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Successful Management with Coated Stent of Osteal Perforation of Left Anterior Descending Artery due to Laser Angioplasty

Hüseyin YILMAZ, M.D, Oktay SANCAKTAR, M.D, İbrahim DEMİR, M.D, Filiz ERSEL TÜZÜNER, M.D.
Akdeniz University Medical Faculty, Antalya - Turkey

SOL ÖN İNEN KORONER ARTERİN LAZER ANJİYOPLASTİSİNE BAĞLI OSTİUM PERFORASYONUNUN KAPLI STENT İLE TEDAVİSİ

ÖZET

Koroner arter perforasyonu perkutanöz koroner girişimin nadir bir komplikasyonudur. Yazımızda akut anterior miyokard enfartüslü bir olguda pirimer anjiyoplastide eximer laser uygulanması sonucunda sol ön inen arter ostiyumunda perforasyon olgusunu bildirdik. Perforasyon bölgesi PTFE-kaplı stent ile kapatıldı. Perikard tamponadı perikarda yerleştirilen 6 french sheath içinden ilerletilen pig-tail kateterle boşaltıldı ve açık kalp cerrahisinde perforasyon bölgesi pirimer onarılarak sol internal mammarian arter sol ön inen arter anastomozu uygulandı.
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Anahtar kelimeler: *Koroner arter perforasyonu, stent, koroner anjiyoplasti, kalp tamponadı, akut miyokard enfarktüsü.*

Coronary perforation is a rare and life threatening complication of percutaneous coronary intervention. Reported incidence varies between 0,1-3,0% within several interventional methods [1-4]. There is concomitant increase with the use of new atheroablative devices that cut, vaporize, or drill the vessel wall [5]. Holmes et al[6]. reported that coronary perforation during excimer laser angioplasty as 1.3% and 5.6% fatal outcome within the perforation group. Although, non-surgical treatment of this life threatening complication is possible conservatively with repeated angioplasty, bare stent, and coated stent [7-9] surgical treatment of coronary perforation is necessary in 37 to 63% of the cases [5,6,10].

We report a case of successful closure of an osteal perforation of left anterior descending artery with polytetrafluoroethylene (PTFE)-covered stent during excimer laser angioplasty.

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Corrospending Address: Hüseyin Yılmaz, Akdeniz University Medical Faculty, Department of Cardiology, 07070 Antalya, Turkey Phone: +90-242-227 43 31 Fax: +90-533-982 46 45
E-Mail: drhy@um.turkcell.com.tr

CASE REPORT

A 64-year old male patient was admitted to our outpatient clinic due to continuing exercise induced chest pain for of 1 hour's duration. ECG recordings showed pathologic Q waves in V1-3 with persistent ST segment elevation. Physical examination showed no abnormality. Patient was diagnosed as having acute anterior myocardial infarction. He subsequently underwent coronary angiography and left venriculography. Coronary angiography revealed total occlusion of LAD at the level of the ostium with TIMI-0 coronary flow. Left circumflex and right coronary artery were normal (Figure-1A). Left ventriculography revealed hypokinesis of anterolateral and apical segments.

Because of continuing chest pain and concomitant ST segment elevation, primary angioplasty was planned.

The ostium of the LMCA was catheterized with 7F 3,5 XB guiding catheter and 0,014-inch wisdom guide-wire advanced through the occlusion to the distal part of LAD. Afterward, 3.0 20 mm balloon dilatation catheter (Adante Boston Scientific Scimed, USA) was advanced over the guide-wire into the occlusive lesion without any difficulty and inflated at 8 atm for 30 seconds. It resulted with TIMI-I antegrad flow and the lesion was full of thrombus (**Figure-1B**). For debulking of the osteal plaque material and to get rid of the thrombus, excimer laser angioplasty (2,0 mm, Vitesse-Cos Concentric, Spectranetics, Colorado. USA) was applied to the lesion. After first pass through the lesion with laser catheter, the patient suddenly became symptomatic with the complaints of faintness and diaphoresis. Injection of radioopaque into the coronary showed massive opacification of the pericardium through a perforation of the osteal LAD (**Figure-1B**). Within seconds patient lost his consciousness with concomitant respiratory arrest. Urgently we introduced second guide-wire into left circumflex artery and decided to seal LAD osteal perforation with PTFE-covered 3.5 18 mm Jo-stent (coronary stent graft, Jomed Implantate GMH, Rangendingen, Germany) (**Figure-1C**). We placed proximal part of the stent in the LMCA and distal part in the LCX artery and then inflated at 17 atm for 20 sec. Subsequent angiograms did not show any leakage of the dye and distal blood flow was well maintained (**Figure-1D**). While implanting the stent, the patient was entubated and pericardiosentesis was performed successfully. A 6 French pigtail advanced into the pericardium via arterial sheath. About 1 liter of blood was decompressed and reinjected to the patient via venous access. After decompressing the pericardial tamponade blood pressure increased steadily up to 110/70 mmHg. Activated coagulation time was 335 seconds. Echocardiog-

raphic study at the catheter laboratory revealed persistent pericardial blood of about 6-10 mm. Because of the evolving myocardial infarction and cardiac tamponade, we urgently referred the patient to emergent cardiac surgery.

At open-heart surgery there was still minute bleeding from the site of perforation, which was repaired primarily, and LIMA to LAD by-pass grafting was performed.

The clinical course was excellent after cardiac surgery and after 12 days patient discharged on antiplatelet treatment with ticlodipine and aspirin.

DISCUSSION

Coronary perforation is a rare and life-threatening complication of a percutaneous coronary intervention, and the incidence of perforation is 0,1 to 3,0% among lesions treated with various interventional techniques [1-4]. Coronary perforation may lead to cardiac tamponade and death [11]. With the use of new atheroablative devices the incidence of coronary perforation is low [11] compared to coronary angioplasty, but device specific risks have not been defined yet. Coronary perforation can be caused by guide-wire and oversized balloon that mismatch to coronary artery diameter [12]. Other risk factors are calcified, tortuous and noncompliant arteries [13].

Conservative transcatheter therapy of the coronary perforation includes prolonged balloon inflation with either the angioplasty balloon or a perfusion catheter at the site of the perforation. However, balloon dilatation catheter blocks the blood flow distal to the inflation site and produce ischemia. On the other hand, perfusion balloons seals the defect, permit distal vessel perfusion, and reduces the ischemia during prolonged inflation. Polytetrafluoroethylene-covered stents [14-16], and autologous vein graft-covered

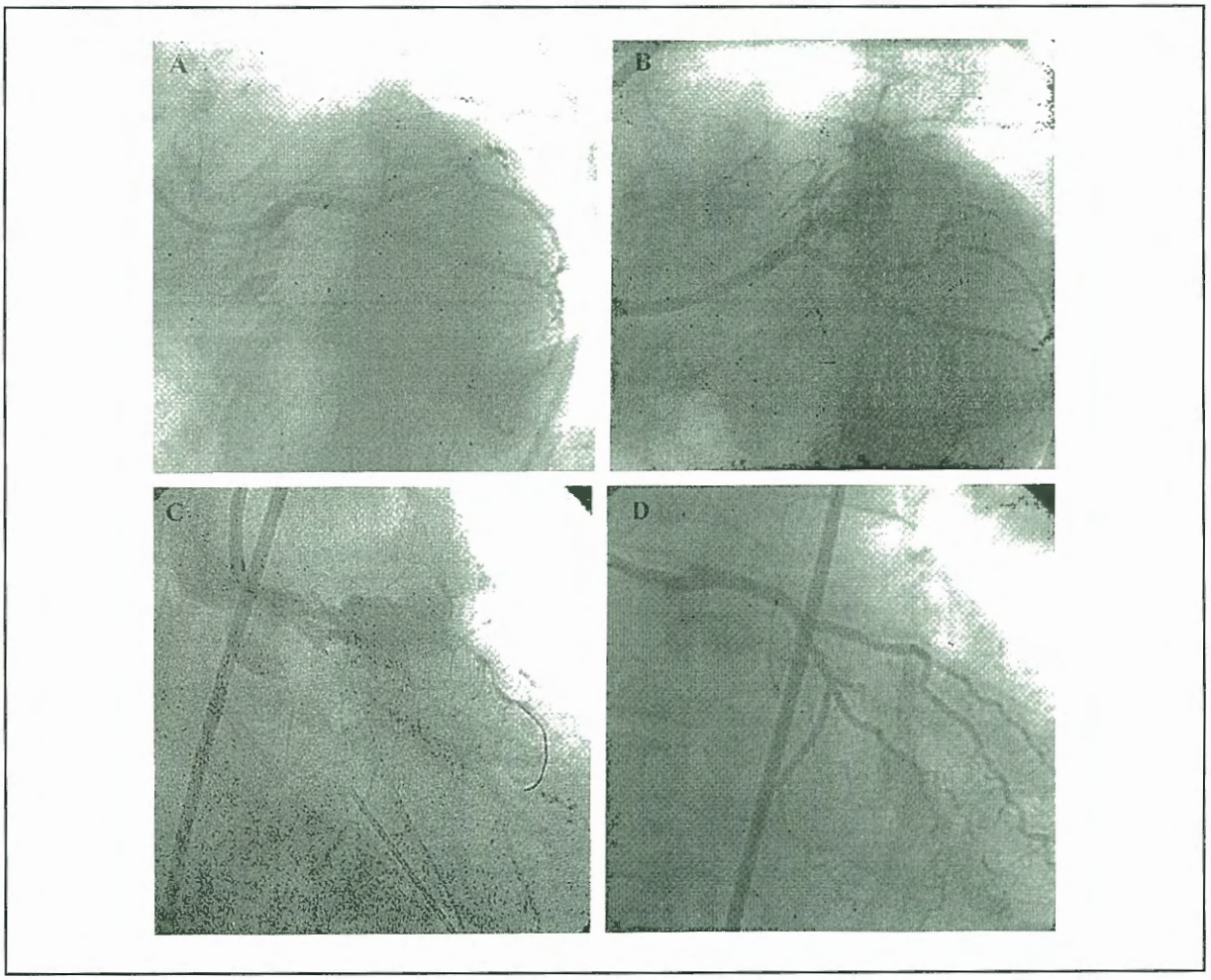

Figure 1. Coronary angiogram during excimer laser angioplasty. **A**, baseline angiography, total occlusion of left anterior descending artery. **B**, Coronary rupture and leakage of contrast at the level of LAD ostium. **C**, Deployement of PTFE-covered stent. **D**, Final result after PTFE-coated stent with no further leakage.

stents may be successful as reported in previously in case of the failure with prolonged balloon inflation, bare stents, [7-10]. High rate of success have been reported with polytetrafluoroethylene covered-stents [14-16]. AVG-coated stents could be difficult to handle in emergencies. Other devices have been used in limited number of cases with coronary artery perforation such as micro-coil embolization [17].

There was no time to prepare AVG-stent in our case because of massive leakage and acute detoriation of the patient, and bare stent would be ineffective because of the location of the perforation. We inflated and sealed the perforation successfully with PTFE-covered Jo-stent.

Recently covered stents have been an alternative therapy to emergency cardiac surgery in selected patients with coronary perforation. Coated stents, avoiding blood leakage between stent struts, may be an alternative to emergency surgery especially in case of rapid detoriation and should be the choice of therapy in case of coronary perforation.

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