

A Percutaneous Coronary Intervention Complication: Coronary Perforation

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Abstract

Coronary perforation is the most feared and lethal complication in the catheterization laboratories. Perforation incidence is reported to be between 0,2 - 0,6%. Sixty nine year-old patient with a typical angina pectoris and having a positive effort test was admitted to the catheter laboratory for coronary angiography. In the coronary angiography, Biomime stent was deployed with nominal pressure to the mid segment of the left anterior descending (LAD) artery which was found to have a 80% stenosis. In order to obtain optimal expansion, postdilatation was performed with a powerline balloon. After postdilatation, Ellis grade III perforation was developed. Bleeding control was achieved with implantation of a 3,0×19 mm graft stent to the perforation site. In the echocardiographic investigations, the patient did not exhibit any pericardial fluid and tamponade findings so the patient was discharged after 48 hours.

Key Words: Percutaneous Coronary Intervention; Coronary Perforation; Covered Stent.

Perkutan Koroner Girişim Komplikasyonu: Koroner Perforasyon

Özet

Koroner perforasyon, kateterizasyon laboratuvarının en korkulan ve ölümcül olabilen komplikasyonudur. Perforasyon sıklığı %0,2-0,6 olarak bildirilmiştir. Koroner perforasyonda, işlemi yapan kardiyologun kılavuzlarda bildirilen yetkinliğe sahip olması, kateter laboratuvarında covered stent bulunması hayat kurtarıcı olmaktadır. Efor testi pozitif olan, tipik anjina tanımlayan 69 yaşındaki hasta koroner anjiyografi için kateter laboratuvarın alındı. Koroner anjiyografide sol ön inen koroner arter (LAD) orta segmentte saptanan %80 darlığa Biomime stent nominal basınçla yerleştirildi. Optimal açılımı sağlamak için powerline balon ile postdilatasyon uygulandı. Postdilatasyon sonucu Ellis grade III perforasyon gelişti. Perforasyon bölgesine 3,0×19 mm graft stent implante edildi. Yapılan ekokardiyografi incelemelerinde perikardial mayii ve tamponat bulguları saptanmayan hasta stabil olarak taburcu edildi.

Anahtar Kelimeler: Perkutan Koroner Girişim; Koroner Perforasyon; Kaplı Stent.

INTRODUCTION

Coronary perforation is an extremely rare complication with a high mortality rate. Technical developments in invasive cardiology have paved the way for more complicated procedures. As a result of these procedures, coronary perforation is being seen more and more often. Coronary perforation is usually seen in lesions that are classified as type B and C according to American Heart Association/American College of Cardiology (AHA/ACC) classification (1). Ellis *et al.* developed a new classification according to the size of perforation (2). Mortality rate is dependent upon the size of the perforation and the form of therapy.

CASE REPORT

Effort test that was performed to a 69-year-old male patient which had a complaint of angina pectoris was found to be positive. The patient who had coronary artery disease risk factors of diabetes mellitus, hypertension and hyperlipidemia was using insulin, cilazapril, amlodipine, metoprolol, atorvastatin and fenofibrate. During coronary angiography, (Axiom Artis,

Siemens, Germany) 2,75×40 mm sirolimus eluting Biomime stent (Meril Life Science Pvt. Ltd. Maharashtra, India) was deployed with nominal pressure to the 80% stenosis of LAD mid segment. Because it was concluded that complete expansion was not established, with a 3,0×10 mm powerline balloon (Biosensors International Group, USA) 18 atm postdilatation was performed from distal to the proximal in order to assure optimal expansion (Figure 1). In the control cineangiogram, it was seen that there was a Ellis Class III perforation and opaque extravasation (Figure 2).

Sudden onset of chest pain, agitation, tachycardia and hypotension was developed in the patient. In order to neutralize the effect of heparin that was administered prior to the procedure, 1 mg protamine was administered intravenously for every 100 units of heparin. Stent balloon was pumped with 8 atm pressure in the region where opaque extravasation has occurred. Afterwards, a polytetrafluoroethylen (PTFE) covered JoStent Graftmaster VR stent (Abbott Vascular, Redwood city, CA, USA) with a size of 3,0×19 mm was implanted rapidly to ensure bleeding control. The patient that was devoid of any opaque extravasations in coronary angiogram was admitted to intensive coronary

care unit and vital signs were monitored closely. He was followed up with echocardiography for fluid collection in pericardial space and tamponade development. After 48 hours, the patient with no fluid collection in the pericardial space and stable findings was discharged.

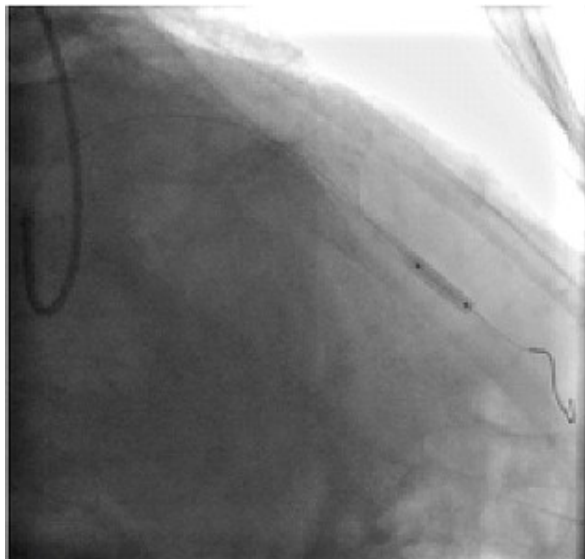


Figure 1. Postdilatation of Biomime stent (2.7x40 mm) with powerline balloon (3x10 mm) at high pressure (18 atm)



Figure 2. Ellis class III coronary perforation. Arrow; Shows contrast jet flow

DISCUSSION

Coronary perforation incidence was reported to be between 0,2-0,6% and the mortality was reported to be 9,5-21,2% in some series (2-4). Dramatic clinical presentation, rapid progression and rapid deterioration of the patient status require a prior preparation for this complication. In the case of a coronary perforation, the fact that the cardiologist performing the operation

should have competence that has been reported in the guidelines and the presence of a covered stent in the catheterization lab is life saving.

Risk factors for coronary perforation are as follows; advanced age, female gender, renal function disorder, heart failure, grade B and C coronary lesions according to AHA/ACC classification, usage of a hydrophilic or rigid guide wire, selection of a large diameter stent and/or balloon, expansion of the balloon with high pressure and usage of a cutting balloon (1-5).

The determinant for mortality in perforation cases is the size of the perforation. According to the classification set by Ellis et al: Class I perforations are crater formations without extravasation, Class II is pericardial and myocardial coloration without contrast jet and Class III perforations are perforations with a diameter bigger than 1 mm that have a jet flow (2).

Prognosis is good in Class I but poor in Class II and III perforations. There is rapid progression to tamponade in Class III perforations. Class II and III perforations can be treated by perfusion balloon or PTFE covered stent graft in the catheter laboratories. Those patients treated with covered stents have better prognosis compared to the patients who had surgery (4-6). In our patient, the lesion was a type C lesion according to AHA/ACC classification. The patient was a geriatric patient. The balloon / vessel diameter rate that was chosen for post-dilatation was 1,2 and maximal pumping pressure was 18 mmHg. Our case was carrying at least four of the risk factors for coronary perforation.

Immediate use of covered stent in the case of coronary perforation prevents tamponade, development of cardiogenic shock and emergency surgery by providing bleeding control. For this reason, the necessity of having a perfusion balloon and covered stent should be added to the guidelines of the centers which perform these procedures.

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Received/Başvuru: 05.06.2013, Accepted/Kabul: 08.07.2013

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For citing/Atıf için

Yildiz A, Bagirtan B. A percutaneous coronary intervention complication: coronary perforation. J Turgut Ozal Med Cent 2013;20:338-40. DOI: 10.7247/jtomc.2013.946