IMAGE CHALLENGE

Typical chest pain and a special intravascular ultrasound image

CLINICAL INTRODUCTION

A man in his 60s with a medical history of hypertension and hyperlipidaemia presented with chest pain which had been present for 10 years and worse for 3 days. Pain often occurred at rest and early in the morning. Cardiac catheterisation was performed. During angiography, the patient experienced chest pain. Coronary angiography and intravascular ultrasound (IVUS) are shown in figure 1 before and after intracoronary injection of nitroglycerin. Fractional flow reserve was 0.75 after adenosine infusion and symptoms resolved with adenosine.

QUESTION

Which of the following is the most likely cause of chest pain?

A. Rupture of attenuated atherosclerotic plaque.
B. Refractory coronary vasospasm because of thickening of vascular media.
C. Circumferential coronary intramural haematoma associated with refractory coronary vasospasm.

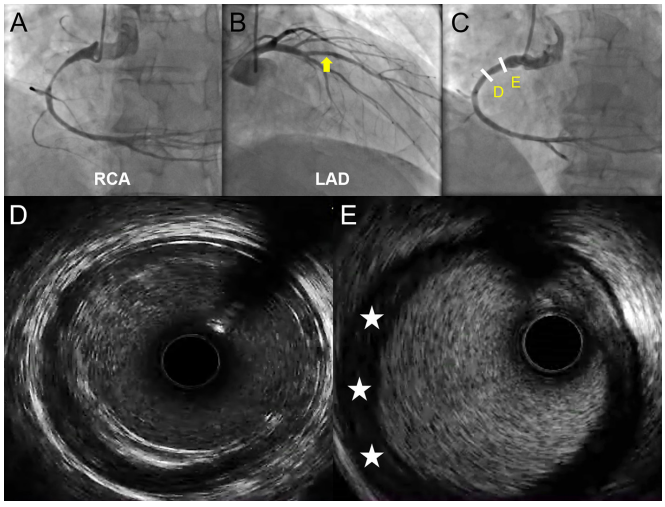

Figure 1 Angiography of the RCA (A) and LAD (B) before FFR, and angiography of RCA after FFR (C). Intravascular ultrasound of the RCA (D, E) image. Yellow arrow indicates the stent in the LAD. White stars indicate the circumferential intraluminal echo-attenuation area. FFR, fractional flow reserve; LAD, left anterior descending; RCA, right coronary artery.

D. No obstructive coronary artery disease with myocardial bridge.

For answer see page 572

Typical chest pain and a special intravascular ultrasound image

For question see page 510

ANSWER: C

DISCUSSION

All the above answers can cause chest pain. Attenuated plaques identified by IVUS featured with the localised absence of the ultrasound signal behind plaque,[1] which was not seen in this patient. Meanwhile, no release of the media thickening after luminal dilatation did not support the diagnosis of coronary vasospasm. Additionally, the presence of an echo-lucent half-moon sign was also not observed, which is the IVUS characteristic image of myocardial bridge.[2]

Spontaneous coronary intramural haematoma (IMH) is an infrequent cause of acute coronary syndrome.[3] Especially, coronary artery spasm is thought to be one of the causes of IMH.[4] In our case, there was no angiographic evidence of dissection, that is, contrast hang-up or luminal linear opacity.[5]

Interestingly, this is the first time to report a new IVUS image of IMH showed circumferential intraluminal echo-attenuation area with a clear border more than 1 mm and without intimal tear and atherosclerotic change in the culprit vessel. For further assessment, CT coronary angiogram (CTCA) was performed and showed the presence of IMH with sign of an intimal tear and concentric compression of the true lumen (figure 2A). The patient was treated medically using aspirin, amlodipine and high-dose statin as no flow limit. CTCA at 6 months after the index procedure found disappearance of the IMH (figure 2B), and the patient was in excellent clinical condition.

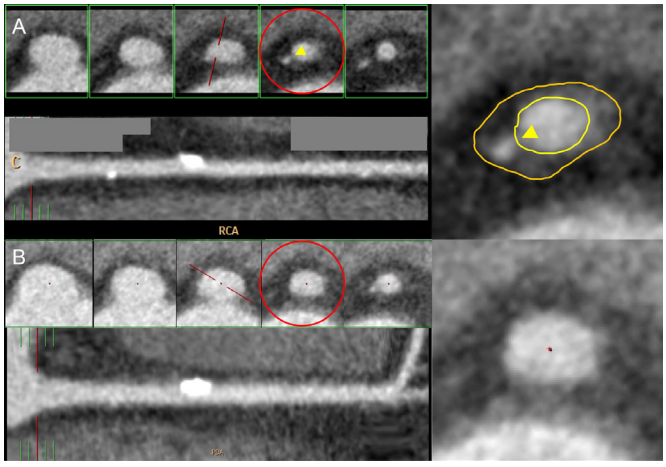

Figure 2 IMH delineated by CTCA (A) and repeated CTCA in 6 months after procedure (B). The low-attenuation area was covered and sealed by the intimal compartment. 'Yellow triangle' pointed to the intimal tear. CTCA, CT coronary angiogram; IMH, intramural haematoma; PDA, Posterior Descending Artery.

Yang Li, Haiwei Liu , Yaling Han

Department of Cardiology, General Hospital of Northern Theatre Command, Shenyang, Liaoning, China

Correspondence to Dr Haiwei Liu, Department of Cardiology, General Hospital of Northern Theatre Command, Shenyang, Liaoning 110016, China; ifoliuhw@sina.com

Contributors YL prepared the first draft. HL and YH reviewed and edited the final manuscript. All authors are responsible for the overall content.

Funding This study was funded by the Key R&D Program of Liaoning Province of China (2020JH 2/10300167).

Competing interests None declared.

Patient consent for publication Obtained.

Ethics approval This study involves human participants but an ethics committee or institutional board exempted this study. This is a clinical case not a study. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

To cite Li Y, Liu H, Han Y. *Heart* 2023;**109**:572.

Heart 2023;**109**:572. doi:10.1136/heartjnl-2022-321796

ORCID iD

Haiwei Liu http://orcid.org/0000-0001-6390-6991

REFERENCES

1 Wu X, Mintz GS, Xu K, *et al*. The relationship between attenuated plaque identified by intravascular ultrasound and no-reflow after stenting in acute myocardial infarction: the HORIZONS-AMI (Harmonizing outcomes with revascularization and stents in acute myocardial infarction) trial. *JACC Cardiovasc Interv* 2011;4:495–502.
2 Pargaonkar VS, Kimura T, Kameda R, *et al*. Invasive assessment of myocardial bridging in patients with angina and NO obstructive coronary artery disease. *EuroIntervention* 2021;16:1070–8.
3 Trivi M, Sciancalepore A, Burgos L. Coronary intramural hematoma visualized on multislice CT angiography. *Rev Esp Cardiol* 2018;71:487.
4 Kahata M, Otsuka M, Kataoka S, *et al*. Successful angioplasty with intravascular ultrasound and optical frequency domain imaging guidance for tandem intramural hematoma caused by coronary artery spasm. *J Cardiol Cases* 2017;16:199–201.
5 Jatti K, Maurovich-Horvat P, Hasleton J, *et al*. Cardiac Computed Tomography to Identify and Guide Therapy of Intramural Hemorrhage in High-Risk Coronary Anatomy. *JACC Case Rep* 2021;3:120–4..