

with early TIMI grade-0 flow, right femoral venous access, cannulation (figure 2C), and PiCSO balloon catheter implantation in the coronary sinus were used (figure 2D) with a 21 min therapy time, and PiCSO doses of 824 mmHg (values > 800 mmHg are advised since they are associated with a reduced infarction size in former studies)⁴ (figure 2E). The first electrocardiogram revealed a left ventricular ejection fraction (LVEF) of 30% with peak troponin levels of 197 419 ng/L. The patient was discharged without any signs of angina or heart failure and a LVEF of 35% to 40% at 7 days.

The second case was a 67-year-old man, active smoker, who had sustained a cardiac arrest due to ventricular fibrillation with recovered circulation 25 min after starting cardiopulmonary resuscitation. The electrocardiogram confirmed the presence of anterior ST-segment elevation of 20 mm in V1-V4, and the coronary angiography the presence of acute thrombotic occlusion in the middle segment of the left anterior descending coronary artery (TIMI grade-0 flow). Thrombus aspiration and drug-eluting stent implantation led to TIMI grade-3 flow (total ischemia time, 120 min). Since this was also a high-risk anterior STEMI, it was decided to implant the PiCSO system in the coronary sinus via right femoral vein with a 20 min therapy time and a PiCSO dose of 830 mmHg. The first electrocardiogram showed a LVEF of 35% and peak troponin levels of 63 141 ng/L. The patient neurological and cardiologic progression was good. The patient's LVEF was 55% 10 days after the infarction.

The PiCSO system is a safe and easy to implement tool in the management of STEMI. However, PiCSO will have to demonstrate its efficacy in ongoing randomized trials.

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AUTHORS' CONTRIBUTIONS

S. Brugaletta, and P. Vidal-Calés participated in the manuscript idea, design, and data analysis. O Abdul-Jawad Altisent, F. Spione, V. Arévalos, and M. Sabaté reviewed and edited the manuscript.

CONFLICTS OF INTEREST

None reported.

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REFERENCES

1. Ibanez B, James S, Agewall S, et al. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC). *Eur Heart J*. 2018;39:119-177.
2. Stone GW, Selker HP, Thiele H, et al. Relationship Between Infarct Size and Outcomes Following Primary PCI: Patient-Level Analysis From 10 Randomized Trials. *J Am Coll Cardiol*. 2016;67:1674-1683.
3. Vidal-Calés P, Cepas-Guillén PL, Brugaletta S, Sabaté M. New Interventional Therapies beyond stenting to Treat ST-Segment Elevation Acute Myocardial Infarction. *J Cardiovascular Dev Dis*. 2021;8:100.
4. De Maria GL, Alkhalil M, Borlotti A, et al. Index of microcirculatory resistance-guided therapy with pressure-controlled intermittent coronary sinus occlusion improves coronary microvascular function and reduces infarct size in patients with ST-elevation myocardial infarction: the Oxford Acute Myocardial Infarction - Pressure-controlled Intermittent Coronary Sinus Occlusion study (OxAMI-PiCSO study). *EuroIntervention*. 2018;14:e352-e359.

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Coronary thrombus after cannabis consumption: the important role of intracoronary imaging modalities

Trombo coronario tras consumo de cannabis: la importancia de la imagen intracoronaria

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To the Editor,

Acute myocardial injury in young adults may be a challenging finding. Although coronary artery disease associated with traditional cardiovascular risk factors is possible, other etiologies like the use of recreational drugs, myocarditis, coronary embolism, spontaneous coronary artery dissection or coronary vasospasm should be considered as well.¹ Intracoronary imaging modalities provide diagnostic information added to invasive coronary

angiography on coronary lesion features, and are useful to guide percutaneous coronary interventions.²

This is the case of a 29-year-old male patient with a history of smoking. His family history included coronary artery disease, but not at a young age. The patient presented to the emergency room with signs of acute chest pain radiating down his left arm the morning following a night of heavy alcohol and cannabis consumption.

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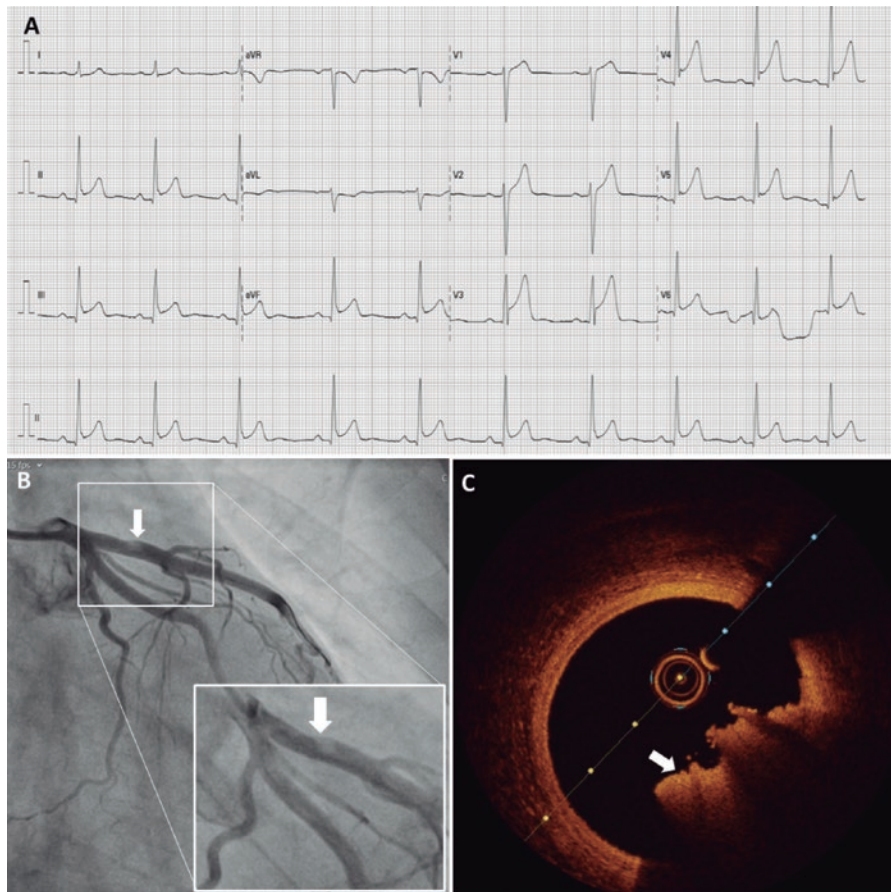


Figure 1. **A:** first 12-lead electrocardiogram. **B:** invasive coronary angiography of left main coronary artery with zoomed-in image of the filling defect. **C:** optical coherence tomography imaging of the same lesion showing a red thrombus.

The 12-lead electrocardiogram revealed sinus rhythm, heart rate of 60 beats per minute, and slight and diffuse ST-segment elevation (figure 1A). Blood biochemistry analysis revealed elevated troponin I levels (37.6 ng/mL; normal values < 0.045 ng/mL). The transthoracic echocardiogram revealed the presence of preserved left ventricular systolic function with normal heart wall motion kinetics, and no evidence of structural heart disease.

Although the early suspected diagnosis was myopericarditis, and the patient was already pain-free, he was referred for elective invasive coronary angiography—via right radial artery—24 hours after hospital admission. We first visualized a dominant right coronary artery with no significant disease. Afterwards, the left main coronary artery angiography showed no significant disease on either the left main or circumflex arteries, but a small filling defect in the proximal segment of the left anterior descending coronary artery causing no flow restriction (figure 1B). To better characterize the lesion, an intracoronary imaging modality—optical coherence tomography—was prescribed (video 1 of the supplementary data). In the corresponding area of the filling defect, we observed a red thrombus that prevented the evaluation of a possible underlying atherosclerotic plaque (figure 1C; minimum lumen area of 9.5 mm² (reference, 12.6 mm²).

After these findings, the diagnosis of acute coronary syndrome was assumed. Therefore, since no percutaneous coronary intervention was ever performed, the patient remained on triple antithrombotic therapy (acetylsalicylic acid, 100 mg; ticagrelor, 90 mg twice a day, and enoxaparin 1 mg/Kg twice a day). Reassessment with invasive coronary angiography was scheduled in a 7-day interval.

By the time of the second left main coronary artery angiography, no filling defect was seen on the proximal segment of the left anterior descending coronary artery (figure 2A). To confirm the improved status of the lesion, reassessment with optical coherence tomography was also performed (video 2 of the supplementary data). This time, we observed a fibroadipose atherosclerotic plaque with no signs of instability with some reminiscent thrombus on the surface of the plaque (figure 2B). The lesion mechanism was thought to be definite plaque erosion (according to the classification by Kolte et al.³). The patient was successfully discharged on dual antiplatelet therapy and behavioral restriction regarding drug consumption.

It has been established that cannabis exerts pathophysiological effects on the cardiovascular system.⁴ There is a growing number of case reports describing adverse cardiovascular events, specifically, cannabis-induced myocardial infarction. As this situation is most frequently reported in young individuals, it may go unnoticed and, consequently, untreated. Intracoronary imaging modalities play a key role in the definition of the mechanism behind coronary lesions—whether atherosclerotic or not—in patients with suspected acute coronary syndrome/myocardial infarction with non-obstructive coronary arteries.² Reassessment after some time of triple antithrombotic therapy may also contribute to clarify the mechanism as the artery lumen may be thrombus-free.

Informed consent and authorization to publish these figures and videos were obtained from the patient.

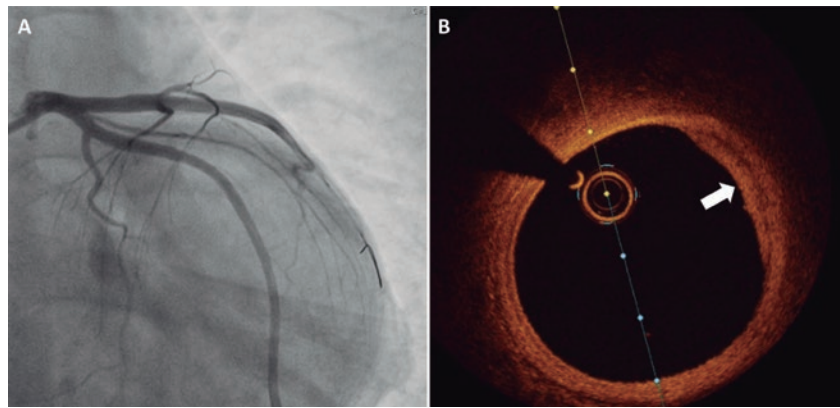


Figure 2. A: reassessment with invasive coronary angiography no longer showing the previous filling defect on the proximal segment of the left anterior descending coronary artery. B: optical coherence tomography of this region revealing a fibroadipose atherosclerotic plaque without signs of instability.

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AUTHORS' CONTRIBUTIONS

All authors contributed to the genesis of this manuscript, were involved and approved its submission.

CONFLICTS OF INTEREST

None reported.

SUPPLEMENTARY DATA



Supplementary data associated with this article can be found in the online version available at <https://doi.org/10.24875/RECICE.M22000356>.

REFERENCES

1. Gulati R, Behfar A, Narula J, et al. Acute Myocardial Infarction in Young Individuals. *Mayo Clin Proc.* 2020;95:136-156.
2. Aparisi Á, Cubero-Gallego H, Tizón-Marcos H. Intracoronary imaging: review and clinical use. *REC Interv Cardiol.* 2022;4:228-237.
3. Kolte D, Yonetsu T, Ye JC, et al. Optical Coherence Tomography of Plaque Erosion: JACC Focus Seminar Part 2/3. *J Am Coll Cardiol.* 2021;78:1266-1274.
4. Chetty K, Lavoie A, Deghani P. A Literature Review of Cannabis and Myocardial Infarction-What Clinicians May Not Be Aware Of. *CJC Open.* 2021;3:12-21.

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Role of drug-coated balloon in the management of very late stent thrombosis

Papel del balón fármacoactivo en el tratamiento de la trombosis muy tardía de stent

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To the Editor,

Very late stent thrombosis—the one occurring, at least, 1 year after stenting—is a rare complication of tremendous clinical relevance. The mechanisms underlying its physiopathology have been widely studied thanks to the use of intracoronary imaging modalities,

especially optical coherence tomography. The 2 main mechanisms of action found are, in the first place, neoatherosclerosis, and secondly, no strut endothelialization.¹ Despite of this, its approach is still under discussion and focused on resolution or minimization of the factors leading to its appearance.

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