



Successful Treatment of Coronary Artery Perforation with Hand-Made Covered Stent

Koroner Arter Perforasyonunun El Yapımı Greft Kaplı Stentle Onarımı

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CASE REPORT
OLGU SUNUMU

ABSTRACT
ÖZET

Coronary perforation is a rare complication of percutaneous coronary intervention with an incidence of 0.2% to 0.6 %. According to the classification of Ellis et al., Type III is the most life threatening type of perforation which needs to be treated with emergency surgery or grafted stents. In this report we describe a case of coronary perforation which occurred during primary PCI of the right coronary artery and was treated with a hand-made covered stent. The technique which we were obliged to use in this case was successful in closure of the perforated segment and prevented progression to tamponade.

Key words: Acute coronary syndrome, percutaneous transluminal coronary angioplasty, coronary artery perforation

Koroner arter perforasyonu, koroner girişim yapılan hastaların %0,2-0,6'sında görülen ölümcül seyredebilecek bir komplikasyondur. Ellis sınıflamasına göre tip III perforasyon en mortal seyreden grup olup, greftli stent implantasyonu veya acil cerrahi müdahale gerektirir. Bu yazıda, akut inferior miyokard infarktüsü tanısıyla koroner anjiyografiye alınan ve sağ koroner artere direkt stent implantasyonu sonrası koroner perforasyon gelişmesi üzerine el yapımı greft stent ile rüptüre bölgenin kapatılmasını anlatmaktayız. Bu vakada uygulamak zorunda kaldığımız yöntem, rüptüre segmenti tamamen kapatmış ve tamponad gelişmesini engellemiştir.

Anahtar kelimeler: Akut koroner sendrom, perkütan transluminal koroner anjiyoplasti, koroner arter perforasyonu

Introduction

With the advances in device technology, percutaneous coronary intervention (PCI) has become an indispensable option for treatment of coronary artery disease (1). However, the frequency of complications associated with these procedures has also increased. Coronary artery perforation is a rare but life-threatening complication of percutaneous coronary intervention (PCI), with an incidence of 0.2% to 0.6% (2-5). Cardiac tamponade, myocardial infarction and even death are potential complications (6). Therapeutic options include emergency coronary artery bypass grafting (CABG) surgery, covered stent implantation and embolisation if perforation occurs at distal segments of the coronary artery (7). Previously, Ellis et al. (4) described a classification for coronary perforations. According to this classification, Type III is the most fatal type of perforation which usually needs to be treated with emergency surgery or covered stents (1). In this report we describe a case of coronary perforation which occurred during primary PCI of the right coronary artery that was successfully sealed with a hand-made covered stent.

Case Report

A 42 year old male patient was admitted to the emergency unit with resuscitated sudden cardiac death. Before arrival at the hospital, he was resuscitated in the ambulance for 40 minutes and sinus rhythm was obtained. On his first physical examination there was pupillary dilatation and the Glasgow score was 3 points. Pulse rate was 97/min and systolic blood pressure was 100 mmHg on cardiac examination. Presenting electrocardiogram revealed ST segment elevation in leads II, III and aVF. After administration of ASA (300 mg) and Clopidogrel (600 mg) at the emergency department, he was transported to the catheterization laboratory for emergency coronary angiography. Coronary angiogram revealed severe obstruction of the left anterior descending artery and total occlusion of the right coronary artery (RCA). After crossing the occluded segment of the RCA with a floppy guide wire, we implanted a 3.5x25 mm bare metal stent (BMS) at 16 atmospheres without predilatation. Cineangiogram obtained after implantation of the stent revealed severe Ellis Type III coronary perforation a in the right coronary artery close to the proximal edge of the stent. We decided to implant a polytetrafluoroethylene-covered stent; however, the size of the largest covered stent at our laboratory was 3.0 mm x 16 mm. In order to maintain adequate coronary flow we compulsorily invented a hand-made covered stent by covering a 3.5 mmx18 mm BMS with the outer surface of a 3.5 mmx15 mm balloon catheter. Following implantation of two hand-made covered stents to the perforated segment of the right coronary artery, leakage of contrast agent to the pericardial space was stopped (Figure 1). During the post-interventional period, close echocardiographic follow-up ruled-out pericardial tamponade. Unfortunately,

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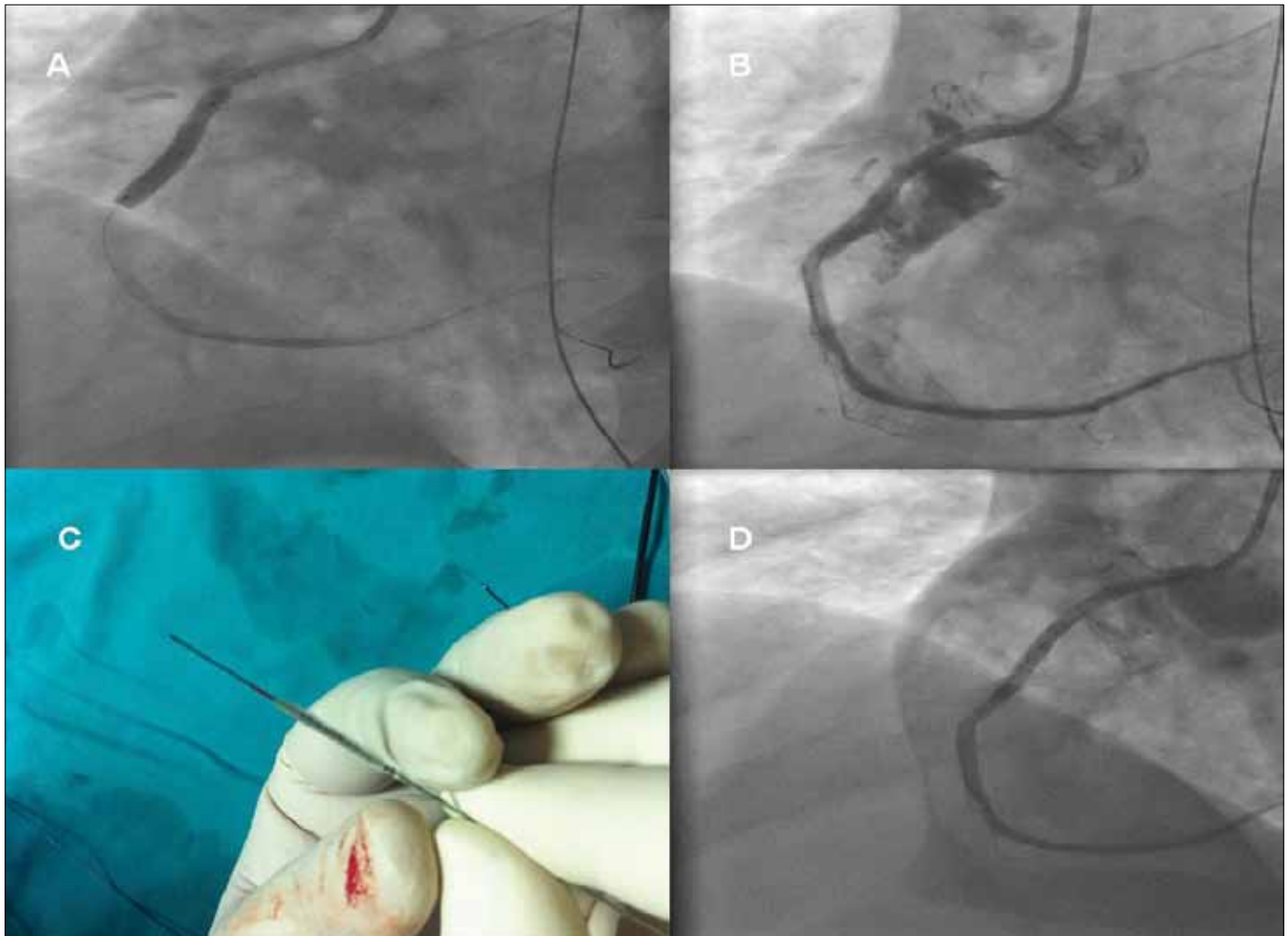


Figure 1. Implantation of 3.5x25 mm BMS resulted in a huge Ellis type III rupture close to the proximal edge of the stent. We produced a hand-made covered stent by replacing the outer surface of a coronary balloon catheter over a 3.5x18 mm BMS. After implantation of the hand-made covered stent, contrast leakage to pericardial space stopped

the patient died days later due to septic shock caused by nosocomial pneumonia.

Discussion

Coronary artery perforation during PCI is a rare but potentially lethal complication. Sudden accumulation of blood in the pericardial space may lead to pericardial tamponade and even death (8). Therefore, rapid closure of the perforated segment is crucial to slow-down and reverse the fatal cascade. Several devices have been introduced to repair coronary perforations occurring during PCI. Among them, the most popular devices are polytetrafluoroethylene-covered stents made of an inert and biocompatible polymer composed of carbon chains saturated with fluorine (7, 9). However, emergency CABG is usually necessary in severe Ellis Type III perforations and cases with hemodynamic compromise even after successful covered stent implantation (1, 10).

In the present case we implanted a BMS covered with a balloon catheter to the perforated coronary artery segment. In this case, emergency surgery was also an alternative treatment strategy for

this procedure. However, time needed to prepare the operation room and staff for surgery was too long to keep the patient alive. Hence, we were constrained to invent this alternative and attractive life-saving technique. Fortunately, this technique was effective in keeping the patient alive and protecting from pericardial tamponade with its serious complications.

Coronary artery perforation is a rare but lethal complication of coronary interventions. Actually, the different sizes of covered stents should be ready in the catheterization laboratory for successful management of coronary perforation. However, in this report; we describe one of the most feared complications of PCI which was treated successfully using a hand-made covered stent.

Conclusion

In cases with coronary artery rupture due to percutaneous coronary intervention and in the absence of an optimal size of covered stent, bare metal stents covered with the surface of a coronary balloon catheter might be used as a covered stent for saving the patient's 'life.

Conflict of Interest

No conflict of interest was declared by the author.

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Authors' contributions: Conceived and designed the experiments or case: BŞ. Performed the experiments or case: BŞ, YD, SK. Analyzed the data: HS, HA. Wrote the paper: BŞ, AOB. All authors have read and approved the final manuscript.

Çıkar çatışması

Yazarlar herhangi bir çıkar çatışması bildirmemişlerdir.

Hakem değerlendirmesi: Bağımsız hakemlerce değerlendirilmiştir.

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