HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

HIV and the Heart

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CORRIGAN MINEHAN HEART CENTER

Objectives

- Describe the impact of HIV infection on the heart.
- Describe the impact of anti-retroviral therapy on heart disease in patients living with HIV.
- Summarize a strategy for managing heart disease and associated risk factors for patients living with HIV.

Question #1

Which of the following statements regarding the risk of heart failure with reduced ejection fraction (HFrEF) is correct?

1. Heart failure is more common in HIV(-) than in HIV(+) people, HR 1.2.

2. Heart failure is more common in HIV(-) than in HIV(+) people, HR 1.6.

3. Heart failure is more common in HIV(+) than in HIV(-) people, HR 1.2.

4. Heart failure is more common in HIV(+) than in HIV(-) people, HR 1.6.

Question #1

Which of the following statements regarding the risk of heart failure with reduced ejection fraction (HFrEF) is correct?

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3. Heart failure is more common in HIV(+) than in HIV(-) people, HR 1.2.

4. Heart failure is more common in HIV(+) than in HIV(-) people, HR 1.6.

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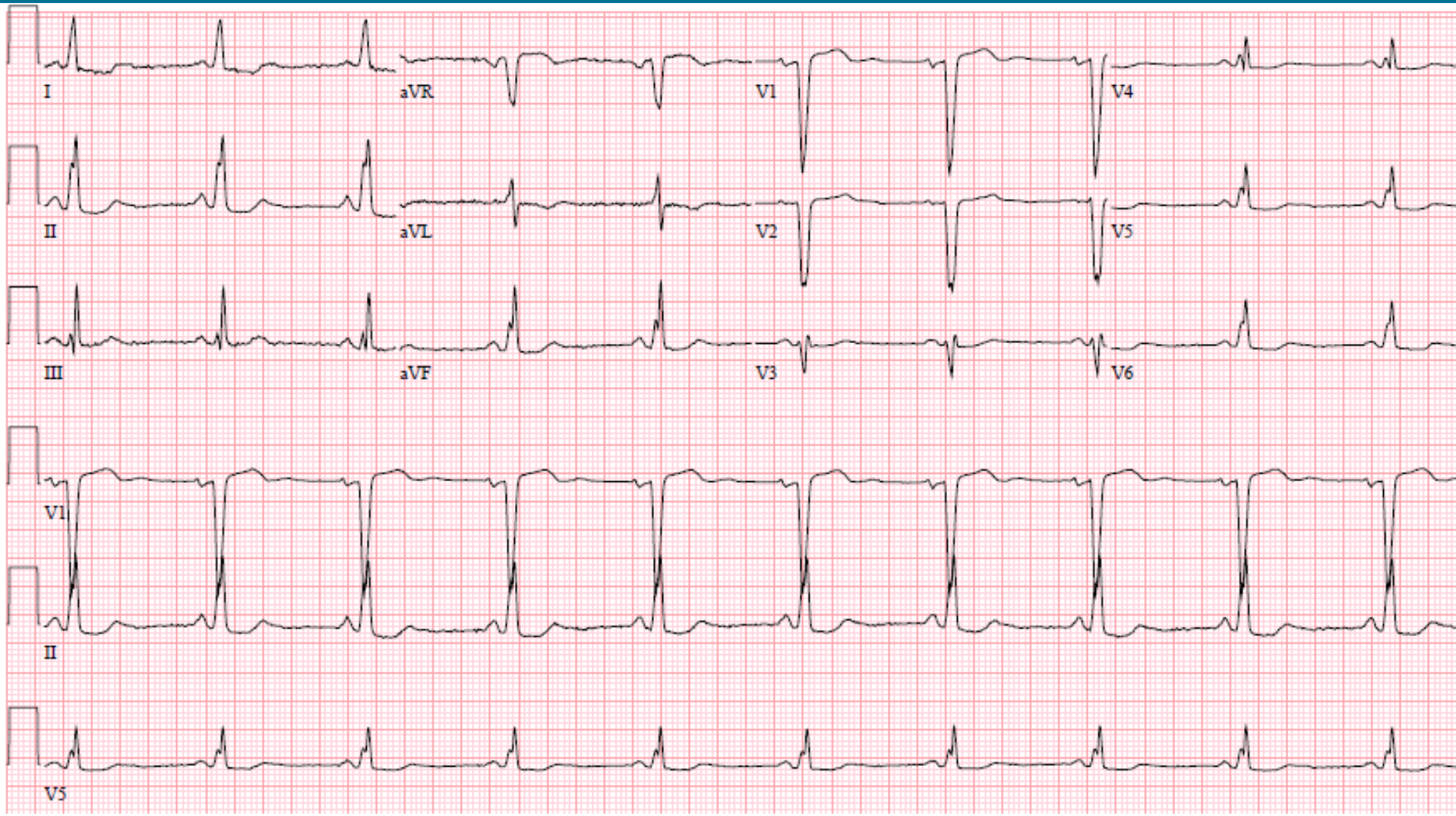
Clinical Case

36-year-old man presents with exertional chest discomfort for 3 weeks. No prior cardiac history and no identified cardiac risk factors. HIV positive for 2 years, not taking anti-retroviral therapy (ART) consistently. No concerning findings on exam, lab work within acceptable limits.

Clinical Case: ECG



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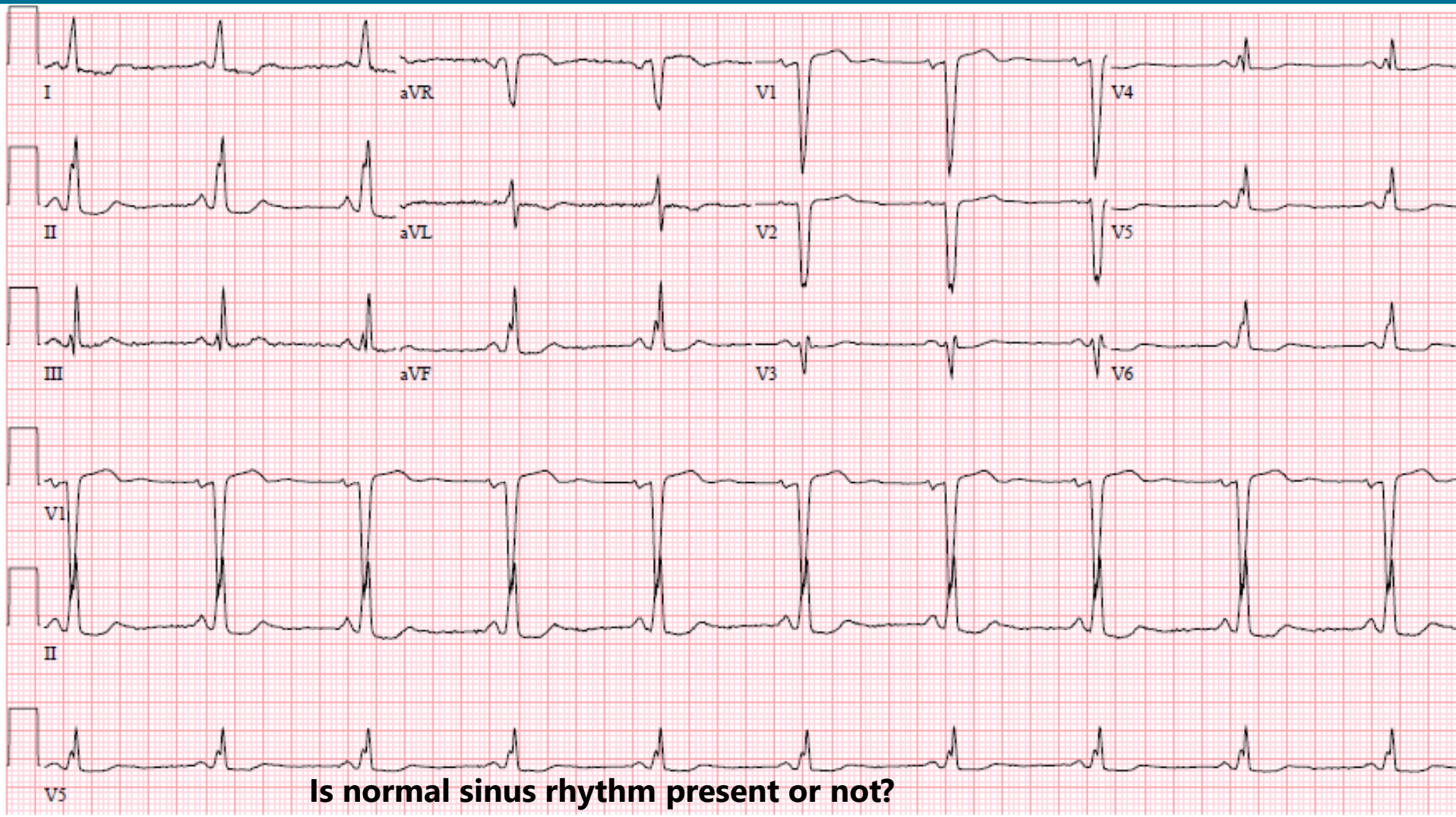
Clinical Case: ECG



Is normal sinus rhythm present or not?

Do you see a P wave?

Does every P have a QRS and does every QRS have a P?

Is the axis of the P wave normal (upright in I and II)?

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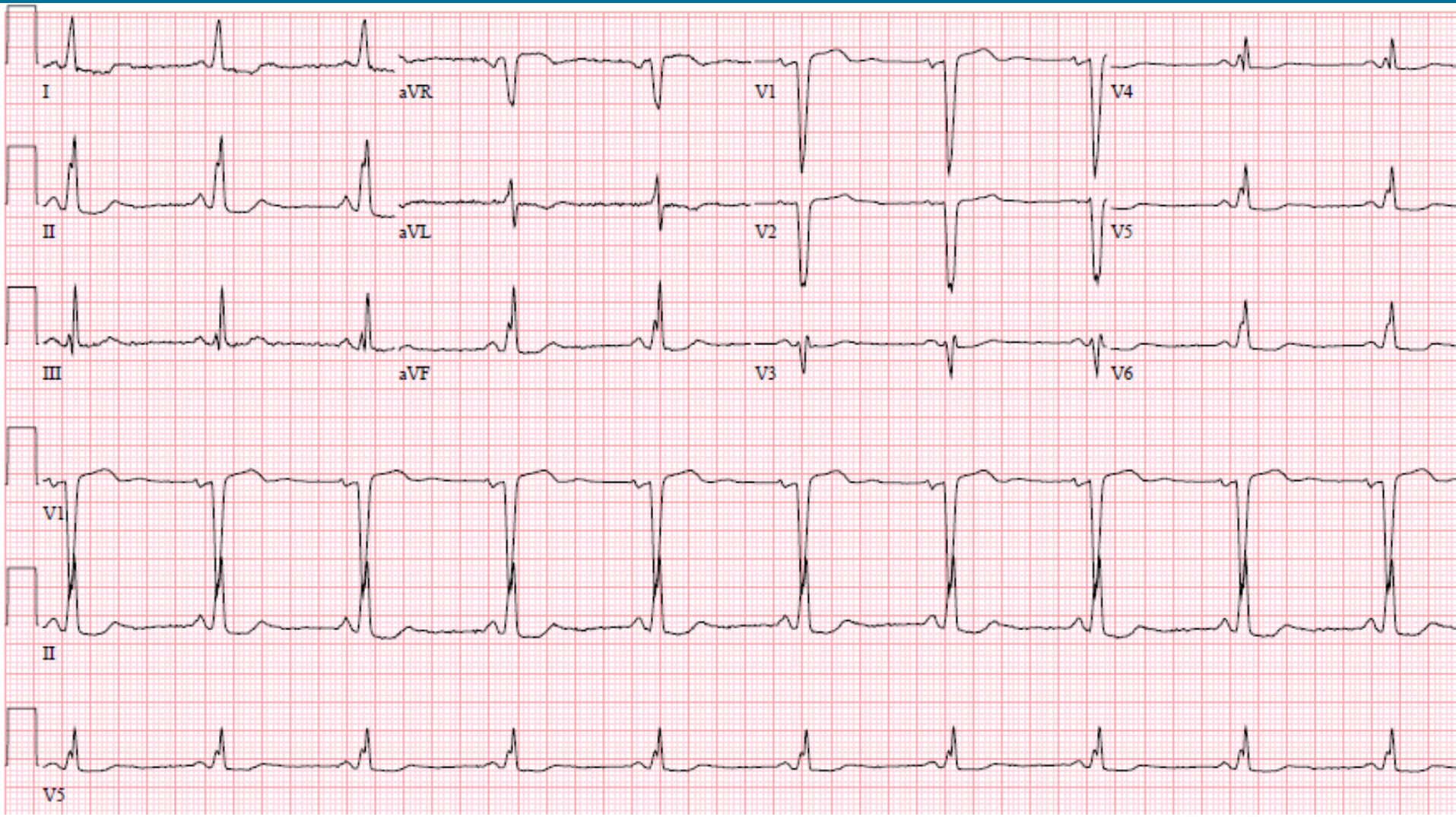
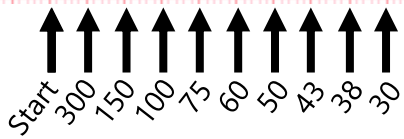
Clinical Case: ECG





Rate in bpm = 300 / # large squares

Rate in msec = 60,000 / bpm

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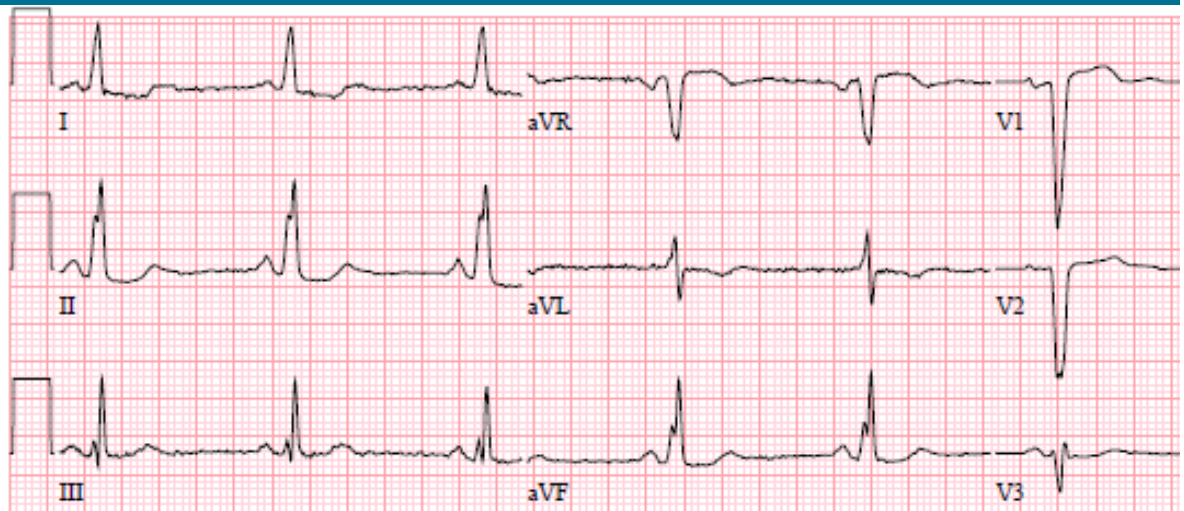
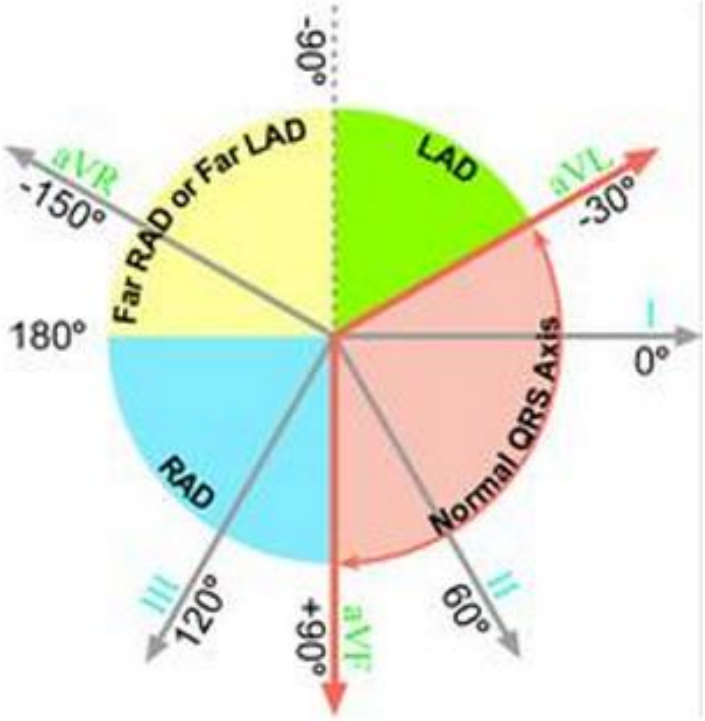
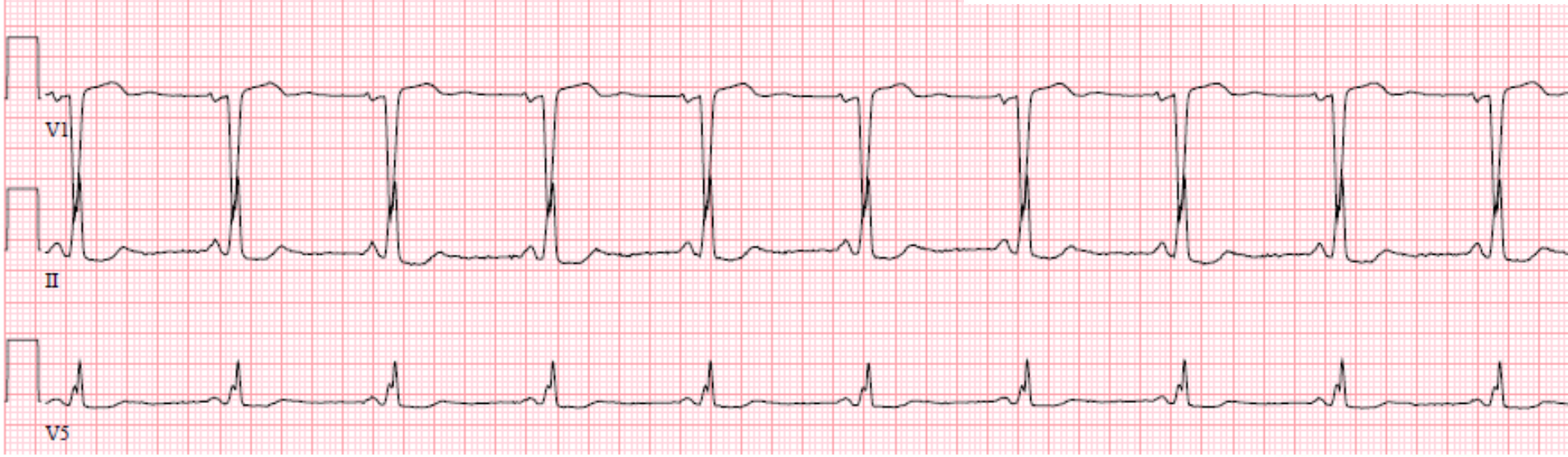
Clinical Case: ECG







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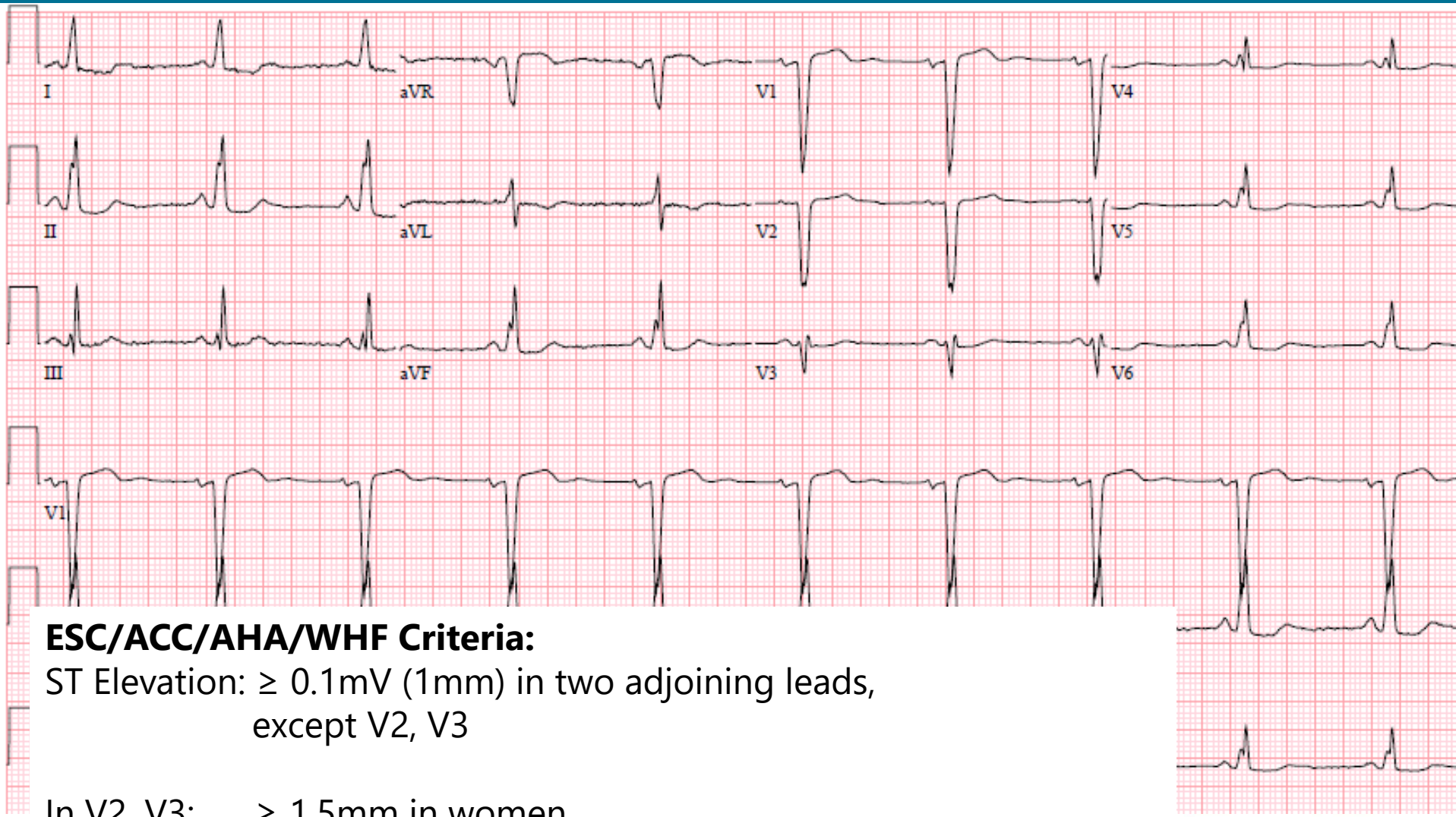
Clinical Case: ECG



ESC/ACC/AHA/WHF Criteria:

ST Elevation: ≥ 0.1mV (1mm) in two adjoining leads,
except V2, V3

In V2, V3: ≥ 1.5mm in women
≥ 2mm in men ≥ 40 years
≥ 2.5mm in men < 40 years

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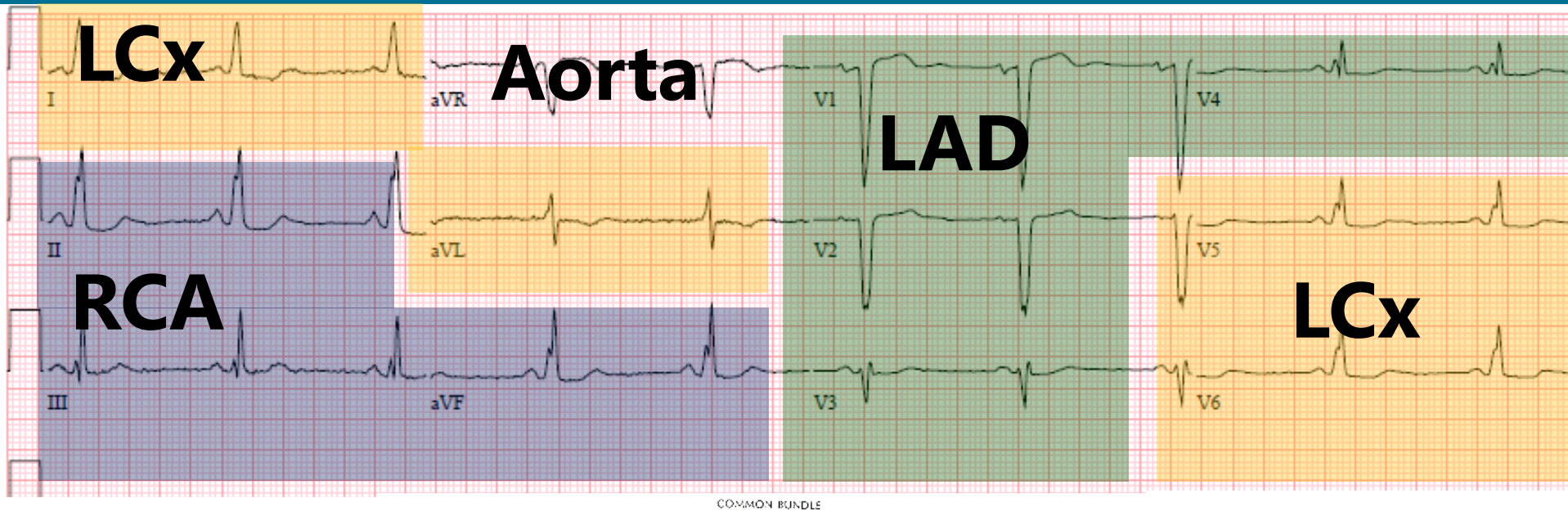
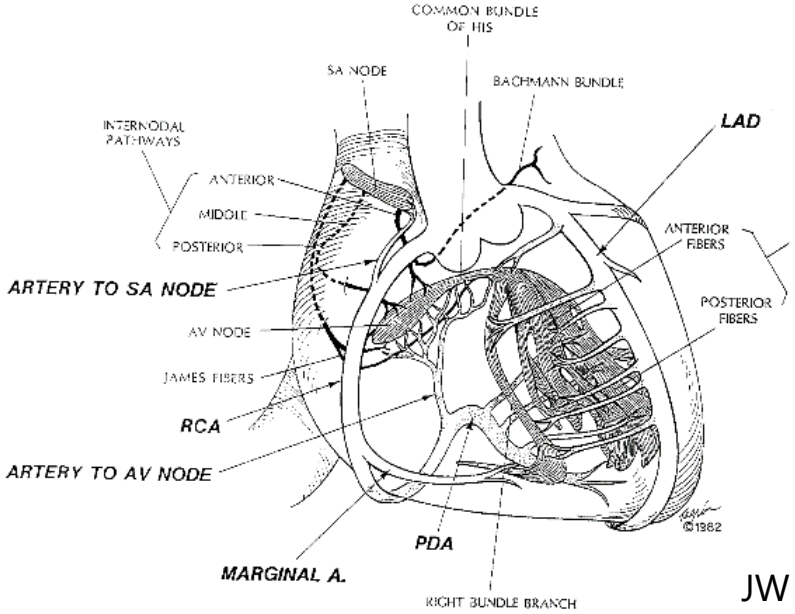
Clinical Case: ECG





JW Harthorne

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Clinical Case

36-year-old man presents with exertional chest discomfort for 3 weeks. No prior cardiac history and no identified cardiac risk factors. HIV positive for 2 years, not taking anti-retroviral therapy (ART) consistently. No concerning findings on exam, lab work within acceptable limits.

Next Steps?

Clinical Case

36-year-old man presents with exertional chest discomfort for 3 weeks. No prior cardiac history and no identified cardiac risk factors. HIV positive for 2 years, not taking anti-retroviral therapy (ART) consistently. No concerning findings on exam, lab work within acceptable limits.

Next Steps?

1. Address clinical evidence of MI:
    - Consider referral to ED based on severity of symptoms.
    - Blood work, echocardiogram, cardiac catheterization.
2. Take this opportunity to initiate ART.

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Clinical Case

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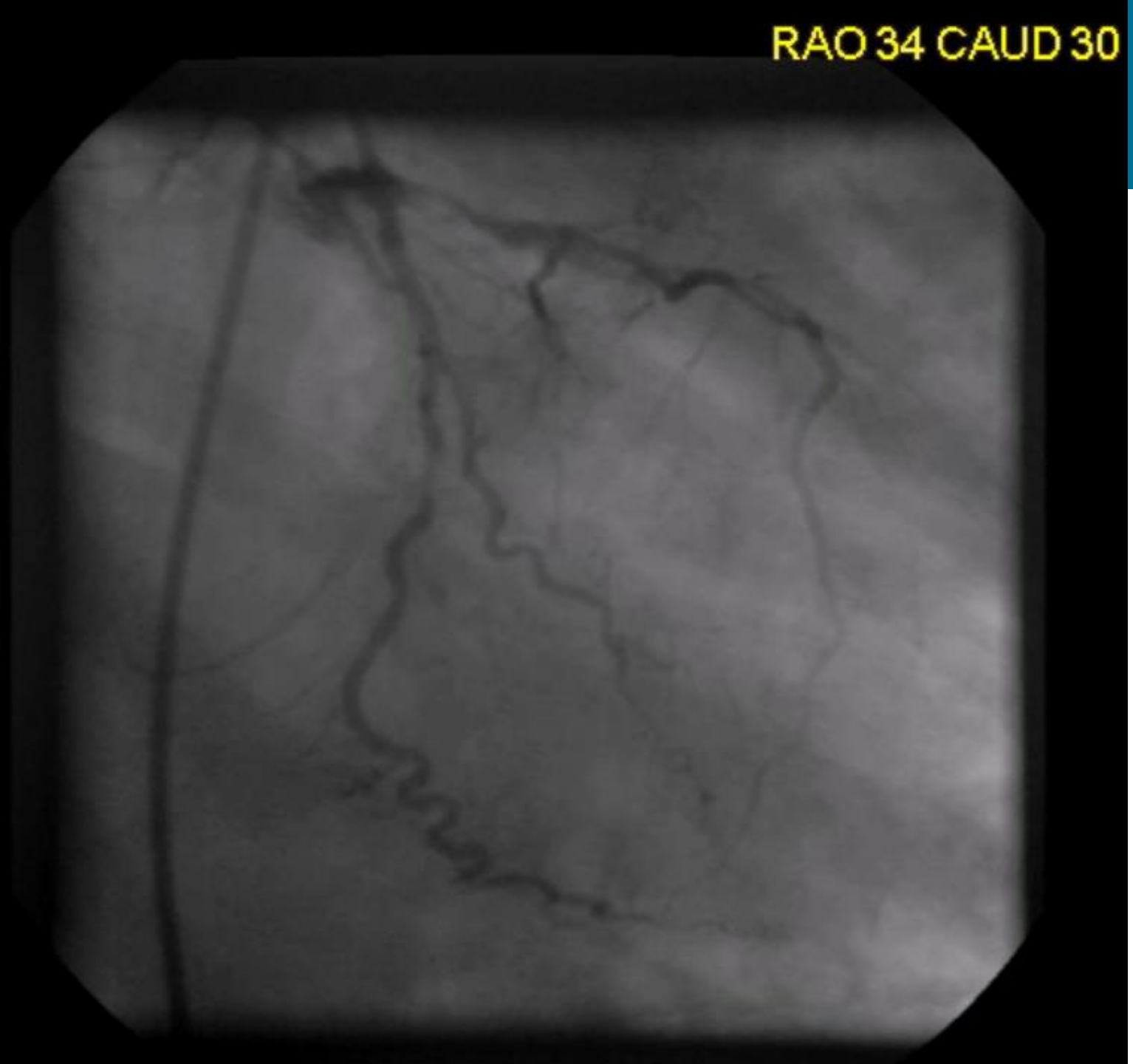
Clinical Course:

1. In ED, cardiac biomarkers revealed elevated troponin.
2. Patient's symptoms accelerated.
3. Cardiac catheterization was performed.



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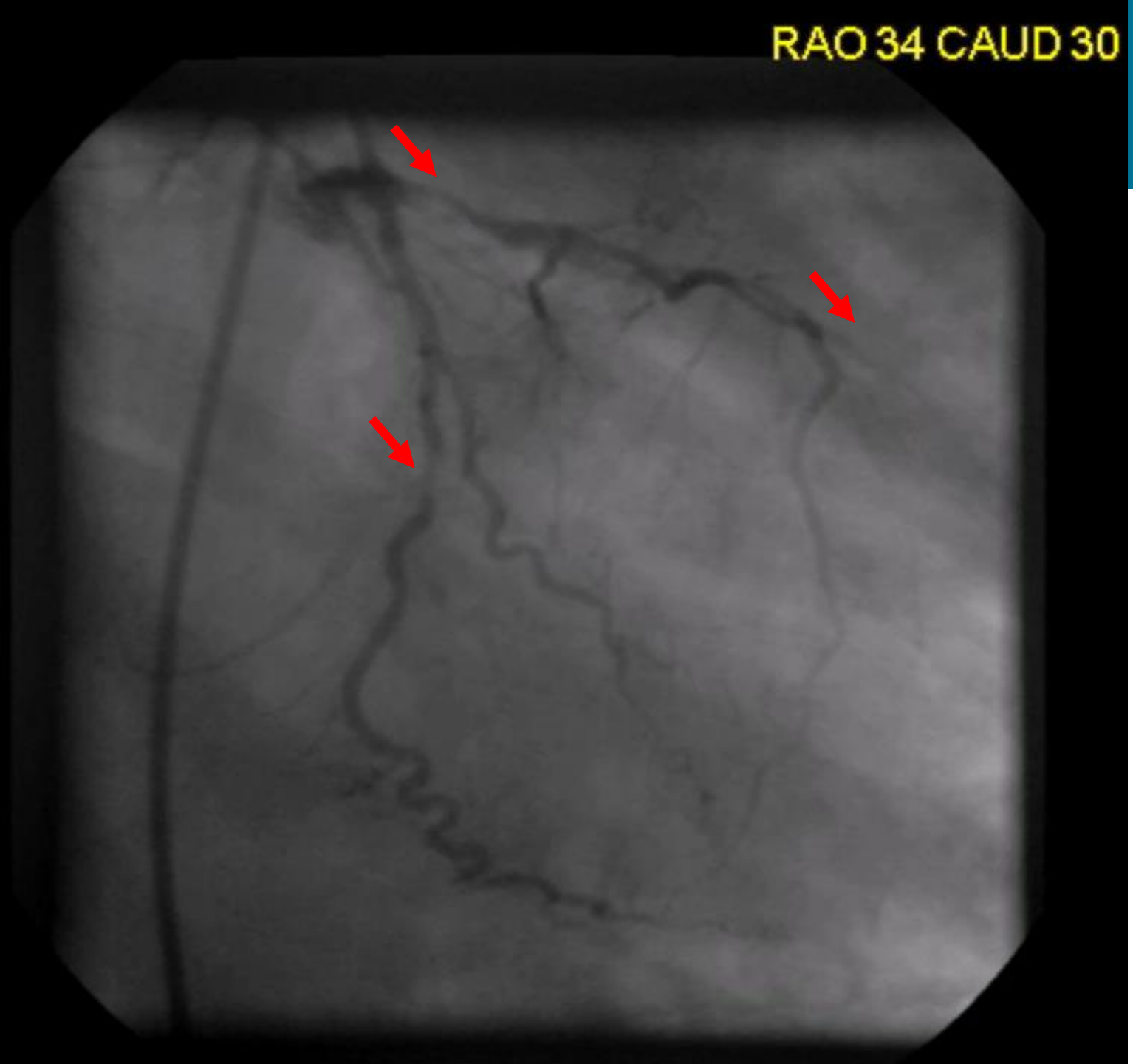

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Clinical Case

Clinical Course:

1. Stents placed in left anterior descending artery.
2. Aggressive lipid-lowering therapy initiated according to guidelines.
3. Further evaluation revealed depressed CD4 count and detectable viral load, no opportunistic infections. ART initiated.

Mortality Related to HIV Infection

Pre-ART Era:

- Mortality associated with HIV infection >20%*
- Most deaths related to AIDS

Post-ART Era:

- Mortality associated with HIV infection <2%*
- Most deaths related to causes other than AIDS**
- Cardiovascular disease major contributor to mortality in HIV(+) people:
  - 1.5-2 fold increase in incidence of cardiovascular disease associated with HIV infection***

* Palella F et al NEJM 1998;338:853
** Neuhaus J et al AIDS 2010;24:697
*** Klein D et al J Acquir Immun Def Syndr 2002;30:471

Question #2

Which of the following cardiac conditions are associated with HIV infection?

1. Coronary atherosclerosis
2. Myocarditis
3. Pericardial effusion
4. Pulmonary hypertension
5. All of the above

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4. Pulmonary hypertension
5. All of the above

Impact of ART on HIV Outcomes

Pre-ART era:

- Myopericarditis, pericardial effusion, pulmonary hypertension were common*
- Attributed to inflammation related to high HIV viral load

Post-ART era:

- Increase in prevalence of coronary atherosclerosis and ischemic heart disease*
- Debate regarding etiology: HIV-related inflammation vs impact of ART (especially older protease inhibitors)**

* Feinstein MJ Am J Cardiol 2016;117:214

** Currier JS Circulation 2008;118:e29

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Impact of HIV Treatment on Cardiovascular Risk

- Highest cardiovascular risk is associated with the lower CD4 counts and higher viral load, independent of ART utilization.*

- Poor immunologic recovery with ART is associated with elevated risk of cardiovascular events.**

- Although ART is associated with elevated cardiovascular risk in some stuties, the risk associated with cessation of ART is higher.***

* Lang S et al. Clin Infect Dis 2012;55:600.
** Drozd DR et al. J Acquir Immun Defic Syndr 2017;75:568.
*** El-Sadr WM et al. NEJM 2006;355:2283.

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Question #3

Which of the following statements about the timpact of HIV infection on the risk of developing heart disease is correct:

1. HIV(+) individuals with depressed CD4 counts or high viral load are at higher risk of developing heart disease.
2. HIV(+) individuals taking ART are at elevated risk of developing heart disease if the CD4 counts do not recover.
3. In HIV(+) individuals, each 300-cell increase in CD4 count is associated with a 25% decrease in MI risk.
4. All of the above.

Question #3

Which of the following statements about the timpact of HIV infection on the risk of developing heart disease is correct:

1. HIV(+) individuals with depressed CD4 counts or high viral load are at higher risk of developing heart disease.
2. HIV(+) individuals taking ART are at elevated risk of developing heart disease if the CD4 counts do not recover.
3. In HIV(+) individuals, each 300-cell increase in CD4 count is associated with a 25% decrease in MI risk.
4. All of the above.

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Question #4

Which of the following statements regarding ART for patients with HIV is incorrect:

1. ART has been associated with increased risk of MI in some studies.
2. ART has not been shown to have any impact on the risk of MI.
3. Cessation of ART has been associated with a higher risk of MI than continuation of ART.

Question #4

Which of the following statements regarding ART for patients with HIV is incorrect:

1. ART has been associated with increased risk of MI in some studies.
2. ART has not been shown to have any impact on the risk of MI.
3. Cessation of ART has been associated with a higher risk of MI than continuation of ART.

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Objectives

- Describe the impact of HIV infection on the heart.
  - Inflammation associated with viral load
  - Multiple issues, e.g., myopericarditis and atherosclerosis
- Describe the impact of anti-retroviral therapy on heart disease in patients living with HIV.
  - Impact of ART on heart disease has been debated but current guidelines support ongoing ART use
- Summarize a strategy for managing heart disease and associated risk factors for patients living with HIV.
  - Frequent screening for heart disease
  - Aggressive risk factor management


Thank you
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