

Pericardial Bleeding Following Covered Stent Thrombosis: Sharp Blade on Both Sides

Kaplı Stent Trombozu Sonrası Perikardiyal Kanama: İki Ucu Keskin Bıçak

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ABSTRACT

Advancements in coronary stent technology encourage interventional cardiologists in performing more complex, percutaneous interventions. Coronary perforation is a lethal complication of percutaneous coronary artery interventions and should be managed within seconds to minutes. Despite technological advancements, coronary perforation incidence has not declined over the years. This consistent incidence of coronary perforation may be related to increased number of complex, percutaneous coronary artery interventions. Covered stent implantation is a life-saving solution during the course of this emergent complication but also carries its own short and long term risks in the follow-up of these patients. Herein this report, we aimed to present a successful management of a case of coronary perforation by covered stent implantation but complicated during in-hospital period in the following days.

Key words: Covered Stent Thrombosis, Pericardial Bleeding, Complication

ÖZ

Koroner stent alanındaki teknolojik gelişmeler girişimsel kardiologları daha kompleks perkütan girişimler gerçekleştirme konusunda cesaretlendirmektedir. Koroner perforasyon perkütan koroner arter girişimleri esnasında görülebilen ölümcül bir komplikasyondur ve saniyeler veya dakikalar içerisinde müdahale edilmelidir. Geçen yıllar içerisinde teknolojik gelişmeler olmasına karşın koroner perforasyon sıklığı azalmamıştır. Koroner perforasyon sıklığında azalma olmamasının kompleks, perkütan koroner arter girişimlerinde artış görülmesiyle ilişkisi olabilir. Kaplı stent implantasyonu acilen müdahale edilmesi gereken bu komplikasyonun seyri sırasında hayat kurtarıcı bir çözümdür ancak bu hastaların takiplerinde, kısa ve uzun dönemde kendine özgü riskler oluşturmaktadır. Bu yazıda, kaplı stent implantasyonu ile başarılı müdahale yapılan ancak takip eden günlerde hastane içi dönemde komplikasyon yaşadığımız bir koroner perforasyon vakasının sunmayı amaçladık.

Anahtar Kelimeler: Kaplı stent trombozu, Perikardiyal kanama, Komplikasyon

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Coronary perforation (CP) is rarely seen but is a frightened complication of percutaneous coronary interventions [1]. Overall incidence of CP has not decreased during last decade and this is mostly related to increase in the complexity of percutaneous coronary interventions along with the advancements in interventional cardiology practice.[2-3].Most serious type of CP is Ellis type-III perforation and it is related to higher percentages of pericardial effusion, cardiac tamponade and death. [4]. Covered stent implantation seems to be the best choice in the emergent management, however this approach carries unique risks in the latter follow-up period.

CASE REPORT

A-67-year-old male patient underwent diagnostic coronary angiography for stabil angina complaints and a positive treadmill exercise test. Coronary angiography revealed 2 distinct, tandem LAD stenosis (Figure-1a) (Video-1). First lesion was bifurcation disease at the level of LAD-dominant Dg side branch and second one was a long segment, calcific stenosis at the level of mid LAD. After predilatation of second stenosis Endeavor Resolute 2.5x30mm drug eluting stent (DES) (Medtronic, MN, USA) has been implanted at 15atm pressure. Because of under-expansion of mid portion of stent we performed postdilatation with Sprinter 2.5x21mm non-compliant balloon at 16atm pressure for several times. Residual under-expansion was noticed. Culotte bifurcation stenting had been performed successfully for Medina 1.1.1 LAD-Dg bifurcation disease (Endeavor Resolute 3.0x24mm DES for LAD and Endeavor Resolute 3.0x15mm DES for Dg). We wanted to postdilate mid portion of mid LAD stent and Sprinter 2.5x21mm non-compliant balloon had been inflated for several times and maximum at 24atm pressure. Following postdilatation, Ellis type-III CP was detected and hemodynamical disturbance and severe bradycardia occurred within seconds (Figure-1b) (Video-2). We quickly implanted a Graftmaster 2.80x19mm covered stent (Abbott Vascular, Santa Clara, CA) at 12atm pressure at perforation. Trans-thoracic echocardiography revealed large pericardial effusion and we performed pericardiocentesis and 400mL fresh blood was drained. We did not detect any recurrent pericardial fluid on serial echocardiographic evaluations.

After 48 hours, during follow-up period ST segment elevation in anterior chest derivations was detected

and emergent coronary angiography revealed subacute graft stent thrombosis (Figure-2a) (Video-3). Following recurrent balloon predilatations intimal dissections were seen before and after covered stent and for proximal dissection Endeavor Resolute 2.75x24mm DES and for distal dissection Endeavor Resolute 2.25x24mm DES had been implanted. Because of LAD slow flow, persistant ST segment elevation and resistant anginal complaints we started tirofiban infusion. There was no leakage to pericardial space in final views.

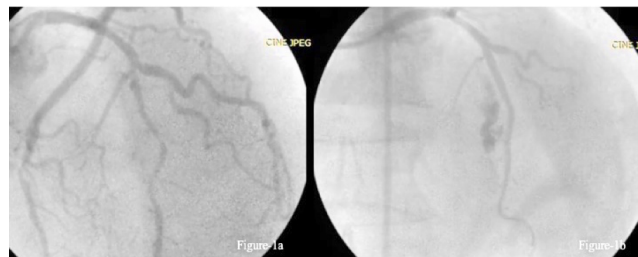


Figure-1a: Diagnostic coronary angiography revealed LAD-Dg bifurcation disease and mid LAD long segment, calcified stenosis. 1b: Ellis type-III perforation after post dilatation of stent at mid segment of LAD.



Video 1.

After 24 hours following the percutaneous intervention for covered stent thrombosis While tirofiban infusion was continuing, we examined severe bradycardia and transthoracic echocardiography revealed hyperechogenic, large pericardial effusion. We could not able to drain effusion percutaneously. Surgical drainage of pericardial effusion was planned and while operation room was being prepared, we performed control coronary angiography for any possible residual leakage to pericardial space and there was not any leakage into pericardial space (Figure-2b) (Video-4). Massive, organized hematoma (Figure-2c&d) was emptied from pericardial space and patient was uneventful following surgical drainage.

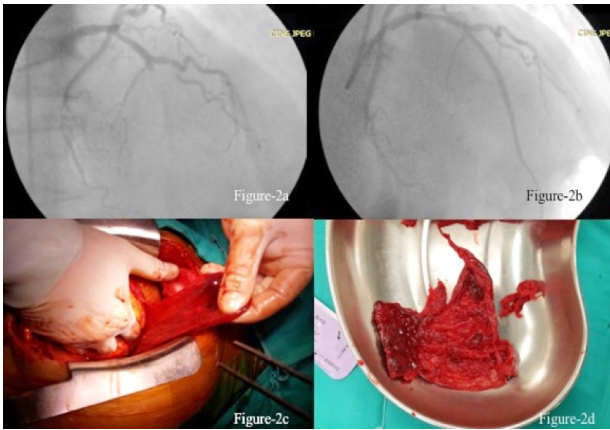


Figure-2a: Subacute thrombosis of LAD covered stent at 2nd day following intervention. 2b: After pericardial bleeding diagnostic coronary angiography was taken and there was not any detectable leak from perforation side. 2c&d: Intraoperative images of organized pericardial bleeding and hematoma.



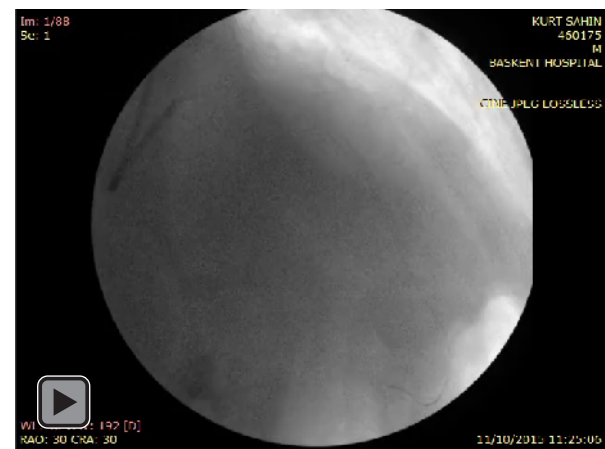
Video2.

DISCUSSION

CP is a rare but distinct and frightful complication of percutaneous coronary interventions. Its incidence has not changed over the years, this may be related to increased complexity of percutaneous coronary interventions. CP during percutaneous coronary interventions should be managed promptly because clinical presentation can be worse within seconds. [5-6]. Contrast streaming or cavity spilling Ellis type-III CP generally need to block leakage between coronary lumen and extravascular space quickly. [7]. Polytetrafluoroethylene covered stent implantation is a good choice for emergent management of CP and can be implanted to perforation site to block leakage promptly. [8]. Although covered stents show great success to treat the emergent condition, they are related to higher per-



Video3.



Video4.

tages of acute/subacute and late stent thrombosis and also have increased need for target lesion revascularization in the long-term follow-up. [9-10]. We should keep in mind that covered stents are life-saving but on the other hand they have their own thrombogenic properties. [11-12].

Pericardial effusion and hematoma is one of the most serious complications of percutaneous coronary interventions. [13]. Ellis type-III CP have an incidence of 45.7% pericardial effusion and cardiac tamponade development. [14]. Unrelated to amount of fluid accumulated, these patients have rapid deterioration because of effusive-constrictive pericarditis development. [15]. Pericardiocentesis is first line treatment choice but drainage of pericardial fluid can not be performed successfully in cases with organized hematoma. Emergent surgical intervention is the best choice in these patients. In our case, we examined hematoma

formation without any residual leakage from previous coronary perforation site. Organized hematoma development was detected in a delayed period after 24 hours following the percutaneous intervention for covered stent thrombosis. In a retrospective evaluation, it has been postulated that delayed intrapericardial hematomas following percutaneous coronary interventions can be seen without any actual site of perforation or leakage.[16] Another possible causes of pericardial tamponade formation following percutaneous coronary interventions are the left ventricular free wall rupture and iatrogenic aortic dissection.[17,18] Left ventricular free wall rupture should be kept in mind especially in patients presenting with acute, transmural myocardial infarction and late onset of pericardial tamponade development in the follow-up.[17] Iatrogenic aortic dissection is also a rare but lethal complication of percutaneous cardiac interventions. Rapid deterioration of hemodynamic status during on-going coronary intervention in catheter laboratory is typical finding of possible aortic dissection and pericardial tamponade development.[18] In our case, we did not detect any echocardiographic finding consistent with possible left ventricular free wall rupture or iatrogenic aortic dissection. We thought that previously damaged visceral pericardium was the cause of bleeding and this excess bleeding could be precipitated with the usage of additional anticoagulant (unfractionated heparin) and antiplatelet (tirofiban) during the treatment of covered stent thrombosis.

CONCLUSION

CP is a rare complication of percutaneous coronary interventions, however its' incidence has not decreased further probably due to the increase in complexity of current interventional Cardiology procedures. Severity of CP determines the management of this complication and Ellis type-III CP generally needs to intervene emergently. Covered stents are good choices to manage this lethal complication in catheter laboratory however they carry their unique thrombogenic properties. In conclusion, acute/subacute or late thrombosis of covered stents are more frequently seen than drug eluting stents and there are limited data about the management of anticoagulant and antiplatelet regimen in the treatment of covered stent thrombosis.

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