


Intrastent haematoma after treatment with a drug-eluting balloon for in-stent restenosis: a case report

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Background

Intrastent haematoma after dilatation of in-stent restenosis (ISR) is rarely reported and the optimal treatment for this condition remains unclear.

Case summary

We present the case of an 87-year-old man with in-stent subtotal occlusion of left circumflex. He experienced chest pain after drug-eluting balloon was released in the stent. Intravascular ultrasound revealed intrastent haematoma, which was not relieved with a cutting balloon but completely sealed by an Endeavor Resolute stent.

Discussion

Intrastent haematoma after dilatation of ISR is rare. Reimplantation of stent seems the best method to solve this problem. Intravascular ultrasound imaging may provide insight into the cause of ISR and guide the treatment.

Keywords

Intrastent haematoma • In-stent restenosis • Intravascular ultrasound • Case report

Learning points

- Balloon angioplasty of in-stent restenosis (ISR) is not completely without risk.
- Intrastent haematoma, which is rare after dilatation of in-stent lesions, may not be relieved by a cutting balloon but can be sealed by implanting a new stent.
- Intravascular ultrasound imaging can provide insight into the cause of ISR and guide the treatment.

Introduction

Intimal tears or dissections following percutaneous transluminal coronary angioplasty (PTCA) in *de novo* coronary lesions are very common.¹ Coronary stents are occasionally used once a large dissection has been caused. However, for in-stent restenosis (ISR), intimal dissection, or intrastent haematoma after dilatation is rarely reported² and the optimal treatment for this condition remains unclear.

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Timeline

Day/month	Event
1 month	Progressive dyspnoea (New York Heart Association III).
Day 1	Admission for shortness of breath, angina with heart failure.
Day 2	Electrocardiogram showed inverted T wave in V3–6 and Q wave in II, III, aVF lead. Troponin was 0.430 ng/mL, and N-terminal pro-brain natriuretic peptide was 6981 pg/mL. Transthoracic echocardiography showed moderate aortic regurgitation and the left ventricular ejection fraction was 36%.
Day 5	Coronary angiography indicated subtotal occlusion of left circumflex. A 2.75/30 mm drug-eluting balloon was released in the stent after successful pre-dilatation. A few minutes later, the patient experienced chest pain. Intravascular ultrasound revealed intrastent haematoma, which was not relieved with a cutting balloon but completely sealed by a drug-eluting stent.
Day 8	Patient discharged home without complication.

Case presentation

An 87-year-old man was admitted to our hospital for recurrent chest distress. His past medical history revealed hypertension, diabetes mellitus, coronary artery disease with percutaneous coronary intervention (PCI) to right coronary artery (RCA) in 2013 and to left circumflex (LCX) in 2015. The patient was taking clopidogrel, atorvastatin, irbesartan, and antidiabetic drugs regularly. During the outpatient clinic follow-up, he developed progressive dyspnoea (New York Heart Association III) within 1 month. Finally, he was sent to our department with recurrent shortness of breath and angina. The physical cardiovascular examination revealed a diastolic decrescendo murmur heard best at the left sternal border and clinical signs of heart failure. Electrocardiogram showed inverted T wave in V3–6 and Q wave in II, III, aVF lead. Troponin was 0.430 ng/mL (reference value: <0.110 ng/mL), and N-terminal pro-brain natriuretic peptide was 6981 pg/mL (reference value: <1800 pg/mL). Transthoracic echocardiography showed moderate aortic regurgitation and the left ventricular ejection fraction was 36%. Coronary angiography (CAG) indicated mild ISR of proximal RCA and subtotal occlusion of LCX (Figure 1A). Therefore, PCI was attempted. The lesion was prepared with 2.0/20 mm compliant and 2.75/10 mm non-compliant balloon, following which a 2.75/30 mm drug-eluting balloon (DEB) (8 atm) (Swide, Shanghai, China) was released in the stent (Figure 1B–D). A few minutes later, the patient experienced chest pain. Coronary angiography showed severe in-stent narrowing and intravascular ultrasound (IVUS) revealed intrastent haematoma (Figure 2A), which was not relieved with a 2.75/10 mm cutting balloon (8 atm) (Figure 2B). Thus, the lesion was treated with implantation of an Endeavor

Resolute 2.75/30 mm stent. Final CAG and IVUS confirmed complete sealing of the haematoma (Figure 2C).

Discussion

In-stent restenosis, which is angiographically defined as >50% reduction in luminal area within the stent or in the adjacent native vessel (5 mm of the proximal or distal stent edge),³ remains the most frequent cause of stent failure and the most common indication for target lesion revascularization.⁴ The two most effective treatments of ISR are DEB-angioplasty or repeat stenting with drug-eluting stent.^{5,6} However, balloon angioplasty of ISR is not completely without risk.

Complications in terms of significant residual dissection or intrastent haematoma are rare but may occur.² The underlying mechanisms of intrastent haematoma remain unclear. Possible explanations are as follows: (i) rupture of the new capillaries in the new plaque in the stent; (ii) blood flows into the plaque after fibrous cap rupture. Reimplantation of stent seems inevitable under the circumstance.

Our case has limitations, intracoronary imaging of ISR with IVUS should be recommended before revascularization to detect the mechanisms underlying ISR especially when the patient's original lesion and the initial procedure could not be reviewed.⁷ Nonetheless, IVUS imaging provide insight into the failure of treatment with DEB and guide the further revascularization successfully.

Lead author biography



Wen-Bin Zhang is a medical doctor at Sir Run Run Shaw Hospital, Zhejiang University School of Medicine. He has rich experience in interventional treatment of complex coronary heart disease. He once studied under Professor Gary Mintz in Columbia University and he is a member of American College of Cardiology and the fellow of SCAI. He has published nearly 30 articles in international high-quality journals as the first author/

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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 authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

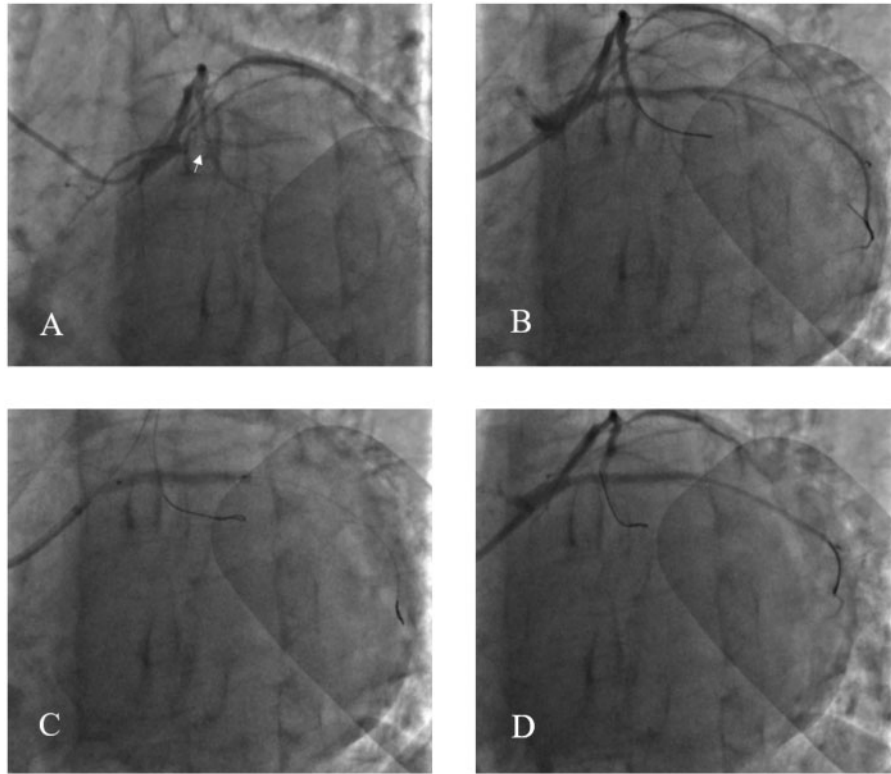


Figure 1 (A) Initial coronary angiography indicated that left circumflex was subtotal occluded (white arrowhead). (B) Coronary angiography after dilatation with 2.0/20 mm compliant and 2.75/10 mm non-compliant balloon. (C) Drug-eluting balloon was released in the stent. (D) Final coronary angiography after drug-eluting balloon was released.

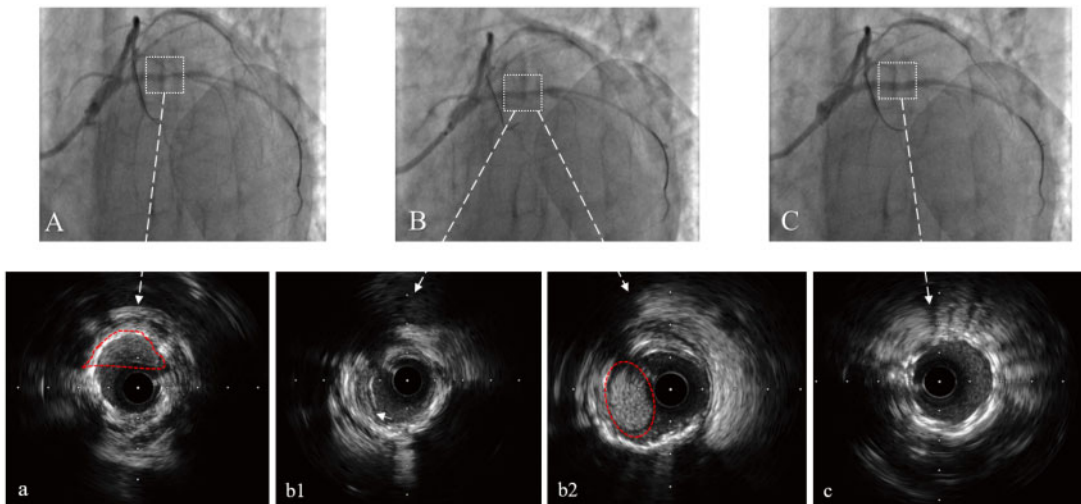


Figure 2 (A) Coronary angiography and the corresponding intravascular ultrasound revealed intrastent haematoma (red dashed area in figure a). (B) Haematoma was not relieved after dilatation with a cutting balloon (intimal flap was shown in figure b1, white arrowhead; the following intrastent haematoma was marked with a dotted red line in figure b2). (C) Final results confirmed complete sealing of the haematoma after drug-eluting stent implantation.

Conflict of interest: None declared.

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