

# Intramyocardial Hemorrhage in a Young Adult

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**KEY WORDS:** intramyocardial hemorrhage, echocardiography, cardiac magnetic resonance imaging

IMAJ 2015; 17: 457–458

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schemic microvascular injury can result from reperfusion after acute myocardial infarction. Intramyocardial hemorrhage reflects severe microvascular injury and results in leakage of erythrocytes into the reperfused myocardium. Intramyocardial hemorrhage was seen successfully with myocardial contrast echocardiography [1,2]. The gold standard for diagnosis of intramyocardial

hemorrhage after the reperfused myocardial infarction is magnetic resonance imaging (MRI). We present a case of intramyocardial hemorrhage suspected during the conventional echocardiographic examination.

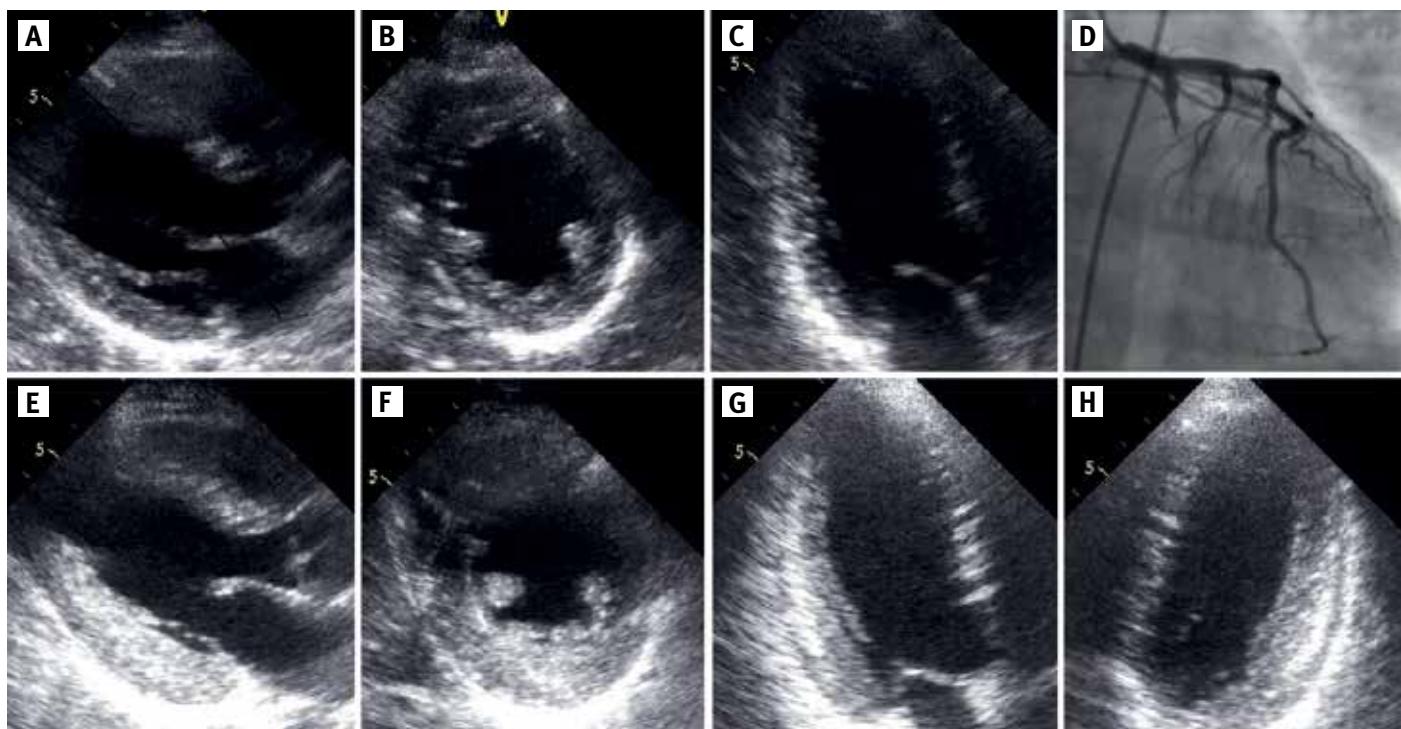
## PATIENT DESCRIPTION

A 25 year old male student was admitted to the Intensive Coronary Care Unit with acute postero-lateral myocardial infarction. Echocardiographic examination [Figures A-C] showed postero-lateral akinesis. Primary percutaneous coronary intervention (PCI) was performed to the culprit left circumflex coronary artery [Figure D].

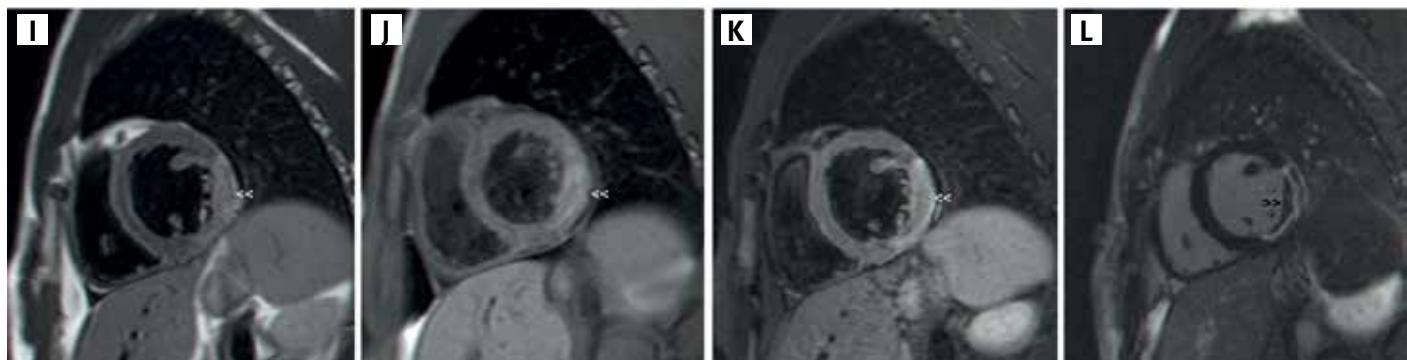
The patient was well, with peak creatine kinase of 9500. The following day routine echocardiography revealed unusual thickening of a non-homogenous postero-lateral wall [Figure E-H], and intramyocardial hemorrhage was suspected. Cardiac MRI was performed. A T1-weighted non-fat suppressed image [Figure I] showed a hyper-intense lesion in the thickened postero-lateral wall, consistent with blood products versus fat infiltration [Figure J]. A T1-weighted fat-suppressed image demonstrated hyper-intensity in the same region, which narrowed the differential diagnosis to blood products only. A T2-weighted fat-suppressed image [Figure K] showed a

[A-C] Echo exam on admission. Posterior wall is thin and akinetic. [D] Coronary angiography showing occluded culprit left circumflex coronary artery.

[E-H] Echo exam the day after the angiography. Postero-lateral wall of the left ventricle is thickened and not homogenous



[I] T1-weighted non-fat-suppressed image showing hyper-intense lesion in the postero-lateral wall. [J] T1-weighted fat-suppressed image demonstrating hyper-intensity in the postero-lateral wall. [K] T2-weighted fat-suppressed image showing thickened postero-lateral wall with a high intensity signal and hypo-intense region in the central part. [L] T1 image 10 minutes after the injection of gadoterate meglumine showing delayed enhancement in the postero-lateral wall, consistent with the scar, and hypo-intense lesion in the central part characteristic of microvascular obstruction



thickened postero-lateral wall with a high intensity signal consistent with myocardial edema and hypo-intense region in the central part, diagnostic for intramyocardial hemorrhage. A T1-weighted image 10 minutes after the injection of gadoterate meglumine [Figure L] detected delayed enhancement in the postero-lateral wall, diagnostic of a scar. The central part of the scar constituted a hypo-intense lesion – a hallmark of microvascular obstruction.

### COMMENT

Serial echocardiographic examination in acute myocardial infarction is a routine procedure in the evaluation of myocardial function, heart valves and mechanical complications. Yet, intramyocardial hemorrhage seen during echocardiographic examination has never been reported in the literature. A gold standard for the diagnosis of intramyocardial hemorrhage is MRI. In our patient, unusual thickening of the myocardial wall that developed the day after the reperfusion was highly suspicious of the intramyocardial hemorrhage.

On T1-weighted images, myocardial hemorrhage resembles a hyper-intense lesion [3], as in our case. On T2-weighted images it looks like a hypo-intense inclusion in the hyper-intense area of myocardial edema [1,4], which we observed in our patient. In our case microvascular obstruction was diagnosed 10 minutes after injection of gadoterate meglumine. According to the literature microvascular obstruction strongly interrelates with intramyocardial hemorrhage and both can represent the same pathology in different imaging sequences [5].

In conclusion, in this young patient with premature coronary artery disease, MRI confirmed the echocardiographic suspicion of the intramyocardial hemorrhage and edema. Intramyocardial hemorrhage was believed to result from reperfusion injury. It may be suspected on serial echo examinations performed before and after PCI. The diagnostic feature is significant thickening of the infarct region after PCI with non-homogenous appearance of the involved myocardium. MRI is the gold standard for the diagnosis.

**“We now know that memories are not fixed or frozen, like Proust’s jars of preserves in a larder, but are transformed, disassembled, reassembled, and recategorized with every act of recollection”**

Oliver Sacks (born 1933), British neurologist, writer and amateur chemist. Currently professor of Neurology at New York University School of Medicine, he was previously professor of neurology and psychiatry at Columbia University, where he also held the position of “Columbia Artist.” Before that, he spent many years on the clinical faculty of Yeshiva University’s Albert Einstein College of Medicine. Sacks is the author of numerous best-selling books, including several collections case studies of people with neurological disorders. His 1973 book *Awakenings*, an autobiographical account of his efforts to help victims of encephalitis lethargica regain proper neurological function, was adapted into the Academy Award-nominated film of the same name in 1990 starring Robin Williams and Robert De Niro

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### References

- Asanuma T, Tanabe K, Ochiai K, et al. Relationship between progressive microvascular damage and intramyocardial hemorrhage in patients with reperfused anterior myocardial infarction. *Circulation* 1997; 96: 448-53.
- Edris A, Patel PM, Krishnam MS. Intramyocardial hemorrhage after percutaneous coronary intervention. *Echocardiography* 2012; 29: E50-1.
- Pedersen SF, Thrysøe SA, Robich MP, et al. Assessment of intramyocardial hemorrhage by T1-weighted cardiovascular magnetic resonance in reperfused acute myocardial infarction. *J Cardiovasc Magn Reson* 2012; 14: 59.
- Robbers LFHJ, Eerenberg ES, Teunissen PFA, et al. Magnetic resonance imaging-defined areas of microvascular obstruction after acute myocardial infarction represent microvascular destruction and haemorrhage. *Eur Heart J* 2013; 34 (30): 2346-53.
- Husser O, Monmeneu JV, Sanchis J, et al. Cardiovascular magnetic resonance-derived intramyocardial hemorrhage after STEMI: Influence on long-term prognosis, adverse left ventricular remodeling and relationship with microvascular obstruction. *Int J Cardiol* 2013; 167 (5): 2047-54.