CASE REPORT

Coronary artery dissection by an oversized balloon

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SUMMARY

Percutaneous coronary intervention (PCI) as a treatment of coronary artery disease can be a simple, rapid procedure with a clear benefit for the patient, but it could also become a complex procedure with fatal consequences. These complications depend on the lesion itself, material used and also on operating staff. In this case we report a coronary artery dissection of the circumflex (CX) artery caused by inflation of an oversized balloon. We discuss here the management and evolution of this complication.

BACKGROUND

The aim of this case is to point out the human error in percutaneous coronary intervention and the way to handle these complications.

CASE PRESENTATION

A 61-year-old man, a smoker with a history of arterial hypertension and preterminal chronic renal insufficiency, was admitted to our intensive care unit (ICU) for persistent chest pain.

The ECG showed ST segment elevation in the inferior and posterior leads with reciprocal changes in the lateral and anterior leads (figure 1A, B).

Urgent coronary angiography showed a subocclusion of the bifurcation of the circumflex (CX) and the first obtuse marginal (MG) arteries (1.1.1 of the Medina classification; video 1A, B).

Two guide wires were introduced in the distal segments of the CX and the MG arteries, respectively. Our strategy was to predilate the CX artery with a 15 mm×2.5 mm non-compliant balloon in order to complete the coronary angioplasty with a final stenting.

Unfortunately, because of a misunderstanding, a non-compliant balloon (QUANTUM APEX MR) 15 mm×5.00 mm was inflated at 10 atm pressure at the lesion's level and was rapidly withdrawn (inflation time 10 s). The coronary angiography showed a double antegrade and a retrograde (type C) dissection of the CX artery with a total occlusion of the distal segment and TIMI (thrombolysis in myocardial infarction) 0 flux (video 2A–C).

After this complication, our concern was how to restore normal coronary flow without destabilising the fragile dissected middle segment, so we decided to stent the proximal segment with a drug-eluting stent (Xience Xpedition 3.5×38 mm Abbot) inflated to 12 atm in 50 s. Another drug-eluting stent (Xience Prime 2.25×18 mm) was also inflated in the distal segment (12 atms in 50 s; video 3A–H).

The result was acceptable with restored TIMI III flow. An urgent transthoracic echocardiography (TTE) showed a hypokinesia of the inferior and lateral walls with 45% left ventricular ejection fraction, a repetitive TTE revealed a pericardial effusion 12 h later, so we had to stop the initial treatment with prasugrel and switch to clopidogrel.

The clinical evolution was simple, a TTE at 6 days showed a regression of the pericardial effusion and the patient was discharged the next day.

A control coronary angiography was planned for 3 months later but the patient was hospitalised for unstable angina and in our ICU 1 week prior to that date. A new coronary angiography revealed a significant stenosis of the non-stented (dissected) segment of the CX artery (video 4A–C), which was treated successfully by angioplasty with a long drug-eluting stent (Xience Xpedition 2.75×28 mm), which was getting support from the existing two stents (video 5A–F).

DISCUSSION

Coronary artery mechanical dilation is often associated with plaque fracture and intimal dissection, which can extend to the media and even the adventitia.

Up to 30% of all conventional balloon angioplasties result in angiographically significant coronary dissection.^{1 2}

Factors that predict its incidence are:

- Angiographic factors: coronary artery calcifications,³ eccentric lesions,⁴ long target lesions³ and complex lesions.⁵
- Technical factors: it appears that Amplatz has a higher rate of coronary dissection during engagement of the coronary ostium⁶ and depending on balloon size (increases with balloon to artery ratio >1.2).

Type A and B dissection, which are benign, can be treated conservatively, but types C,D,E,F, increase the morbidity and mortality,^{1 7} so they must be treated urgently.

Stenting remains the most important measure for the management of coronary artery dissection and abrupt vessel closure.⁸

In our case, the coronary flow could be restored by stenting of the proximal and distal segments of the CX artery, without the need of another immediate intervention in this massively deformed middle segment, but now we think that the procedure had to be completed by covering the whole dissected vessel with stents.

Another option that could have been used was to complete the procedure by stenting of the dilated dissected segment with a long covered stent in

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Figure 1 (A and B) ST segment elevation in the inferior and posterior leads, with reciprocal changes in the lateral and anterior leads.

Video 1 (A and B) Subocclusion at the bifurcation of circumflex and the first obtuse marginal arteries.

Video 2 (A–C) Double antegrade and a retrograde (type C) dissection of the circumflex artery with a total occlusion of the distal segment and TIMI (thrombolysis in myocardial infarction) 0 flux.

Video 3 (A–H) Coronary angioplasty of the circumflex artery.

Video 4 (A–C) Significant stenosis of the non-stented (dissected) segment of the circumflex artery.

Video 5 (A–F) Angioplasty with coated stent.

order to prevent a delayed perforation, but this option carries its own risk of in-stent restenosis or thrombosis.

Learning points

- ▶ Even in competent teams, human errors still exist, and a high degree of concentration is always required to avoid serious complications.
- ▶ Severe, but sometimes not flow limiting iatrogenic coronary dissection should be covered by stent implantation.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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