

# Cocaine/amphetamine-induced accelerated atherosclerosis, coronary spasm and thrombosis, and refractory ventricular fibrillation

Corstiaan A. den Uil <sup>1,2\*</sup>, Jurgen M. R. Ligthart <sup>1</sup>, Loes Mandigers<sup>2</sup>, and Wijnand K. den Dekker<sup>1</sup>

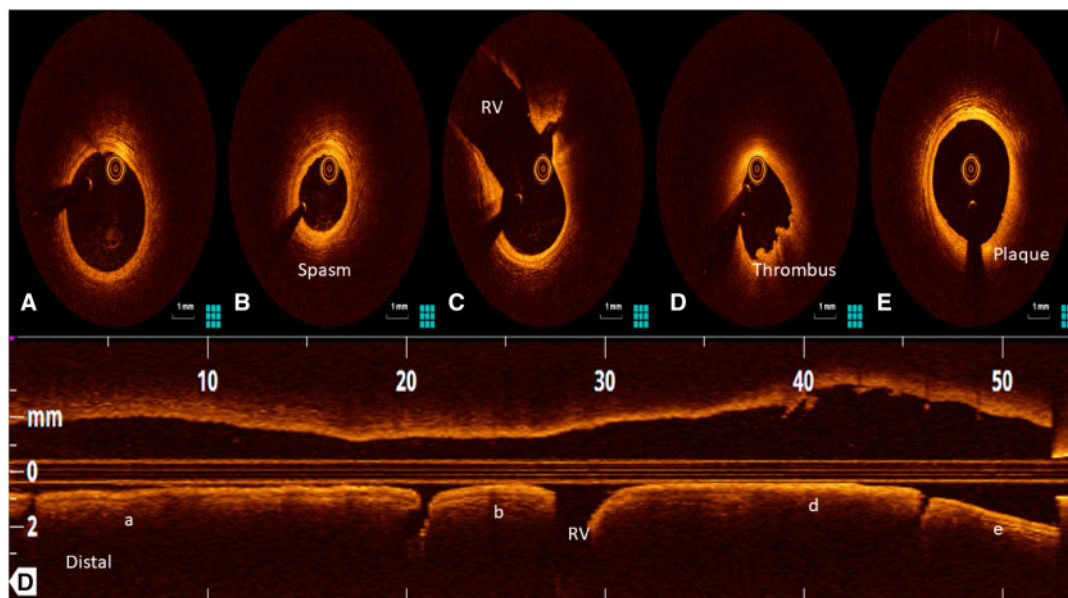
<sup>1</sup>Thoraxcenter, Department of Cardiology, Erasmus MC, University Medical Center, Room Rg-626, Dr Molewaterplein 40, 3015 GD Rotterdam, The Netherlands; and  
<sup>2</sup>Department of Intensive Care Medicine, Erasmus MC, University Medical Center, Rotterdam, The Netherlands

Received 16 July 2019; first decision 6 August 2019; accepted 5 September 2019; online publish-ahead-of-print 24 September 2019

## Case description

A 24-year-old obese man collapsed after a night out. No basic life support was performed, but paramedics arrived at  $T = 2$  min. The patient's

first recorded rhythm was ventricular fibrillation (VF). He was intubated and arrived at our emergency department in refractory VF at  $T = 34$  min. We proceeded with extracorporeal cardiopulmonary resuscitation. Femoral vein dilatation was hard and extracorporeal



**Figure 1** Right coronary angiography and optical coherence tomography at presentation. Immediately after rheolytic thrombectomy: focal spasm, residual red thrombus, and proximal plaque without rupture.

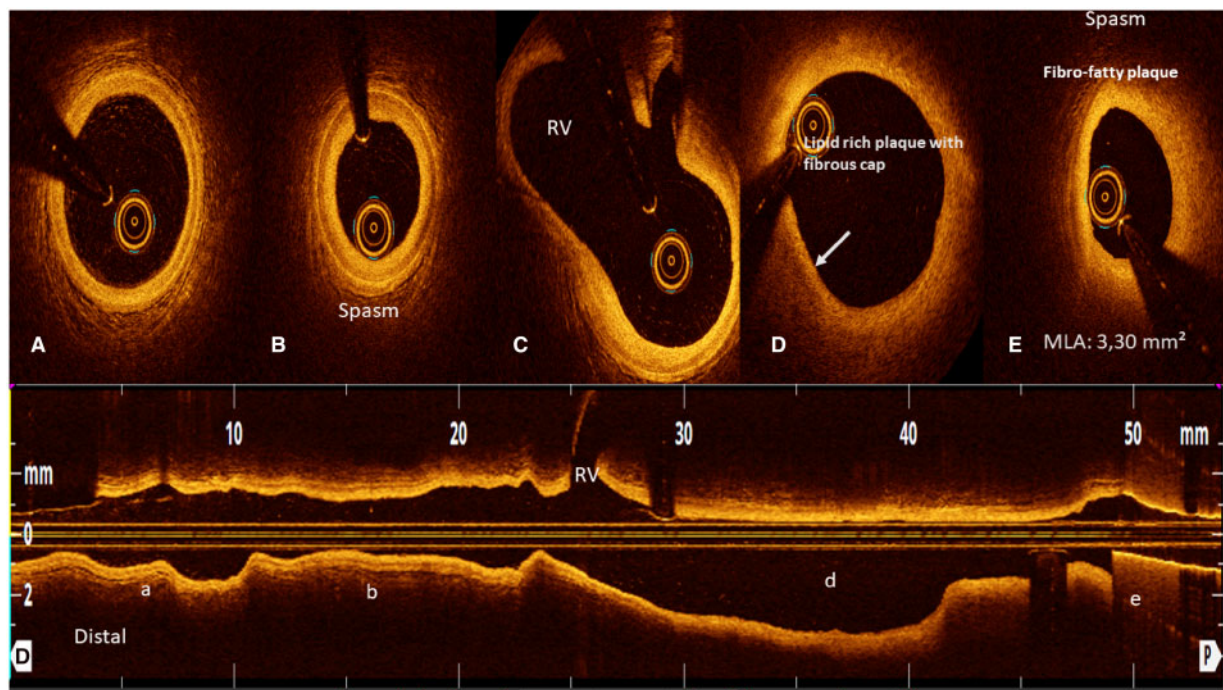
\* Corresponding author. Tel: +31 614673334, Email: c.denuil@erasmusmc.nl

Handling Editor: Georg Goliasch

Peer-reviewers: Dejan Milasinovic and Marco De Carlo

© The Author(s) 2019. Published by Oxford University Press on behalf of the European Society of Cardiology.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact [journals.permissions@oup.com](mailto:journals.permissions@oup.com)



**Figure 2** Right coronary angiography and optical coherence tomography after 6 weeks. Control: extensive plaque with spasm but again no evidence of (healed) plaque erosion or rupture.

membrane oxygenation (ECMO) was running at  $T = 79$  min. After return of spontaneous circulation, the electrocardiogram showed inferior ST-elevation myocardial infarction. Coronary angiography showed thrombosis of the proximal right coronary artery. Manual thrombectomy failed and rheolytic thrombectomy was applied after which coronary flow was restored. We performed optical coherence tomography (OCT) that revealed focal spasm, red thrombus, and proximal plaque without rupture (Figure 1, see Supplementary material online, slide set for angiograms and full OCT videos). Hence, no stent was implanted and the patient was transferred to the ICU. Screening for amphetamine and cocaine was positive, the cholesterol profile was normal. He was treated with aspirin, heparin, atorvastatin, and targeted temperature management. On Day 1, the ECMO was removed. The patient was extubated at Day 4, discharged after 4 weeks, and achieved full neurologic recovery after 6 weeks. He admitted to have regularly used amphetamine and cocaine. Repeat angiography and OCT showed extensive plaque with spasm but again no evidence of (healed) plaque erosion or rupture (Figure 2). A calcium antagonist was added to the therapy.

Substance abuse and sudden cardiac death are increasingly prevalent among young adults.<sup>1,2</sup> Extracorporeal cardiopulmonary resuscitation buys time to unravel the diagnosis and salvage the patient, where OCT may guide the therapy.<sup>3</sup> The pathophysiology in this patient was explained by cocaine/amphetamine-

induced accelerated atherosclerosis, coronary spasm and thrombosis, and VF.

## Supplementary material

Supplementary material is available at *European Heart Journal - Case Reports* online.

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

**Consent:** The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

**Conflict of interest:** none declared.

## References

- Carillo X, Curoso A, Muga R, Serra J, Sanvisens A, Bayes-Genis A. Acute coronary syndrome and cocaine use: 8-year prevalence and in-hospital outcomes. *Eur Heart J* 2011;**32**:1244–1250.
- Lucena J, Blanco M, Jurado C, Rico A, Salguero M, Vazquez R, Thiene G, Basso C. Cocaine-related sudden death: a prospective investigation in south-west Spain. *Eur Heart J* 2010;**31**:318–329.
- Jackson MWP, Williams PD. Cocaine-induced coronary vasospasm using optical coherence tomography imaging to guide management. *JACC Cardiovasc Interv* 2016; **9**:e27–e28.