A 69 year-old man with atypical chest pain and sporadic dyspnea

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Teaching case Cardiac # 2

• A 69 year-old man presents with atypical chest pain and sporadic dyspnea.
• He is a previous smoker, has overweight and dyslipemia.
• He is on calcium channel blockers and statins.
• He has a history of moderate-to-severe aortic stenosis.
• An exercise stress test showed 0.5 mm ST depression with no symptoms.

• He was sent for a 99mTc-Sestamibi stress/rest myocardial perfusion study.

• He exercised for 4.5 minutes following Bruce protocol achieving 87% of MPHR.

• Basal BP was 145/90 mmHg and reached 190/110 mmHg at peak exercise.

• No chest pain developed and there were no significant ST changes.
Report?

- A) Ischemic pattern, one coronary territory.
- B) Ischemic pattern, two coronary territories.
- C) Mixed pattern; ischemia & fibrosis.
- D) Most probably a motion artifact is present.
A) Ischemic pattern, one coronary territory.
B) Ischemic pattern, two coronary territories.
C) Mixed pattern; ischemia & fibrosis.
D) Most probably a motion artifact is present.

**Comments:**

- The “hurricane sign” in the short axis images is a typical motion artifact (see next slide).
- Either application of motion correction software or a repeat study are necessary, otherwise the study is uninterpretable.
Report?

A) Normal.
B) Possible infero-basal fibrosis; transient LV dilation.
C) Infero-basal ischemia.
D) Non-diagnostic; artifact still present.
Report?

A) Normal.

B) Possible infero-basal fibrosis; transient LV dilation.

C) Infero-basal ischemia.

D) Non-diagnostic; artifact still present.

Comments:

• The study shows a fixed infero-basal defect consistent with fibrosis (previous MI?). No reversible defects are present.
• The LV cavity is obviously greater in the stress than in the rest study, the so-called “transient ischemic dilation” or TID.
• The motion artifact was completely removed after correction.
What would you do?

A) It is safe to send the patient home since no ischemia was observed.
B) Pharmacologic test is indicated.
C) Stress echocardiography is indicated.
D) Coronary angiography is indicated.
What would you do?

A) It is safe to send the patient home since no ischemia was observed.
B) Pharmacologic test is indicated.
C) Stress echocardiography is indicated.

**D) Coronary angiography is indicated.**

**Comments:**

- This is a high risk study.
- TID is usually associated with cardiac events, even with no evidence of segmental ischemia (see next slide).
- Coronary artery disease should be investigated.
TID in patients with normal perfusion findings

n=1,560

\[ p=0.014 \]

\[ p=0.01 \]

Abidov et al., JACC 2003

TID in patients with normal perfusion findings

Total events (%/year)

<table>
<thead>
<tr>
<th>Condition</th>
<th>TID quartil (Control)</th>
<th>TID quartil (TID)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise</td>
<td>0.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Vasodilators</td>
<td>1.0</td>
<td>3.2</td>
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</table>
Coronary angiogram of this patient was normal.
Transient ischemic dilatation of the left ventricle with severe post stress left ventricular dysfunction in the setting of severe aortic stenosis and normal coronary arteries.

Kowalski M, Harkness BA, Ananthasubramanian K.

Henry Ford Heart and Vascular Institute, Henry Ford Hospital, Detroit, MI, USA.

Transient ischemic dilatation (TID) of the left ventricle observed during perfusion SPECT is an important non-perfusion finding that may not only suggest underlying significant (usually multi-vessel) coronary artery disease (CAD) but also an independent prognostic factor of adverse outcomes regardless of perfusion findings. We present a patient with no significant epicardial coronary disease who had significant TID and considerable decrease in the left ventricular ejection fraction with left ventricular dilatation after a rest-stress Tc-99 tetrofosmin SPECT study in the setting of severe aortic stenosis.
Teaching points:

• Artifacts should be recognized before interpreting a study.
• Motion artifacts are common and can be corrected with appropriate software.
• However, in some cases a repeat study is needed.
Teaching points:

- TID is associated with increased risk of cardiac events, both with exercise and pharmacologic stress.

- Patients showing TID and no perfusion defects may have multi-vessel coronary artery disease with balanced ischemia in myocardial perfusion studies.

- TID can be found in patients with aortic stenosis and normal coronary arteries.