Symptomatic patient with LBBB

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Clinical history

- Woman 66 y.o., no known risk factors for CAD.
- Asthmatic, atypical chest pain.
- Chronic LBBB.
- Had bronchospasm when submitted for MPS with dipyridamole, so she was switched to exercise.
Myocardial perfusion study
Quantitative results
How would you describe the findings?

a) Septal fixed defect.
b) Septal reversible defect.
c) Septal partially reversible defect.
d) No defect, normal study.
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c) *Septal partially reversible defect.*
d) No defect, normal study.

There is a septal defect which clearly shows partial reversibility, with no complete normalization (septal wall is still thinner than lateral wall at rest).
How would you interpret the findings?

a) Ischemia.
b) Infarction.
c) Ischemia + infarction.
d) Inconclusive, defect possibly due to LBBB.
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c) Ischemia + infarction.

d) Inconclusive, defect possibly due to LBBB.

- LBBB produces septal defects believed to represent a relative perfusion deficit because myocardial perfusion should be maximum during diastole and this can be impaired since the relaxation phase is compromised.
What stress test would you have primarily selected?

a) Physical exercise.
b) Adenosine / dipyridamole.
c) Dobutamine.
d) Regadenoson.
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b) Adenosine / dipyridamole.
c) Dobutamine.
d) *Regadenoson.*

- Perfusion defects due to LBBB can be exaggerated with increased heart rate, so vasodilators are preferred, but the patient is asthmatic.
- *Regadenoson* is a selective $A_{2A}$ receptor agonist with no effect on bronchial smooth muscle.
Follow up

- Since the patient remained symptomatic and the myocardial perfusion result was inconclusive, she underwent cardiac catheterization.
- The result: normal coronary arteries.
Teaching points

- Patients with LBBB or ventricular pacemaker should undergo vasodilator stress because exercise often produces a false-positive perfusion defect in the interventricular septum.

- The defect is probably related to abnormal septal contractility, accompanied by a relative fall in coronary flow to the septum.

- Exercise stress or any cause of tachycardia tends to enhance this heterogeneous perfusion by increasing the flow proportionately more in the normally contracting myocardium, resulting in a reversible perfusion defect on imaging.

- Vasodilator stress has been shown to overcome the coronary flow misbalance, resulting in a more homogeneous perfusion pattern.
Teaching points

• Regadenoson is a pharmacologic agent approved by the FDA in 2008 as an agent for use in stress testing and can also be used in combined protocols with exercise.

• Regadenoson produces maximal hyperemia quickly after IV injection as a bolus and maintains it for an optimal duration, practical for myocardial perfusion imaging.

• Regadenoson is an agonist with low affinity for the A\textsubscript{2A} adenosine receptor, and at least a 10-fold lower affinity for the A\textsubscript{1} adenosine receptor. In addition, it has relatively weak affinity for the A\textsubscript{2B} and A\textsubscript{3} adenosine receptors.

• Coronary vasodilation and an increase in coronary blood flow (CBF) results from activation of the A2A adenosine receptor by regadenoson.
References


