46 y.o. woman admitted to ER with atypical chest pain

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Teaching case cardiac # 1

• A 46 y.o. woman is admitted to Emergency Room with atypical chest pain, that has lasted for about 3 hours, stable.

• She complains of fatigue and palpitations when exercising, however with no chest pain.

• She is a smoker since she was 23, with no history of diabetes and in annual check-ups her blood pressure and cholesterol levels have always been normal. She has no family history of CAD.
Her BMI is 27, heart rate 78 bpm, BP 145/90 mmHg, normal chest examination, otherwise unremarkable.

- Basal EKG: pre-excitation syndrome. Cardiac enzymes including serum Troponine levels are within normal limits.

- Basal echocardiogram: mild mitral valve prolapse, with preserved global and regional ventricular function.
What would you do?

- A) Send the patient home since she is on very low risk of a heart attack.
- B) Keep the patient under surveillance until clinically stable, then to Cath Lab.
- C) Treat medically. When asymptomatic, perform a Treadmill Test.
- D) Treat medically. When asymptomatic, perform a stress-rest gated SPECT.

To verify answer please click here...
What would you do?

A) Send the patient home since she is on very low risk of a heart attack.
B) Keep the patient under surveillance until clinically stable, then to Cath Lab.
C) Treat medically. When asymptomatic, perform a Treadmill Test.
D) Treat medically. When asymptomatic, perform a stress-rest gated SPECT.
Comments:

- The patient is at intermediate risk for MI, so she should not be discharged.

- There is no indication for angiography without previous functional tests.

- Treadmill is contra-indicated because of pre-excitation syndrome.

- *Gated SPECT will provide diagnostic and risk stratification information.*
The patient exercised for 7 minutes until exhaustion, no pain, no ECG changes.
99mTc MIBI injected at maximum stress.
A rest study was performed the following day.
Gated images obtained for the stress study only (not shown here).
Interpretation?

- A) Anterior-septal fixed defect, consistent with MI.
- B) Anterior-septal fixed defect, breast attenuation artifact.
- C) Not possible to decide, additional imaging data needed.
- D) Mixed defect, ischemia not ruled out.
Interpretation?

- A) Anterior-septal fixed defect, consistent with MI.
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Comments:

• MI cannot be ruled out, however the defect seems to be worse at rest (arrows).
• Breast attenuation artifact is a possibility, but needs to be confirmed.
• Additional imaging data could clarify the diagnosis.
• This is not a mixed defect, so an ischemic pattern is not present.
Additional data

Raw data

Gated SPECT
Report?

A) Anterior-septal fixed defect, probable MI.
B) Anterior-septal fixed defect, probable breast attenuation artifact.
C) Not possible to decide, additional info needed.
D) Mixed defect, ischemia not ruled out.

*To verify answer please click here...*
Report?

- A) Anterior-septal fixed defect, probable MI.
- B) Anterior-septal fixed defect, breast attenuation artifact.
- C) Not possible to decide, additional info needed.
- D) Mixed defect, ischemia not ruled out.

Comments:

- The raw data shows breast ‘shadow’.
- Gated SPECT shows preserved thickening of anteroseptal wall.
- Possible ‘paradoxical’ defect, more evident at rest not indicating ischemia.
- Gated SPECT provided diagnostic clue ruling out MI.

Patient was safely discharged with no events at 1-yr follow up.
Teaching points:

- Attenuation is a common artifact in myocardial perfusion imaging, being present in 20-30% of cases, mimicking the presence of MI.

- Breast attenuation causes pseudo-defects on the anterior wall of the left ventricle, and is more evident in women with large breasts. However, it can be also significant in women with small but dense breasts. In men, diaphragmatic attenuation is more common, affecting the inferior wall - especially in obese patients.
Teaching points:

- Attenuation correction is possible using external sources or CT, but these are expensive solutions. Prone imaging can be used mainly for inferior wall artifacts.
- Gated SPECT provides information about regional wall motion and thickening, which would be affected by infarction but preserved when attenuation is present.
- Visualization of raw data can also aid in depicting attenuation.