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# Simultaneous Acute Pulmonary Embolism and Isolated Septal Myocardial Infarction in a Young Patient

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## ABSTRACT

We report the case of a young patient with a simultaneous isolated septal myocardial infarction (MI) and pulmonary embolism (PE).
The aim was to describe a rare clinical entity and to explain why these two pathologies were present at the same time in a young patient. A review of literature was performed. An interventional cardiologist, an interventional radiologist and a lung specialist were consulted.
The diagnostic workup revealed only heterozygous Factor Leiden V mutation. This presentation was probably fortuitous, but worth reporting in our opinion.

## LEARNING POINTS

- To our knowledge, the simultaneous presentation of an isolated septal MI and PE in a young patient has never been reported.
- Isolated septal MI should be considered in the presence of right bundle branch block (RBBB) at sub-occlusion of a large septal branch. The final diagnosis can optimally be confirmed by cardiac magnetic resonance (CMR).
- An increasing number of asymptomatic PE are being detected due to advances in computed tomography (CT) scanning. This is important because, if left untreated, incidental PE may be associated with higher recurrence rate and mortality.

## KEYWORDS

Pulmonary embolism, incidental, isolated septal myocardial infarction, myocardial infarction in the young

## INTRODUCTION

While the overall incidence of myocardial infarction has been decreasing since 2000[1], there is an increasing number of younger patients presenting with MI[2]. Few studies have focused on MI in very young patients, as they still only account of a minority[3]. New imaging techniques, such as CMR and CT, are increasingly performed and enable further refinement of the diagnosis of MI. These techniques allow, in particular, precise location and quantification of MI.
Establishing diagnosis of PE remains a challenge, since signs and symptoms may be non-specific. Because of the widespread use of CT and its improved visualization of pulmonary arteries, PE may be discovered incidentally[4].
We report the case of a 35-year-old man with isolated septal MI and simultaneous PE. The diagnosis of this rare clinical entity was only possible by means of new imaging techniques.

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## CASE PRESENTATION

A 35-year-old man presented to the emergency department with typical retrosternal chest pain. Cardiovascular risk factors included smoking and class II obesity. Electrocardiography (ECG) demonstrated evolution from a normal to the development of a new RBBB. Troponins T was elevated at 1.93 ng/mL. Coronary angiography revealed a non-significant lesion of the left anterior descending artery (LAD), suggesting plaque rupture (*Fig. 1*). Coronary CT angiography scheduled to characterize the plaque at the level of LAD confirmed this diagnosis, and revealed multiple segmental acute PE of left segments 6, 9 and 10 (*Fig. 2*). Echocardiography revealed maintained left ventricular ejection fraction, with localized septal akinesia. It also revealed a moderate patent foramen ovale at valsalva maneuver. Finally, CMR confirmed the diagnosis of isolated septal MI (*Fig. 3*). Total creatine kinase rose to a level of 663 U/L and further investigations demonstrated a heterozygous Factor V Leiden mutation. A conservative strategy was chosen. Because of the diagnosis of PE, oral anticoagulation with warfarin was started. At present, three years after the initial presentation, the patient is asymptomatic.

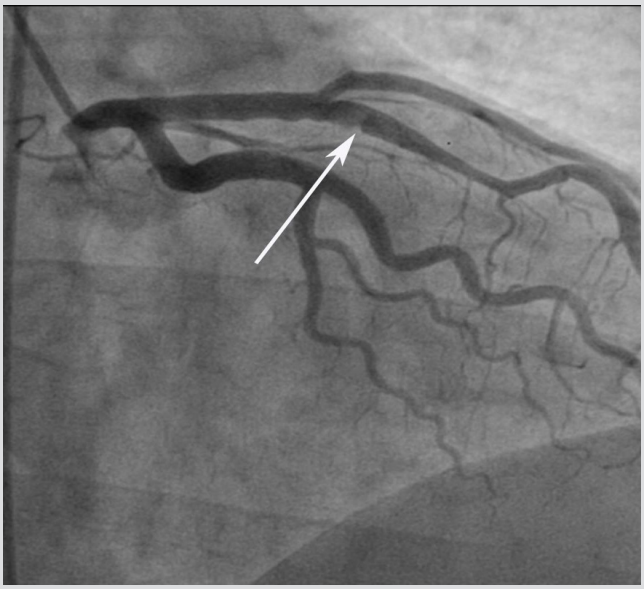

*Figure 1. Selective left coronary angiography demonstrating (arrow) sight of the plaque rupture at the level of the mid-LAD and absence of the septal branch.*

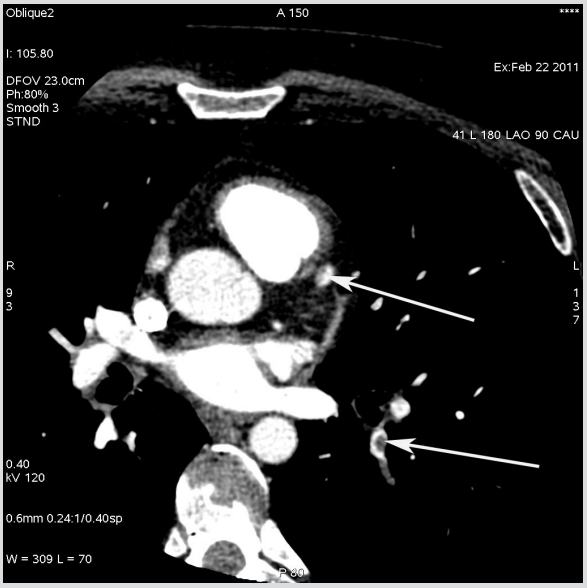


*Figure 2. Enhanced cardiac CT that demonstrates homogenous non-calcified plaque in proximal LAD (upper arrow) and segmental PE (lower arrow).*

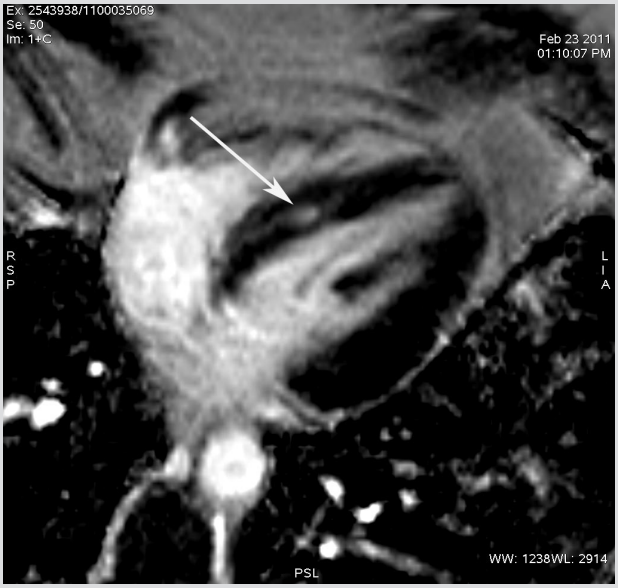


*Figure 3. Late enhancement sequence after gadolinium injection in four-chamber view, showing a focal mid-mural enhancement in the anterior septum (arrow), highly suggestive of MI in the territory of the first septal branch.*

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## DISCUSSION

To our knowledge, this is the first description of isolated septal MI with simultaneous PE in a young patient.

On admission the diagnosis of acute coronary syndrome was evident, based on the clinical presentation, rise in biomarkers and ECG changes. The appearance of a new RBBB on ECG, together with the angiographic findings, suggested the presence of an isolated septal MI, which was confirmed by CMR. Limited plaque rupture at the level of the mid-LAD occluded accidentally the septal branch, causing septal MI. MI in the young has been poorly described, with young patients aged 35 years or less representing less than 1% of all patients with MI[3].

Acute PE was incidentally discovered on chest CT intended for further evaluation of the lesion of the LAD. An increasing number of asymptomatic PEs are being detected through CT scanning. According to a recent meta-analysis, the prevalence of incidental PE is 2.6% [4]. If left untreated, it may be associated with higher recurrence rate and mortality. The main risk factors for incidental PE are advanced age, recent surgery and the presence of cancer, all of which were absent in our case.

The association of PE and isolated septal MI in young patients has never been reported. Multiple and/or simultaneous disease presentation is rare in young patients. Nevertheless, PE and MI share common risk factors, such as smoking and obesity, which the patient presented. However, after extended investigations, including deep vein thrombosis assessment and exclusion of central venous catheter placement, no explanation was found. Despite the presence of a moderate foramen ovale on echocardiography, paradoxical embolism was considered very unlikely. Research of thrombophilia only revealed heterozygous Factor V Leiden mutation, which significantly increases the risk of venous thromboembolism by a 9.45-fold[5].

With the increasing incidence of MI in the young and the rapidly improving performances of imaging techniques for the diagnosis of asymptomatic PE, such cases are likely to become more frequently identified in the future. Potential loss of life-years are more dramatic in these very young patients, thus retrosternal chest pain should be more carefully studied in this population.

## CONCLUSION

In conclusion, this is a unique case of isolated septal MI presenting simultaneously with PE in a young patient. This presentation was probably fortuitous, but worth reporting to our opinion.

Isolated septal MI should be considered in the presence of RBBB at sub-occlusion of a large septal branch. The final diagnosis can optimally be confirmed by CMR.

An increasing number of asymptomatic PEs are being detected due to the advances in CT scanning. This is important because, if left untreated, incidental PE may be associated with higher recurrence rate and mortality.

Ultimately, this case report suggests the need to set up a pilot study to systematically screen young patients presenting with MI for PE.

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