A 79-year-old woman with a history of open abdominal aortic aneurysm repair presented with worsening angina. Her ECG showed mild ST-segment depression at rest (Figure 1A). Computed tomography coronary angiography revealed a critical stenosis at the right coronary artery ostium without atherosclerotic plaque, which appeared to be induced by extrinsic mechanical compression between the sternum and dilated aortic root (Figure 2 and Movie I in the online-only Data Supplement). Because she refused to undergo cardiac surgery, elective percutaneous coronary intervention for the ostial right coronary artery lesion was performed (Movie II in the online-only Data Supplement). Intravascular ultrasound findings were similar to those observed on computed tomography coronary angiography (Figure 3 and Movie III in the online-only Data Supplement). A Liberte bare metal stent 4.0/12 mm was directly deployed, followed by postdilatation with a 5.0-mm balloon. Although excellent angiographic results were achieved (Movie IV in the online-only Data Supplement), intravascular ultrasound after the procedure showed asymmetrical expansion of the stent despite high-pressure postdilatation (Movie V in the online-only Data Supplement). After the percutaneous procedure, she was free of angina, with an improvement in ST-segment depression (Figure 1B). She presented 1 month later with recurrent angina. Repeat computed tomography coronary angiography and intravascular ultrasound revealed a completely collapsed stent and subsequent significant luminal narrowing (Figure 4 and Movies VI and VII in the online-only Data Supplement). Two CYpher drug-eluting stents were deployed to overlap the broken stent to achieve greater radial force. Final angiographic and intravascular ultrasound images showed excellent short-term results, with the stents fully expanded (Movie VIII in the online-only Data Supplement). Although the patient had been asymptomatic for 3 months after the second coronary intervention, she was admitted to the hospital for sepsis caused by an iliofemoral abscess. Conventional chest computed tomography revealed complete disruption of the stent with formation of a pseudoaneurysm between 2 stent fragments (Figure 5A and 5B). On hospital day 9, she suddenly developed cardiopulmonary arrest and died. Noncontrast computed tomography revealed a massive circumferential pericardial effusion, suggesting cardiac tamponade as a reason for the sudden cardiopulmonary arrest (Figure 5C). Postmortem examination revealed a hemopericardium with ruptured pseudoaneurysm between 2 stent fragments (Figure 6).

Coronary stent fracture is a rare but potentially serious complication of coronary artery stenting because it can result in in-stent restenosis and acute stent thrombosis.\(^1,2\) Most fractures occur in stents after aggressive postdilatation, in stents implanted in tortuous and calcified lesions, and after cardiac trauma.\(^3\) Although the mechanism of aneurysm formation is still unclear, this case shows that stent fracture, aneurysm formation, and coronary artery perforation might result from both mechanical stress caused by compression by the sternum and dilated aortic root and the unique property of drug-eluting stents in which the drug coating may inhibit the healing process.\(^4\)

Disclosures

None.

References


From the Department of Cardiology, Tsukuba Medical Center Hospital (T.H., H.N., Y.N.), and Cardiovascular Division, Institute of Clinical Medicine, Graduate School of Comprehensive Human Sciences, University of Tsukuba (A.S., Y.K., K.A.), Tsukuba, Japan.

The online-only Data Supplement is available with this article at http://circ.ahajournals.org/cgi/content/full/123/15/1679/DC1.

Correspondence to Akira Sato, MD, Cardiovascular Division, Institute of Clinical Medicine, Graduate School of Comprehensive Human Sciences, University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki 305-8575, Japan. E-mail asato@md.tsukuba.ac.jp

(*Circulation*. 2011;123:1679-1682.)

© 2011 American Heart Association, Inc.

*Circulation* is available at http://circ.ahajournals.org

DOI: 10.1161/CIRCULATIONAHA.110.001537
Figure 1. A, On presentation, an ECG at rest showed mild ST-segment depression. B, After revascularization, ST-segment depression was resolved.

Figure 2. Images from 64-slice computed tomography coronary angiography of the culprit lesion present in the ostial right coronary artery. A, Axial image. B, Curved multiplanar reconstruction. RCA indicates right coronary artery. Black arrows indicate the culprit lesion present in the ostial right coronary artery.
Figure 3. A, Right coronary angiography. B through D, Intravascular ultrasound cross-sectional images reveal a severely narrowed lesion in the ostial right coronary artery (arrows).

Figure 4. Computed tomography coronary angiography reveals a completely collapsed stent with severe narrowing in the ostial right coronary artery. A, Axial image. B, Curved multiplanar reconstruction.
Figure 5. A, Contrast computed tomography (CT) reveals complete disruption of the stent with formation of a pseudoaneurysm (yellow arrowhead) between 2 stent fragments (yellow arrows). B, Two stent fragments. C, After development of cardiac arrest, noncontrast CT revealed a circumferential pericardial effusion (red arrows).

Figure 6. Postmortem examination revealed a hemopericardium with ruptured pseudoaneurysm (yellow arrow) between 2 stent fragments (blue arrows).
Fatal Ostial Right Coronary Artery Coronary Stent Fracture and Perforation Induced by Mechanical Stress Between the Sternum and Dilated Aortic Root
Tomoya Hoshi, Akira Sato, Hidetaka Nishina, Yuki Kakefuda, Yuichi Noguchi and Kazutaka Aonuma

Circulation. 2011;123:1679-1682
doi: 10.1161/CIRCULATIONAHA.110.001537
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2011 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/123/15/1679

Data Supplement (unedited) at:
http://circ.ahajournals.org/content/suppl/2011/04/21/123.15.1679.DC1

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org/subscriptions/