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When the answer was already there

Quando a resposta já estava lá

Carla Maria Marques Pires Rodrigues[1iD], Jorge Marques[1iD], Carlos Galvão Braga[1iD]

[1] *Department of Cardiology, Hospital de Braga, Braga, Portugal.*

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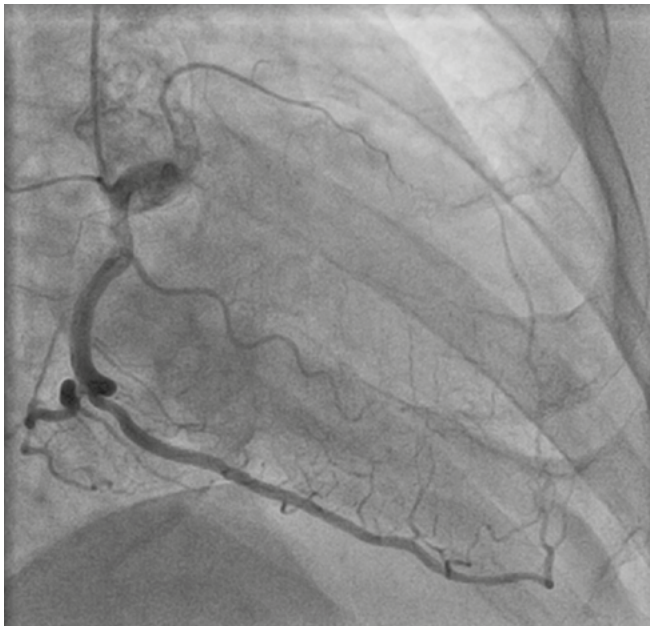

Figure 1. Coronary angiography revealed a long proximal chronic total occlusion of the left anterior descending artery (retrograde filling from ipsilateral and contralateral collaterals, Rentrop 3).

Video 1. Ellis type III perforation.

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Corresponding author:
Carla Marques Pires
Department of Cardiology,
Hospital de Braga
Sete Fontes-São Vitor
4710-243 – Braga, Portugal
E-mail: carlammpr@gmail.com

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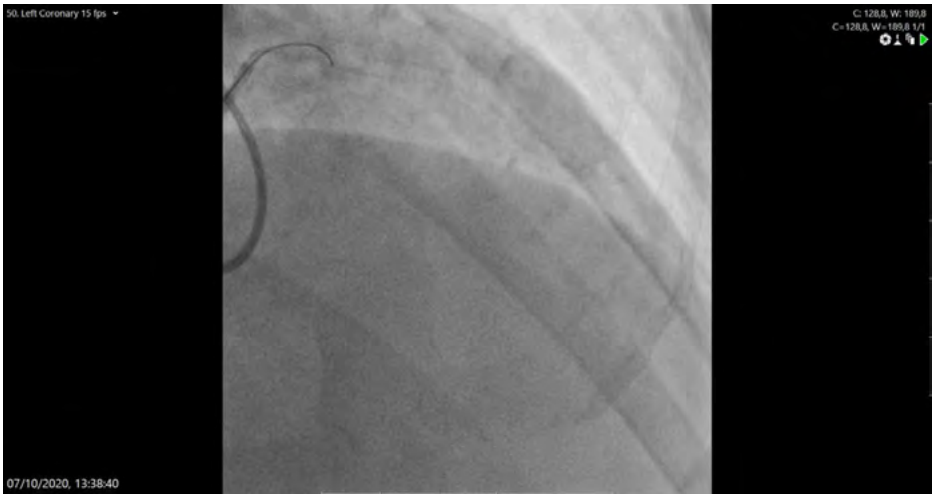

Video 2. Angiographic final result.

A 67-year-old man with several cardiovascular risk factors was referred to cardiology consultation, due to effort angina – Canadian Cardiology Society (CCS) class II/IV, for the last 6 months, under optimal medical treatment. Resting electrocardiogram and transthoracic echocardiogram (TTE) were normal. Stress treadmill test was positive. The coronary angiogram revealed a long proximal chronic total occlusion (CTO) of the left anterior descending artery (LAD; J-CTO=1, Rentrop3), a distal CTO of the left circumflex artery (J-CTO=0, Rentrop3) and a 50% stenosis in the posterolateral branch (SYNTAX score 21).

Considering symptoms, angiographic findings, and patient preference, a percutaneous coronary intervention (PCI) of LAD was planned, as priority, and performed using bi-radial access, contralateral injection, and anterograde wire escalation approach (Figure 1). Sion guidewire was advanced to distal LAD with the aid of FineCross® microcatheter. Two overlapping everolimus-eluting stents (2.5x48mm and 3x23mm) were deployed in proximal LAD, after adequately pre-dilatation. Immediately after post-dilatation with non-compliant balloon (3x23mm) at 22atm, the patient developed a severe Ellis type III perforation in the mid LAD (Video 1). The post-dilatation balloon was re-inflated at 8atm, at the site of perforation to stop bleeding. A bedside TTE was performed and revealed small circumferential pericardial effusion without hemodynamic impact.

Unfortunately, prolonged (10 minutes) balloon inflation failed to seal the coronary artery perforation (CAP) and a double guiding catheter ping-pong technique was used. For this reason, another guiding catheter was inserted from the contralateral radial access, and a second guidewire passed into distal LAD artery, after transient deflation of the first balloon. Then, a non-compliant balloon 3x12mm was advanced into mid LAD through the second guidewire, and was inflated at 8atm at site of perforation, after removing the first balloon. Finally, a 2.5x20mm polyurethane-covered stent was advanced, through the first guidewire, and successfully deployed at high atmospheres at the perforation site, after the second balloon was deflated and removed. The final angiographic result was excellent (Video 2).

During the procedure the patient complained of severe oppressive chest pain and became drowsy, however he remained hemodynamically and electrically stable. The patient was continuously monitored during 48 hours and remained asymptomatic and stable. Blood analyses revealed a slight elevation of troponin (peak of 0.3ng/mL). There were no ischemic changes on serial electrocardiograms. The follow-up TTE, 12 hours and 48 hours after the event, showed normal biventricular function and ruled out pericardial effusion. During one-year follow-up, the patient remains asymptomatic with normal serial TTE.

Coronary artery perforation remains a rare but feared and potentially devastating PCI complication. The reported incidence is 0.2% to 0.9% in relatively low risk PCI; however, in complex cases, the incidence could achieve up to 9%.[1] In previous studies the risk factors reported were female sex, advanced age, tortuous vessel, calcified lesions, PCI in coronary artery bypass graft, or CTO and use of cutting-balloons or rotational atherectomy.[2] According to Ellis classification, CAP are classified as type I (extraluminal crater without extravasation), type II (pericardial or myocardial blushing) and type III (perforation with at least 1mm diameter with contrast streaming or cavity spilling). Type I and II are usually caused by stiff guidewires, while type III are caused by intracoronary devices, balloon or stent mismatch, or occur in frail vessels with eccentric calcification or negative remodeling.[3] Type III CAPs have higher risk of cardiac tamponade and need prompt recognition and management, to avoid a catastrophic outcome. Nowadays, advances in PCI increased the opportunity to treat this complication and reduced the number of cardiac surgeries required.

This clinical case had a set of particularities that allowed a favorable outcome. Our patient had long CTO of proximal LAD and refractory angina. Considering CTO, bi-radial access is a well validated treatment, since it improves technical success and procedural safety, by elucidating the guidewire location during crossing attempts, and facilitating the management of periprocedural complications.[4] In this case the presence of bi-radial access allowed immediate application of double guiding catheter ping-pong technique, which has been associated with lower mortality and fewer number of urgent pericardiocentesis. In this technique two different guiding catheters are used into the same coronary artery, allowing simultaneous management of an angioplasty balloon and a covered stent. This reduces bleeding since the time without sealing is kept to minimum. Moreover, the authors also chose to advance the covered stent through the first guidewire, which was undoubtfully in the true lumen. In this way, they hoped to overcome the risk of placing the covered stent in a possible dissection or false lumen. Finally, in this case, prompt management of CAP was only possible due to performance of coronary angiogram before removing the balloon and guidewire, which should always be routinely performed. The present case illustrates the importance of using two-vessel access during treatment of chronic total occlusions, to facilitate the management of periprocedural complications.

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CONFLICTS OF INTEREST

The authors declare there are no conflicts of interest.

CONTRIBUTION OF AUTHORS

Conception and design of the study: CMMPR, JM and CGB; data collection: CMMPR, JM and CGB; data interpretation: CMMPR, JM and CGB; text writing: CMMPR, JM and CGB; approval of the final version to be published: CMMPR, JM and CGB.

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