

Case report: Recovery after large intramyocardial dissecting haematoma of the ventricular septum—a rare complication of myocardial infarction

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Background

Intramyocardial dissecting haematoma is a rare and potentially life-threatening complication of myocardial infarction (MI). Only a few isolated cases have been reported so far.

Case summary

We report the case of a patient with a large, obstructing intramyocardial haematoma of the ventricular septum following MI due to plaque rupture of the right coronary artery (RCA) and following successful coronary intervention. The clinically inapparent haematoma was discovered during routine echocardiography and confirmed by both computed tomography (CT) and magnetic resonance imaging (MRI). With non-surgical treatment, the patient remained clinically stable. Repeated echocardiography showed gradual regression of the haematoma. Follow-up echocardiography 3 months after the initial diagnosis demonstrated no evidence of septal haematoma.

Discussion

This report suggests that even large intramyocardial haematoma may recede without operative intervention. Echocardiography, CT, and MRI are all helpful in quantifying the size of the haematoma. The appropriate management should be patient-oriented, depending on clinical stability and progression of the haematoma. Conservative treatment in clinically stable patients suffering from septal haematoma following MI and coronary intervention can be a feasible option.

Keywords

Case report • Intramyocardial dissecting haematoma • Haematoma of ventricular septum • Spontaneous remission

Learning Points:

- Intramyocardial haematoma is a rare and potentially life-threatening complication of myocardial infarction, usually caused by a haemorrhagic dissection of the myocardium.
- In haemodynamically stable patients, conservative therapy may be a possible treatment strategy.
- In addition to close monitoring echocardiographic examinations, other imaging techniques, such as computed tomography or magnetic resonance imaging, may be helpful in quantifying the haematoma.

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Introduction

Intramycardial haematoma is a rare complication of myocardial infarction (MI).^{1,2} It is usually caused by a haemorrhagic dissection of the myocardium.^{3,4} Hypothesized pathomechanisms are rupture of intramycardial vessels into the interstitial area, reduced tensile strength of the infarcted area or an acute increase in coronary perfusion pressure.^{5,6} An intramycardial haematoma can occur in every part of the heart, i.e., in the left ventricular (LV) free wall, the LV septal wall or in the right ventricular free wall.⁷

We report on a patient with a large intramycardial haematoma of the ventricular septum obstructing the right ventricular cavity.

Timeline

Time	Event
25 June 2019	Patient presented to a secondary care hospital with persistent left-sided chest pain during exercise with mild dyspnoea.
25 June 2019	The patient was diagnosed with a myocardial infarction.
26 June 2019	Coronary intervention with a drug-eluting stent implantation into the proximal and mid-RCA was performed. The initial post-procedural echocardiogram demonstrated normal findings.
27 June 2019	Transthoracic echocardiography (TTE) showed an unidentified right ventricular (RV) mass occluding the RV cavity. Computed tomography demonstrated a widening of the ventricular septum to 40 mm.
27 June 2019	Imaging showed an intramycardial haematoma of the ventricular septum.
28 June 2019	Magnetic resonance imaging confirmed the finding. Patient was transferred to our cardiac surgery department.
29 June to 8 July 2019	Repeated echocardiography every 2 days showed a spontaneous gradual regression of the haematoma.
03 July 2019	Patient developed a single short episode of atrial fibrillation (electrically converted to sinus rhythm).
8 July 2019	The patient was discharged.
16 October 2019	TTE done at 3-month follow-up revealed an almost complete regression of the septal haematoma.

Case presentation

A 77-year-old male patient presented to a secondary care hospital with persistent left-sided chest pain during exercise for one week with mild dyspnoea. His past medical history included coronary artery disease with previous coronary artery bypass

surgery in 2009, chronic obstructive pulmonary disease on inhaled steroid therapy, dyslipidaemia, and arterial hypertension. The clinical examination showed no abnormality on respiratory examination, normal heart sounds, and normal abdominal findings. The initial electrocardiogram (ECG) showed sinus rhythm, a heart rate of 79 b.p.m. with a right bundle branch block as well as isolated ventricular extrasystoles (Figure 1). The initial echocardiography showed a mildly reduced LV systolic function with moderate tricuspid valve insufficiency. Coronary angiography was organized because of typical chest pain and elevated cardiac biomarkers on Day 1, including troponin I at a level of 22 114 pg/mL (normal < 57 pg/mL), CK at a level of 707 U/L (normal < 190 U/L) and CK-MB at a level of 44 ng/mL (normal < 3.6 ng/mL). The patient was diagnosed with a NSTEMI. Coronary intervention with drug-eluting stent implantation (Coroflex® ISAR NEO) into the proximal and mid-right coronary artery (RCA) was performed. An ostial stenosis of the left anterior descending artery (LAD) and a 50% stenosis of the proximal left circumflex artery was left untreated. The venous bypass on the RCA showed a stenosis of the proximal anastomosis, the arterial bypass (left internal mammary artery on LAD) was patent and functional. The patient was loaded on dual anti-platelets with 500 mg aspirin and 600 mg clopidogrel following coronary angioplasty. The post-procedural echocardiogram demonstrated normal findings.

The following day transthoracic echocardiography (TTE) showed an unidentified right ventricular (RV) mass occluding the RV cavity. Main differential diagnoses were an intraventricular thrombus or an overlooked myocardial tumour mass like sarcoma or metastasis. Computed tomography confirmed the finding (Figure 2) and demonstrated a widening of the ventricular septum to 40 mm. Intramycardial haematoma was suspected and confirmed by magnetic resonance imaging (Figure 3).

Due to the large, interventricular haematoma, the patient was transferred to our cardiac surgery department because a substantial risk of developing a ventricular septal defect.

Upon admission to our cardiac surgery intermediate care unit, the patient was clinically stable and asymptomatic. His blood pressure was 90/60 mmHg with a heart rate of 77 beats per minute and oxygen saturation of 91% on room air without added breath sounds on auscultation. In a repeat TTE as performed 2 days later, the intramycardial haematoma was unchanged (Figure 4 and Videos 1 and 2). CK and troponin I levels peaked on Day 1 and then gradually declined with final CK at a level of 93 U/L and final troponin I below 57 pg/mL on Day 7.

Patient developed atrial fibrillation with a ventricular rate of 110–120 b.p.m. without haemodynamic instability during cardiac monitoring, which lasted for more than 24 h. This was electrically converted to sinus rhythm after a guideline-based exclusion of an intra-atrial thrombus by transoesophageal echocardiography. The decision to perform an electrical cardioversion followed an institutional policy. On Day 11 after the initial diagnosis, a slight decrease of the haematoma and the septal thickness (37 mm) was noted in the four-chamber view of the TTE (Figure 4). The patient was discharged.

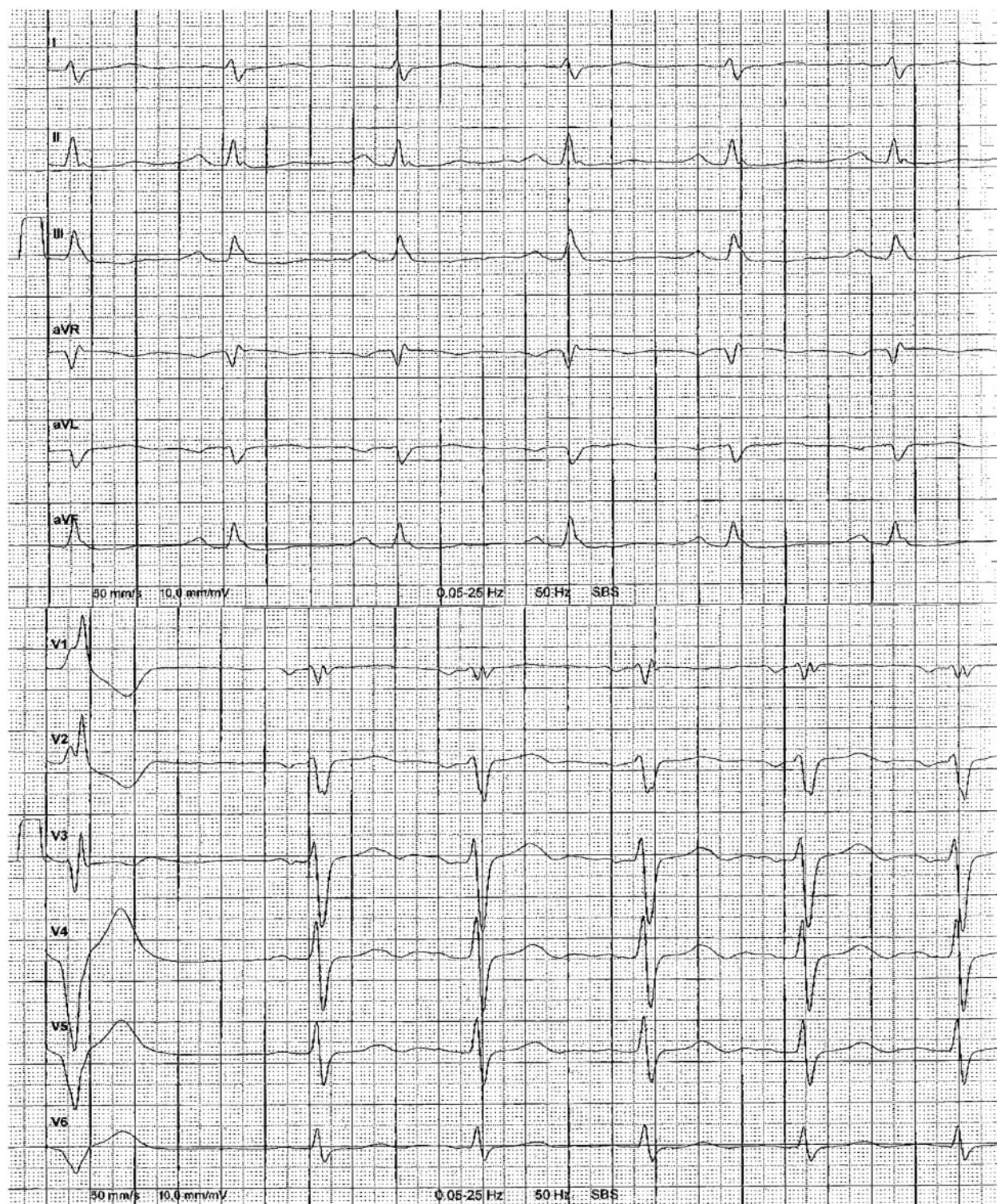


Figure 1 Initial electrocardiogram: sinus rhythm, a heart rate of 79 beats/min with a right bundle branch block as well as isolated ventricular extrasystoles.

Transthoracic echocardiography done after 3-month follow-up revealed an almost complete regression of the haematoma (*Figure 4, Video 3 and Supplementary material online, Video S1*). The patient had remained symptom-free.

Discussion

Due to the scarcity of an intramyocardial haematoma, there are no exact estimates of incidence and prevalence, i.e., experience with this disease is limited to only a few cases.^{1,8} Most commonly, it is described following MI or cardiac catheterization.^{2,9,10} Intramyocardial haematoma after PCI oftentimes occurs after complicated retrograde percutaneous interventions of chronically occluded coronary arteries.⁹ In the presented case, we believe the

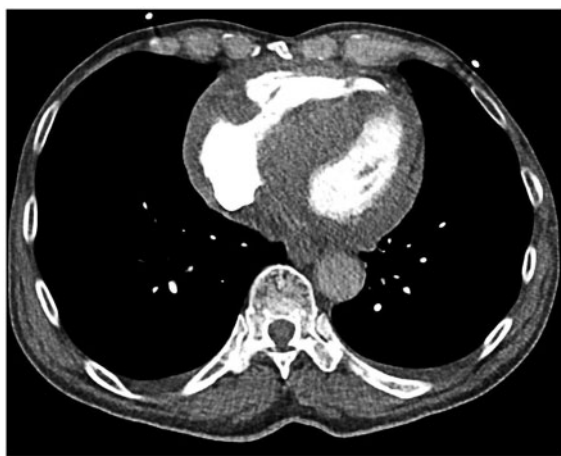


Figure 2 Computed tomography scan in transverse section: massive narrowing of the right ventricle by a septal haematoma.

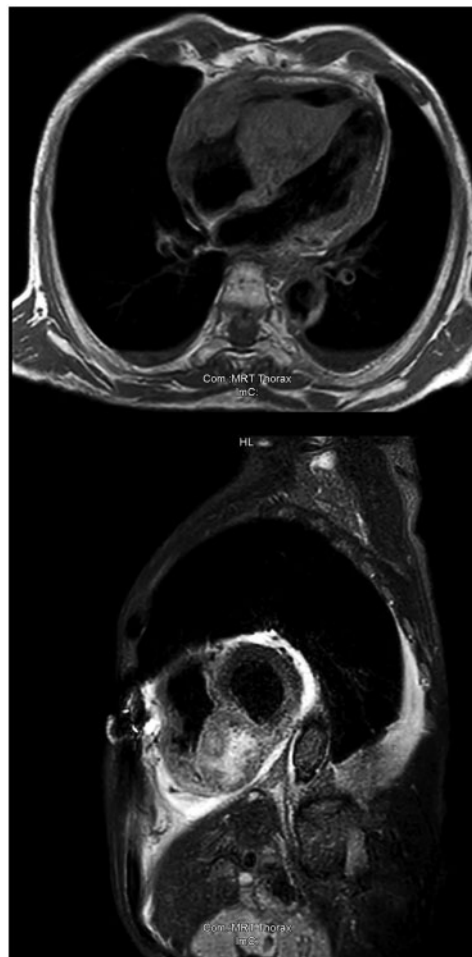


Figure 3 Magnetic resonance imaging scan in transverse section above and in sagittal section below: septal haematoma.

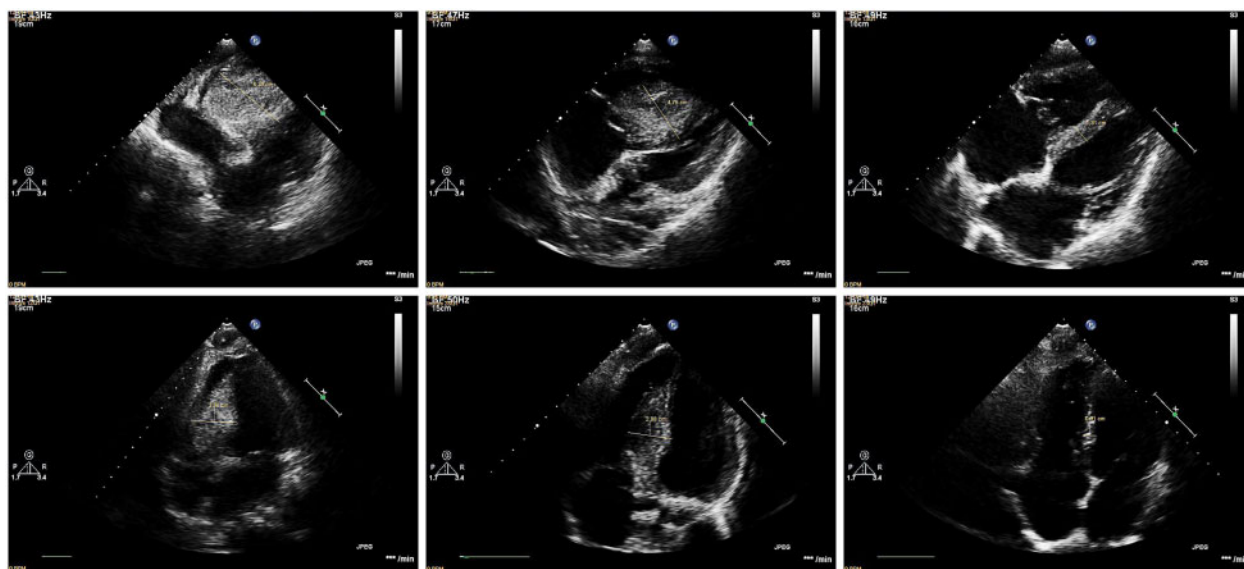
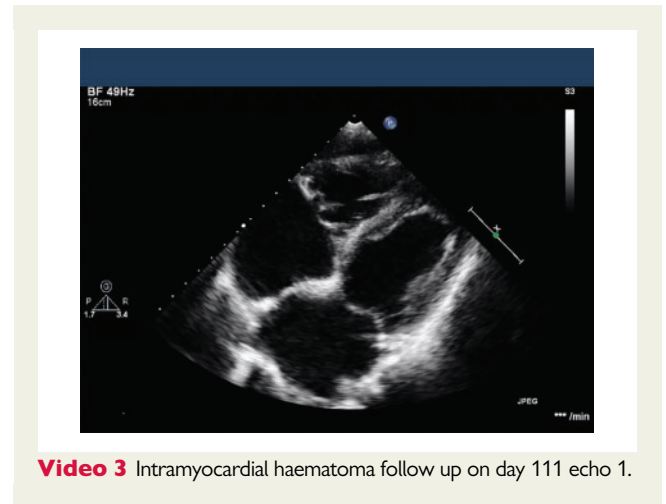


Figure 4 Transthoracic echocardiography controls on Days 4, 11, and 111 after initial diagnosis (from left to right: 1st column after 4 days, 2nd column after 11 days, and 3rd column after 111 days); significant decrease in septal haematoma.

septal haematoma occurred as a consequence of uncomplicated antegrade PCI of the RCA or ongoing MI.

Differentiating ventricular thrombus, intramyocardial haematoma or tumours with echocardiography may be challenging. Alternative imaging modalities may help to identify the underlying pathology. Cardiac magnetic resonance imaging or cardiac CT may be useful in this regard.¹¹ TTE however remains the examination of choice to diagnose and monitor haemodynamically unstable patients with such condition.¹

An optimal therapeutic approach for intramyocardial haematoma has not been defined to date. A surgical correction of a myocardial haematoma entails a true open heart surgery with the absolute necessity of cardiopulmonary bypass. The haematoma is oftentimes not removable, since it is distributed into the septal myocardium. A surgical removal of the haematoma is highly associated with a septal patch correction and a consecutive loss of functional myocardium. Therefore, a surgical correction should be the last option in case of mechanical complications (e.g. ventricular septum defect etc.). The appropriate management must always be based on individual factors such as haemodynamic stability, general condition, and extent of the intramyocardial haematoma. In some cases with rapid progression,



Video 3 Intramyocardial haematoma follow up on day 111 echo 1.

cardiac surgery is essential and good results have been reported.^{11,12} Conservative therapy is an option for haemodynamically stable patients. Intramyocardial haematomas may resolve spontaneously if left untouched.^{3,11}

Conclusion

In haemodynamically stable patients, conservative therapy may be a possible treatment strategy. The regression of an intramyocardial haematoma is a matter of weeks and requires close clinical monitoring.

Lead author biography



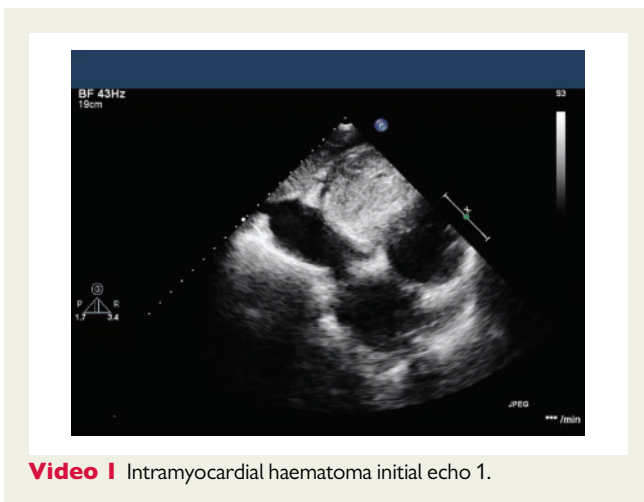
Dr. med. univ. David Lovasz is a second-year resident in heart surgery in Bavaria (Germany) at the renowned University Medical Center Regensburg in the Department of Cardiothoracic Surgery. He is interested in the field of malformations of the heart muscles. He studied and graduated at the Medical University of Innsbruck (Austria) and then trained at various hospitals in Austria and Germany.

Supplementary material

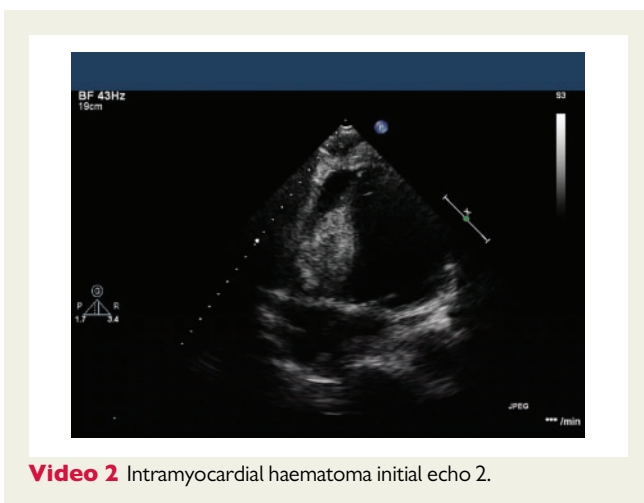
[Supplementary material](#) is available at *European Heart Journal - Case Reports* online.

Slide sets: A fully edited slide set detailing these cases and suitable for local presentation is available online as [Supplementary data](#).

Consent: The authors confirm that written consent for submission and publication of this case report including images, videos, and



Video 1 Intramyocardial haematoma initial echo 1.



Video 2 Intramyocardial haematoma initial echo 2.

associated text has been obtained from the patient in line with COPE guidance.

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