Delayed Perforation of Coronary Artery after Percutaneous Coronary Intervention of Left Main Bifurcation Lesion Using Two Stents

Taek Kyu Park, MD; Jin-Ho Choi, MD, PhD; Jang-Whan Bae, MD, PhD

Coronary artery perforation during percutaneous coronary intervention (PCI) has been reported repeatedly. However, delayed perforation several months after PCI, which may cause potentially serious complications, has not been well recognized. Here we report a case of delayed coronary artery perforation 4 months after PCI of the left main bifurcation lesion.

A 69-year-old man with intermittent syncope underwent follow-up diagnostic coronary angiography. He was under maintenance hemodialysis for 9 years and had multiple risk factors, including hypertension, dyslipidemia, and diabetes. Four months earlier, he suffered from acute myocardial infarction with ST-elevation in multiple leads from V1 to V4, and underwent emergent percutaneous coronary intervention for critical left main (LM) bifurcation disease, involving 90% ostial stenosis of both left anterior descending (LAD) artery and left circumflex (LCX) artery (Figure A; see online-only Data Supplement Movie I). A Promus element stent 3.5/20 mm was implanted at 12 atm in LM to LAD artery. Then it was crushed by implantation of a Taxus Liberte stent 4.5/24 mm at 9 atm in LM to LCX artery (see online-only Data Supplement Movies II–IV). Rewiring of LM–LAD arteries was attempted, but was unsuccessful. Consequently, kissing ballooning was not done, and the procedure was finished without kissing ballooning after high-pressure postdilatation at 14 atm in LCX artery by Quantum 4.5/8 mm balloon (see online-only Data Supplement Movie V). A small hump was noticed in the stent in LCX artery, but intravascular ultrasound was not performed because no leakage was found (Figure B; see online-only Data Supplement Movie VI). Aspirin and clopidogrel was used. The patient was stable and could receive regular hemodialysis.

Four months later, the patient’s first episode of syncope developed and recurred twice for 2 weeks. Therefore, he was admitted for the evaluation of cardiogenic syncope. Follow-up coronary angiography showed an aneurysmal sac formed by Ellis type III coronary artery perforation at the stented segment of the proximal LCX artery (Figure C; see online-only Data Supplement Movies VII–VIII). Echocardiography confirmed rapid progression of aortic stenosis to severe grade with maximal flow velocity across the aortic valve=3.02 m/s, mean pressure gradient=26 mm Hg, and aortic valve area by continuity equation=0.37 cm². Presurgical coronary computed tomography was performed to identify the extent and location of aneurysm and revealed a 33x13 mm-sized pseudoaneurysm adjacent to the proximal LCX artery (Figure E; see online-only Data Supplement Movie IX). The repair of pseudoaneurysm using bovine patch, aortic valvular replacement, and tricuspid annuloplasty were done uneventfully (Figure F). He also underwent reconstruction of arterio-venous shunt for dialysis, and was discharged 3 weeks after surgery.

Coronary perforation caused by excessive dilatation is not uncommon, but delayed perforation is rare. Delayed perforation or aneurysmal rupture can result in a catastrophic event after implantation of coronary stents. Although the mechanism and timing of aneurysm formation is still unclear, this case shows that coronary artery perforation with pseudoaneurysm might result from mechanical stress caused by high-pressure postdilatation. Appropriate sizing of stent by intravascular ultrasound-guided dilatation might prevent the late perforation in our case.

Disclosures

None.

References


Received February 23, 2012; accepted March 8, 2012.

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The online-only Data Supplement is available at http://circinterventions.ahajournals.org/lookup/suppl/doi:10.1161/CIRCINTERVENTIONS.111.969436/-/DC1.

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(Circ Cardiovasc Interv. 2012;5:e26–e27.)
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Circ Cardiovasc Interv is available at http://circinterventions.ahajournals.org DOI: 10.1161/CIRCINTERVENTIONS.111.969436
Figure. Coronary angiography, computed tomography, and photo. A, Coronary angiography shows 90% ostial stenosis of both left anterior descending and left circumflex arteries (yellow arrowheads). B, Small hump (yellow arrowhead) was noticed after implantation of 2 stents using crush technique. C, Follow-up coronary angiography revealed delayed Ellis type III perforation, forming a pseudoaneurysm (blue arrowheads). The location of the perforation is pointed by yellow arrow. D, Computed tomography shows a 33x13 mm-sized attenuated mass, which was a pseudoaneurysm between left coronary sinus and left atrium. E, Three-dimensional reconstruction of pseudoaneurysm (blue arrowheads). F, Gross image of coronary pseudoaneurysm from operator view showing small thrombus inside of pseudoaneurysm (blue arrowheads).
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_Circ Cardiovasc Interv._ 2012;5:e26-e27
doi: 10.1161/CIRCINTERVENTIONS.112.969436
_Circulation: Cardiovascular Interventions_ is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 1941-7640. Online ISSN: 1941-7632

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