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A simpler approach to seal severe coronary perforation with bare metal stent

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A simpler approach to seal severe coronary perforation with bare metal stent

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Summary

The case of a coronary artery perforation in which overinflation of a balloon at an angulated segment of the left anterior descending (LAD) artery after stent deployment resulted in an Ellis type III coronary artery perforation is presented. A bare metal stent (BMS) was used successfully to seal this high-grade perforation. Here, it is demonstrated that it may not be illogical to consider BMS as the first choice before embarking on use of a covered stent if the clinical/haemodynamic condition of the patient allows it and if a covered stent is not available.

BACKGROUND

Severe (grade III) coronary perforation is one of the most devastating but fortunately rare complications during a percutaneous coronary intervention (PCI). Covered stents remain the final percutaneous choice and may help avoid surgery, but they have an inherently greater risk of thrombosis and restenosis. This risk is accentuated by the reversal of anticoagulation during perforation. Here, we have demonstrated that it may not be illogical to consider BMS as the first choice before embarking on use of a covered stent if the clinical/haemodynamic condition of the patient allows it or if a covered stent is not available.

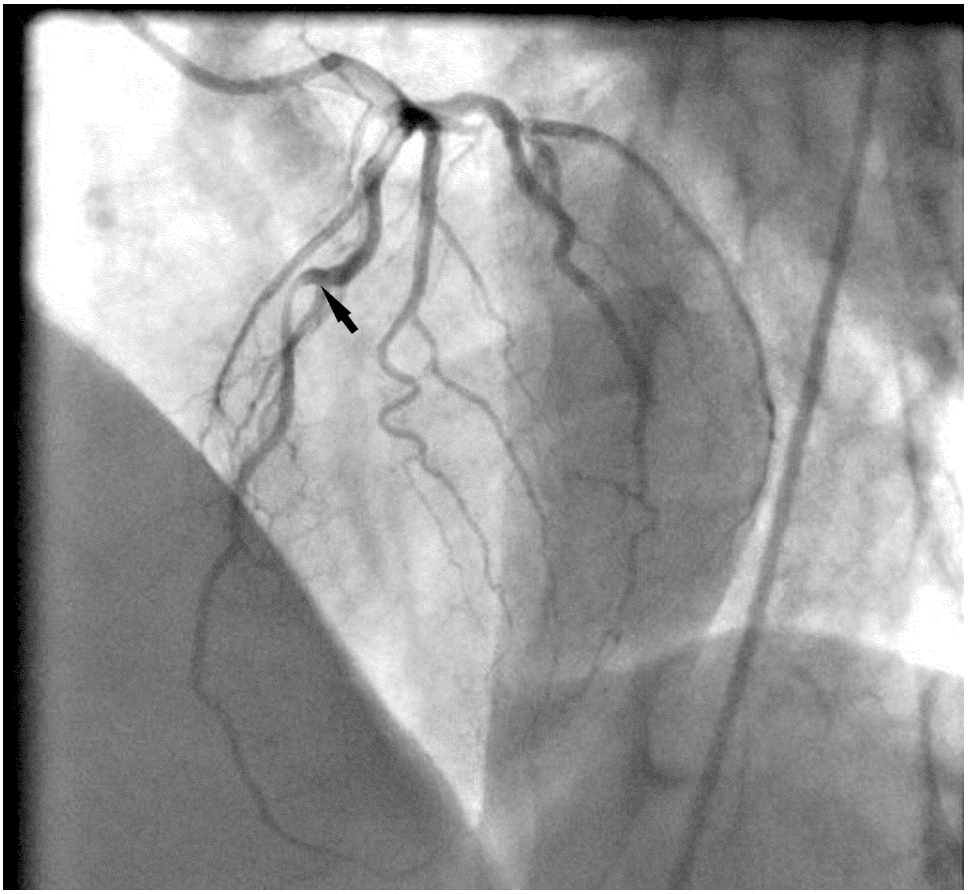

Figure 1 Angulated left anterior descending (LAD) lesion.

CASE PRESENTATION

A 65-year-old man who was a smoker was admitted with a history of chest discomfort over the past few hours, and was diagnosed as having non-ST segment elevation myocardial infarction.

INVESTIGATIONS

The coronary angiogram revealed severe stenosis in proximal left circumflex artery and first obtuse marginal artery (LCX/OM1). Another 70% focal angulated lesion was noted in the mid left anterior descending (LAD) artery (figure 1). The right coronary artery had mild non-obstructive disease. A left ventricular (LV) angiogram revealed preserved LV function with an ejection fraction of 60%.

TREATMENT

The patient underwent percutaneous intervention of the LAD and LCX/OM1. A 2.5 × 18 mm microdriver (Medtronic, Minneapolis, MN, USA) bare metal stent (BMS) was deployed at 12 atmospheres (atm) into the LCX/OM1 with thrombolysis in myocardial infarction grade 3 (TIMI 3) flow.

For the LAD lesion, a 2.5 × 18 mm microdriver (Medtronic) BMS was deployed at 14 atm and postdilated with 3.0 × 13 mm power sail balloon (Guidant, Santa Clara CA, USA) at 22–24 atm. Dissections were noted at the proximal and distal edges of the stent. To cover the distal edge dissection a 2.5 × 14 mm microdriver (Medtronic) BMS was deployed at 12 atm. Both stents were postdilated with a 3.0 × 13 mm power sail balloon (Guidant) at 14–24 atm. The proximal edge dissection was covered with a driver 3.0 × 18 mm (Medtronic) BMS deployed at 10 atm. The 3.0 × 18 mm stent balloon was used to postdilate the overlapping zone of the proximal and middle stent. The balloon was inflated at 10 atm. As the balloon was deflated, an Ellis type III perforation was noted (figure 2 and video 1). The same balloon (3.0 × 18 mm) was inflated immediately at the site of perforation.

Video 1 Ellis Type 111 coronary perforation 10.1136/bcr.06.2009.1954v1

The activated clotting time was corrected with 30 mg of intravenous protamine and intravenous tirofiban was immediately stopped. An emergent echocardiogram showed mild pericardial effusion without any evidence of cardiac tamponade and wall motion abnormalities. In the mean time, the patient was asymptomatic and haemodynamically stable. Intermittent balloon inflations continued for the next 30 min but there was still extravasation of dye. We decided to deploy a BMS at the site of perforation as we were unable to locate the covered stent rapidly. The theory was that this may alter the morphology of the vessel and seal the perforation. To this end, a 3.0 × 18 mm driver (Medtronic) BMS was deployed at 8 atm at the site of

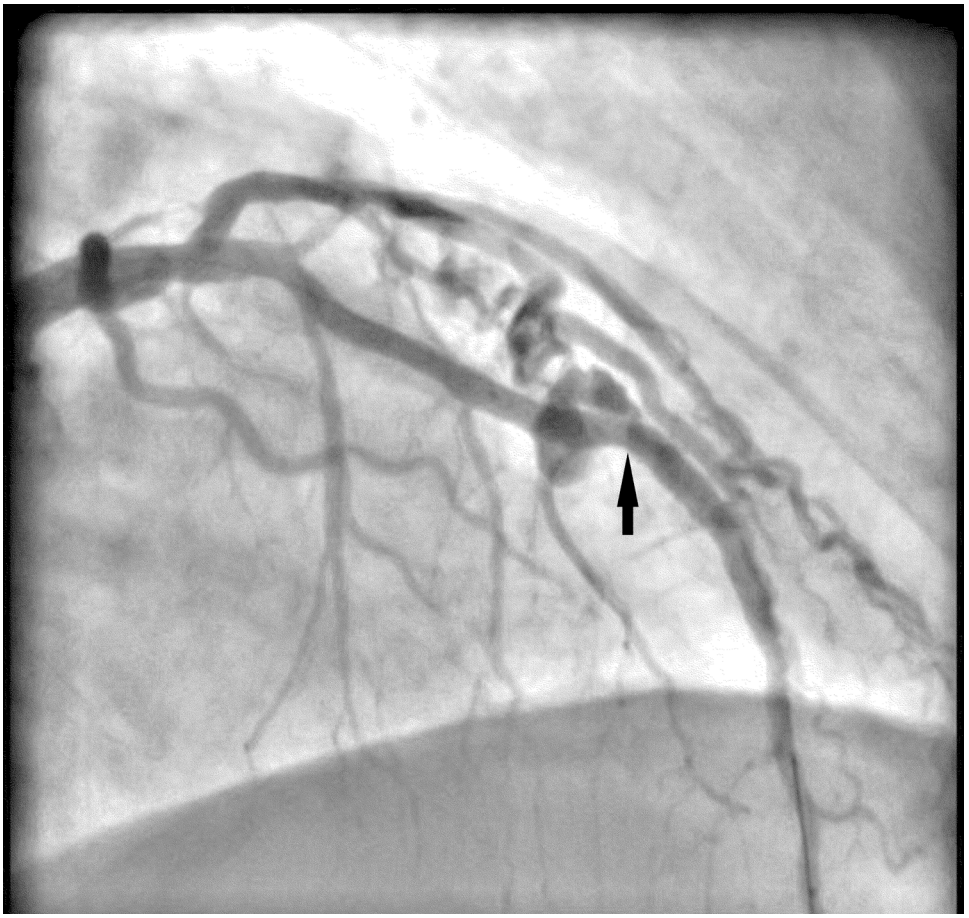

Figure 2 Ellis type III coronary artery perforation.

Figure 3 Sealed coronary artery perforation after bare metal stent (BMS) deployment.

perforation. This immediately sealed the perforation. The stent was postdilated with a 3.0 × 18 mm stent balloon at 14 atm. The final result was TIMI 3 flow without any extravasation of dye at the site of perforation (figure 3).

OUTCOME AND FOLLOW-UP

After percutaneous intervention the patient remained stable. Repeat echocardiograms over the next 72 h did not reveal any increase in effusion, evidence of tamponade or segmental wall motion abnormalities. He continued taking oral antiplatelet agents and was discharged on day 5. A follow-up of the patient a year later showed that he was asymptomatic and well.

DISCUSSION

Severe (grade III) coronary perforation is one of the most devastating but fortunately rare complications during a PCI.[1 2] Perforation or frank rupture of coronary arteries can result from the guide wire, atherectomy devices or balloons.[3] It usually occurs secondary to overzealous dilatation of the lesion with a balloon or overinflation of the stent during deployment or postdilation.[4] The incidence is higher with the use of atherectomy devices to ablate tissue for certain complex lesions.[1] In the past, only a couple of case reports have demonstrated the utility of BMSs in such a situation.[5] Covered stents remain the final percutaneous choice and may help avoid surgery; they have an inherently greater risk of thrombosis. This risk is accentuated by the reversal of anticoagulation during perforation. It may not be illogical to consider BMS as the first choice before embarking on use of a covered stent if the clinical/haemodynamic condition of the patient allows it.

Learning points

- Severe coronary perforation can result from overzealous dilatation of the lesion with a balloon or overinflation of the stent, especially at angulated segments.
- Covered stents remain the final percutaneous choice and may help to avoid surgery.
- It may not be illogical to consider BMS as the first choice before embarking on use of a covered stent; if a covered stent is not available it may be an option to deploy BMS before sending patients for surgery to seal coronary perforations.

Competing interests None.

Patient consent Obtained.

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