CASE REPORT

A large dissecting sub-epicardial hematoma and cardiac tamponade following elective percutaneous coronary intervention

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Received 17 March 2008; received in revised form 9 May 2008; accepted 16 May 2008
Available online 16 July 2008

Summary
A 70-year-old woman was performed percutaneous coronary intervention at the stenotic lesion of the 1st diagonal branch. Soon after stenting, cardiac tamponade occurred and emergent cardiac surgery was performed. A large epicardial hematoma was observed in the antero-lateral wall that was compressing the distal diagonal branch. The patient died of multi-organ failure 3 days after surgery. An autopsy of her heart revealed an extensive intramural hematoma in the left ventricular wall. There was no evidence of perforation of the stented lesion. The suspected cause was neither coronary perforation nor coronary rupture of target lesion.
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Case report

A 70-year-old woman experienced severe chest pain at rest 2 months prior to admission. She had a past history of collagen disease in age 63 and had taken oral medicines for 1 year. She had no active symptom of collagen disease then. A 12-lead ECG exhibited sinus rhythm and Q waves on leads II, III, and aVF (Figure 1A). Her echocardiogram showed akinetic left ventricular wall motion in the inferior region with thinned walls. Coronary angiograms revealed total occlusion in the mid right coronary artery and 99% stenosis in the 1st diagonal branch. We performed balloon angioplasty and stenting at the diagonal branch lesion. Oral aspirin and ticlopidine had been administered for a...
soon after stenting (B). Left coronary angiogram from the 30° cranial (C) and the 30° right anterior oblique views (D). Patency of the stent lesion was demonstrated (C and D, filled arrowheads). Contrast extravasated from the distal portion of the 1st diagonal branch into the pericardial space (D, open arrowhead).

week before the percutaneous coronary intervention (PCI).

Soon after stenting she experienced chest pain and her ECG showed ST elevation on leads I, aVL and V4-V6; and ST depression on leads II, III, aVF and V1-V3 (Figure 1B). She had hypotension and tachycardia, emergent echocardiography demonstrated cardiac tamponade. A coronary angiogram demonstrated patency of the stented lesion and extravasated contrast at the distal diagonal branch (Figure 1C and D). Emergent pericardiocentesis was performed and after 500 mL of unoxygenated blood was aspirated her heart rate and blood pressure recovered. Heparin was neutralized by intravenous
A dissecting subepicardial hematoma and cardiac tamponade following elective PCI

Figure 2 (Left panel) Photograph during surgery shows a massive pericardial hematoma in the antero-lateral wall. (Right panel) The schema in the photograph. LV = left ventricle. The arrow indicates the apex of the LV.

propanolol sulfate. Coronary angiography showed no further bleeding. However, blood was drained at 50 mL per 5 min, suggesting continued active bleeding.

Emergent cardiac surgery was performed. The pericardial cavity was filled with blood and a large sub-epicardial hematoma was observed in the antero-lateral wall that was compressing the distal diagonal branch (Figure 2). A hematoma may have been caused by dissection of the epicardium from the myocardium. There was a small cleft in the epicardium at the apical side of the antero-lateral wall. Complete hemostasis at the site of injury was achieved by attaching fibrin membranes. The operation was completed after confirming that there was no active bleeding in the epicardium.

Bleeding from a nasogastric tube was present during and after surgery. After surgery, respiratory organ status was sustained well but hypotension continued. So much blood transfusion was needed. Continuous bleeding from a nasogastric tube was thought to cause hypotension. Examination of the stomach using an endoscope was performed. The stomach was filled with a large clot. Then close observation and hemoclip were impossible. Computed tomography of the abdomen showed profuse intestinal gas and suggested paralytic ileus and intestinal death. Multi-organ failure developed and the patient died 3 days after surgery. An autopsy of her heart revealed an extensive intramural hematoma in the left ventricular wall. The bleeding area spread into the fatty connective tissue between epicardium and myocardium. In the center of hematoma, hemorrhagic necrosis of myocardium as well as fatty connective tissue was observed. There was no evidence of perforation of the stented lesion. There was an ulcer in the stomach. The ulcer contained the artery wall, suggesting arterial hemorrhage. The cause of directly leading to death was thought the bleeding stomach ulcer and hemorrhagic shock.

Discussion

Coronary perforation and coronary rupture are rare, but severe, complications of PCI [1,2]. They are attributed mostly to vessel wall penetration with guide wires, inflation of a balloon in the subintima, or overexpansion of the coronary artery by an oversized balloon [3]. Cardiac tamponade has been reported to occur at an incidence of 0.1—0.4% following PCI [3,4]. Severe cases require emergent treatment.

Several cases of PCI with cardiac hematoma have been reported. Shekar et al. reported that dissecting sub-epicardial hematoma occurred during PCI [5]. The hematoma was caused by a tear in the SVG while using a cutting balloon. In another case a large sub-epicardial hematoma and cardiac tamponade were discovered 36 h after PCI and emergent cardiac surgery was performed [6]. The authors hypothesized that intramyocardial hemorrhage occurred during PCI and a IIb/IIIa receptor antagonist promoted bleeding in the infarcted myocardium. In our case cardiac tamponade developed within several minutes. We first suspected ischemic events caused by acute coronary occlu-
sion and lateral wall ischemia because of chest pain and ST elevation soon after stenting. The patient had inferior wall OMI and additional lateral wall ischemia could induce acute global left ventricular dysfunction. But a coronary angiogram demonstrated patency of the stented lesion and other coronary arteries. We speculated that a large sub-epicardial hematoma and cardiac tamponade reduced cardiac output and coronary perfusion then global ischemia developed. The cause of the sub-epicardial hematoma was not coronary perforation or coronary rupture of target lesion. Considering the findings from coronary angiography and surgery we hypothesize the following mechanism. First, a guide wire penetrated the coronary artery wall at the distal portion of the diagonal branch and small bleeding occurred. Second, a sub-epicardial hematoma developed from dissection of the epicardium from the myocardium. Third, the epicardium covering the hematoma split slightly and unoxygenated blood from the hematoma flowed into the pericardial cavity, causing drastic cardiac tamponade. She had a past history of collagen disease. Evan and Fraser reported that a man with Ehlers-Danlos syndrome (type IV) experienced spontaneous coronary artery rupture and resulted in cardiac tamponade [7]. Though she had no active symptom of collagen disease then, any hidden connective tissue disorder might weaken the binding power between the epicardium and the myocardium.

Cardiac tamponade and cardiogenic shock triggered the bleeding stomach ulcer. Antiplatelet agents to prevent in-stent thromboses also promoted bleeding. Practitioners should pay more attention to the risk of severe bleeding in patients taking dual-antiplatelet agents.

References