output (not necessarily the answer to #12), and assuming an arterial O<sub>2</sub> saturation of 98% and a mixed venous O<sub>2</sub> saturation of 24%, what increase would you get for METs if you took steps (increased iron intake or transfusion or EPO administration) to increase his [Hgb] to 15 gm/100ml? His weight remains constant at 90kg.
- 2.0 to 3.5 METs
  - 3.5 to 5.3 METs
  - 4.5 to 5.0 METs
  - 5.3 to 8.0 METs
16. He decides that to prevent boredom he wants to do some of his training on the treadmill. Assuming a cycle exercise capacity of 7 METs (not necessarily the answer to question #5), assuming his walking VO<sub>2</sub>max is 110% of his cycle VO<sub>2</sub>max, how fast would his walking speed at 50% of MET reserve be, if he wanted to do his training up a 5% slope?

ACSM Walking Equation

VO<sub>2</sub> (ml/kg)= horizontal + vertical + resting

VO<sub>2</sub>(ml/kg)=(speed x 0.1) + (speed \* 1.8 \* grade) + 3.5

Speed=meters/min, fractional grade (3%=0.03)

- 3.7 kph
- 4.3 kph
- 4.9 kph
- 5.2 kph

The following 2 questions are based on being able to read ECG's

17. The following ECG depicts:



- Sinus tachycardia
- Atrial flutter
- Atrial fibrillation
- Premature atrial complexes

18. The following ECG depicts:



- Sinus bradycardia
- First degree heart block
- Second degree heart block, Mobitz I
- Third degree heart block

The following 2 questions are based on information to be derived from the readings.

19. Based on information presented by Jon Myers about the relationship between exercise capacity and 5 year survival, what MET level is associated with ~95% survival both in patients with known heart disease and individuals with no evidence of heart disease.
  - a. 5 METs
  - b. 6 METs
  - c. 7 METs
  - d. 8 METs
  
20. Based on information provided by Rainer Hambrecht, what is the minimal weekly energy expenditure threshold where regression of coronary lesions is likely?
  - a. 750 kcal (150 min/week @ 5 kcal/min)
  - b. 1500 kcal (300 min/week @ 5 kcal/min)
  - c. 2200 kcal ((440 min/week @ 5 kcal/min)
  - d. 2450 kcal (490 min/week @ 5 kcal/min)

Answers practice exam

1	C	6	C	11	B	16	A
2	A	7	D	12	B	17	C
3	C	8	C	13	A	18	D
4	B	9	C	14	B	19	D
5	D	10	A	15	D	20	C