Coronary Perforation and Tamponade During Thrombectomy and Treatment with PTFE Coated Stent and Autotransfusion: A Case Report

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Introduction

Coronary perforation is a rare, but one of the most dreadful complications of percutaneous coronary interventions. Incidence is reported to be between 0.2 % and 0.6 % in different studies (1-4). This ratio may further increase with the use of "atheroablative" devices such as atherectomy, thrombectomy, excimer laser angioplasty (5, 6). This complication can be treated by placement of an uncoated stent within the first stent or an autologous vein-covered stent or even a PTFE (Polytetrafluorethylene) coated stent. In this article, successful treatment of the left anterior descending artery (LAD) perforation by PTFE coated stent and autologous blood transfusion is presented in a patient developed cardiac tamponade during thrombectomy.

Case Report

A 43 years old male patient admitted to coronary care unit with the diagnosis of hyperacute anterior myocardial infarction. Tissue plasminogen activator (tPa), conventional heparin infusion and aspirin treatment were started 1.5 hours after onset of the pain and chest pain disappeared after one hour. The physical examination revealed no pathological finding and blood pressure was 105/65 mmHg, pulse rate 60/min. In laboratory studies, hematocrit was found to be 47%, leucocyte-9600/mm3, thrombocyte -205000/mm3, and biochemical findings were within normal limits except high CK value of 3635 IU/L. On echocardiographic examination, there was severe hypokinesia of anterior, septal and apical walls with a global EF of 40%. Thrombus was not detected in left ventricle. Due to the recurrence of chest pain at the sixth hour of the follow-up, tirofiban HCl infusion was started with the rate of 0.1 mcg/kg/min following a bolus injection of 0.4 mcg/kg. After 12 hours of infusion, considering the patient's age and recurrence of chest pain, the patient was taken to the catheterization laboratory. In coronary angiographic examination, intracoronary thrombus and stenosis of 70% at proximal LAD just before the first septal branch were detected (Fig.1). We decided to aspirate the thrombus via X-SIZER thrombectomy catheter with the diameter of 4.5 F (1.5mm), but thrombus was not removed enough and the same procedure was repeated with another X-SIZER catheter of 6 F (2mm) diameter. After the process, it was detected that LAD was ruptured at the point where it made an angle after the first diagonal artery and contrast agent leakage to pericardial space was seen (Fig.2). At the same time, general condition of the patient worsened suddenly with loss of consciousness, pulse rate decreased to 30/min and systolic blood pressure dropped to 50 mmHg. A pigtail catheter was introduced into the pericardial space by pericardiocentesis and PTFE coated ''Jostent'' of 3.5x16 mm in size was implanted to the ruptured LAD segment. At control angiography, it was seen that the rupture was closed completely and the passage of contrast agent to the pericardium was stopped. Second stent with the diameter of 3.5x18 mm was implanted to the stenosis in

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the proximal LAD and no residual stenosis was left (Fig.3). Meanwhile, approximately 300 cc blood taken from the pericardial space was given back to the coronary system to stabilize the hemodynamic status. The patient's consciousness, blood pressure and heart rate returned to normal in a short period and after hemodynamic stabilization he was followed-up in the coronary care unit.

Discussion

Coronary artery perforation is a rare but serious complication of percutaneous coronary interventions leading to tamponade, myocardial infarction, emergency surgical intervention or death. As a major complication with high mortality and morbidity rate, coronary perforation occurs due to use of "atheroablative" devices in about half of the cases (1) while rest occurs by the guidewire, use of oversized balloons. Prognosis is poor especially in elderly patients who developed cardiac tamponade and in patients who required emergency coronary artery bypass grafting. Mortality rate is reported to be about 10% (1,7,8) in these cases. Arteries that are highly calcific, tortuous, acutely angled and with low compliance are predisposed to this complication (1,9). The use of glycoprotein IIb/IIIa antagonists before coronary intervention is reported not to be a predisposing factor for coronary perforation, but a factor that may worsen the situation in cases with perforation (10).

In the largest series on coronary perforation, while the incidence is reported as 0.3 % in all percutaneous interventions, perforation rate is found as 0.8 % for "rotablator" atherectomy, 1 % for "excimer" laser angioplasty and 0.9 % for "directional" atherectomy (1). The rate of coronary perforation with the use of thrombectomy devices, which are relatively new methods used in a small number of cases, is reported to be between 0.1 and 0.2 % (11).

There are different treatment modalities for coronary artery perforations. Being one of the firstly used methods, perfusion balloon application not only prevents blood extravasation but also helps the closure of the defect. Surgical treatment is necessary in whom perfusion balloon is unsuccessful or in patients that are still hemodynamicly instabilized in spite of pericardiocentesis. In recent years, alternative treatment methods other than surgery are reported in limited number of cases. "Microcoil" embolization (12, 13), Gelfoam embolization, intracoronary autotransfusion with patient's own blood to form clot embolization (14) and coated coronary stents are included in this group. Coated stents are made by coating of PTFE as a very thin layer between 2 stents or autologous vein grafts. In the literature, it has been re-

Figure 1: Angiogram of left coronary artery injection showing intracoronary thrombus and stenosis of proximal LAD.

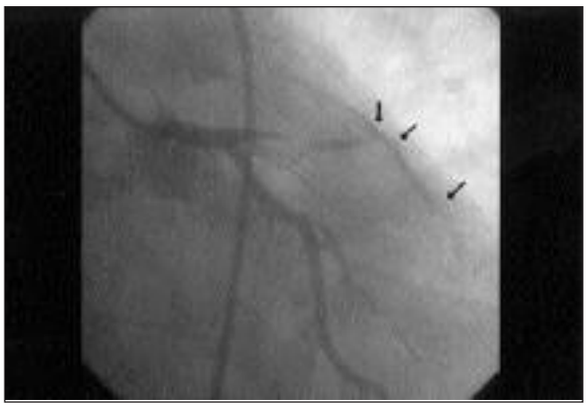

Figure 2: Angiogram of left coronary artery injection showing ruptured LAD and contrast material in pericardial sac (arrow).

Figure 3: Angiogram of left coronary artery injection showing LAD after stent implantation.

ported that coated stents are used successfully for coronary perforation in a few cases (15-18).

According to large series, patients undergoing surgical procedures like bypass or pericardial window have a higher in-hospital mortality rate probably due to loss of time (1). As a result, urgent interventional methods performed in the catheter laboratory become more important.

In this case report, coronary perforation progressed rapidly with the effect of tirofiban infusion for 12 hours and patient's hemodynamic status worsened in a very short time. Since the general condition of the patient did not improve in spite of pericardiocentesis; PTFE coated stent was implanted to the ruptured coronary artery site to stop leakage and autotransfusion, reported in a case report (14), was performed by taking back the patient's own blood from the pericardial space into coronary bed although this procedure had a risk of contamination (especially with staphylococcal organisms) and systemic embolization. With this hybrid approach, an extremely aggressive coronary perforation case was successfully treated.

As a result, in coronary perforations during percutaneous interventions, today coated stent implantation seems to be the first choice in treatment of coronary perforation considering the high mortality and morbidity rate of surgery. Besides, in cases with severe hemodynamic instabilization, autotransfusion may provide further benefits.

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