Paradoxical pattern in a patient with previous myocardial infarction

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Clinical history

- Woman 66 y.o.
- Previous MI.
- Dyspnea and non-specific chest discomfort.
- ECG: Q waves V3-V5.
- Echo: LVEF 48%, apical hypokinesia.
- Referred for MPS w/ pharmacologic stress.
- Dipyridamole + rest (2-day protocol), 99mTc-MIBI.
- Well tolerated, no symptoms, no ECG changes, BP 130/80 mmHg at rest, 120/75 mmHg during the test.
Stress/rest myocardial perfusion study
Stress/rest myocardial perfusion study
How would you interpret the study?

a) Normal.
b) Equivocal.
c) Apical infarction + ischemia.
d) Apical infarction, no ischemia.
How would you interpret the study?

a) Normal.

b) Equivocal.

c) Apical infarction + ischemia.

d) Apical infarction, no ischemia.

• There seems to be normal perfusion at stress with an apical defect at rest (paradoxical pattern).

• However, stress images are too noisy, raising the suspicion of a technical artefact - so the interpretation should be categorized as *equivocal* since the presence of ischemia cannot be ruled out.

• Technical parameters should be verified to check for artefact.
Motion was excluded, but low-count statistics in stress study was detected. Partial extravasation of the dose was confirmed.

<table>
<thead>
<tr>
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<th>Total counts</th>
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<tbody>
<tr>
<td>Stress</td>
<td>72,678</td>
</tr>
<tr>
<td>Rest</td>
<td>287,085</td>
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</tbody>
</table>
What would you do now?

a) Release an indeterminate report.
b) Report the rest result only.
c) Try to repeat the stress portion of the study.
d) Report paradoxical pattern.
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a) Release an indeterminate report.
b) Report the rest result only.

c) Try to repeat the stress portion of the study.
d) Report paradoxical pattern.

- The best option in these cases is to repeat the defective study whenever possible, which may cause additional discomfort to the patient but ensures a reliable result.
- Any other option would be of little help for the referring cardiologist and the patient.
Myocardial perfusion study (repeated stress)
Myocardial perfusion study (repeated stress)
Polar maps

Stress #1

Rest

Stress #2

Rest
How would you interpret the study now?

a) Normal.
b) Equivocal.
c) Apical infarction + ischemia.
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a) Normal.
b) Equivocal.
c) Apical infarction + ischemia.

d) Apical infarction, no ischemia.

- The new stress study is of good diagnostic quality and paradoxical pattern is no longer present.
- Is possible to conclude that there is an extensive apical MI with no significant induced ischemia.
- Any other option would be of little help for the referring cardiologist and the patient.
• Myocardial necrosis with a paradoxical pattern (PP) is observed in a few proportion of patients with myocardial necrosis.

• Necrotic areas with PP have preserved myocardial flow, owing to either patency of the culprit artery, or the presence of collateral circulation to this territory when the artery is occluded.

• Patients exhibiting a PP on MPS with Tc-99m-labeled tracers have a better prognosis and better LV function than patients with a non-PP pattern in necrotic myocardial regions.

• PP can also be observed as an artefact in studies with low-count statistics, or if there is dominant attenuation during the stress portion.

• QC data should be always checked before interpreting MPS.

