

Coronary artery bypass graft surgery for right coronary artery: balloon catheter entrapment

Sağ koroner arter için koroner arter baypas greft cerrahisi: Balon kateteri sıkışması

Metin Hıdıroğlu, Aslıhan Küçükler, Ayşegül Kunt, Levent Çetin, Erol Şener

Department of Cardiovascular Surgery, Atatürk Training and Research Hospital, Ankara, Turkey

Percutaneous coronary interventions which are widely performed for atherosclerotic heart diseases have become almost an outpatient practice. However, being an invasive intervention, coronary angiography and percutaneous coronary interventions may have some serious complications. In this article, we report an 81-year-old male case with a complication of percutaneous coronary intervention where the balloon catheter was entrapped in the right coronary artery and emergent coronary artery bypass grafting was required. This report aims to emphasize the need for a cardiovascular team in hospitals performing percutaneous coronary interventions although some respected guidelines do not require such a set-up.

Keywords: Cardiac surgery; catheter entrapment; percutaneous coronary intervention.

Percutaneous coronary interventions (PCIs) are accepted as effective treatment modalities in coronary artery atherosclerotic diseases with balloon angioplasty or stent applications. In the recent literature, the complication rates of PCI requiring emergency cardiac surgery have been decreased from approximately 6-4% to as low as 0.6-0.3% with the advancements in the interventional techniques.^[1] Primary PCIs are considered to be reasonable in hospitals without on-site cardiac surgery in accordance with the 2011 ACCF/AHA/SCAI (American College of Cardiology Foundation/American Heart Association/Society for Cardiovascular Angiography and Interventions) PCI Guidelines (Class IIa, level of evidence B)^[2] Although the complication rates requiring surgery are low, it cannot be excluded totally. Therefore,

Aterosklerotik kalp hastalıklarında perkütan koroner girişimler yaygın uygulanmakta olup, neredeyse hastane yatışı gerektirmeden uygulanabilecek hale gelmiştir. Ancak, invaziv bir girişim olduğu için, koroner anjiyografi ve perkütan koroner girişimlerin bazı ciddi komplikasyonları olabilmektedir. Bu yazıda, perkütan koroner girişim sırasında sağ koroner arter içerisinde sıkışan ve acil koroner arter baypas grefleme gerektiren perkütan koroner girişimin bir komplikasyonunun görüldüğü 81 yaşında bir erkek olgu sunuldu. Bu yazı, son yıllara ait bazı saygın kılavuzlarda gerekli görülmemiş olmasına rağmen, perkütan koroner girişimlerin uygulandığı hastanelerde kardiyovasküler ekibin gerekliliğini vurgulamak amacıyla kaleme alınmıştır.

Anahtar sözcükler: Kalp cerrahisi; kateter sıkışması; perkütanöz koroner girişim.

current guidelines may be questioned for the present suggestions.

CASE REPORT

An 81-year-old man was admitted to our hospital with chest pain. He was hospitalized with the diagnosis of non-ST elevated myocardial infarction and atrial fibrillation. Elective coronary angiography revealed non-stenotic atherosclerotic plaques on the left anterior descending artery, 70% and 80% stenosis on the proximal circumflex artery and optional diagonal artery, 80% and 99% stenosis on the right coronary artery (RCA) proximally, and distal to the right ventricular branch. Percutaneous coronary intervention to the RCA was planned. Balloon dilatation to the



Available online at
www.tgkdc.dergisi.org
doi: 10.5606/tgkdc.dergisi.2014.8617
QR (Quick Response) Code

Received: April 11, 2013 Accepted: June 13, 2013

Correspondence: Aslıhan Küçükler, M.D. Atatürk Eğitim ve Araştırma Hastanesi, Kalp ve Damar Cerrahisi Kliniği, 06800 Bilkent, Ankara, Turkey.

Tel: +90 312 - 291 25 25 e-mail: asliastan@yahoo.com

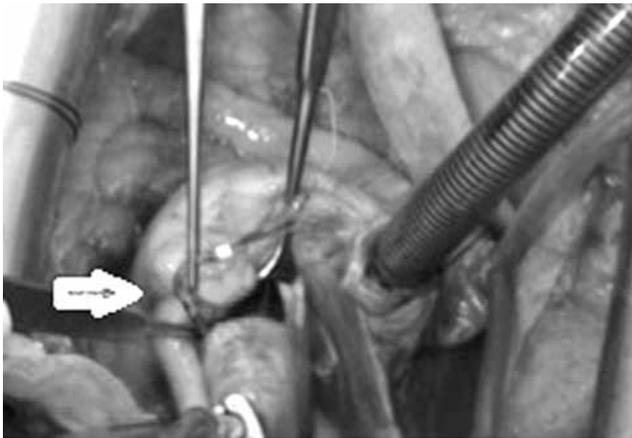


Figure 1. An image of the balloon catheter pulled out from the right coronary artery through aortotomy incision.

distal lesion of the RCA was performed successfully. Nevertheless, balloon dilatation of the proximal lesion failed, as the catheter was entrapped in the artery. Neither deflation nor pulling out the balloon catheter could be accomplished. The patient was referred for emergency operation and was managed by routine coronary artery bypass graft (CABG) operations using saphenous vein grafts.

Cardiopulmonary bypass was established in a standard fashion. The inflated balloon catheter was seen in the proximal part of the RCA. The balloon was deflated with a purified protein derivative (PPD) needle from the outside of the vessel wall. An attempt to pull out the catheter from femoral region was made, however it failed and a small aortotomy incision was done. The catheter was seen in the aorta going into RCA and was pulled out gently (Figure 1). The aortotomy was closed and saphenous vein bypass to the RCA with a sequential graft to obtuse marginal and optional diagonal artery was performed. Cardiopulmonary bypass was terminated and the patient was taken into intensive care unit. The follow-up was uneventful and the patient was discharged on the sixth postoperative day.

DISCUSSION

Despite technical improvements and increased experience in PCIs over time, mechanical complications like catheter entrapment, as seen in our case, do still occur in the current era.^[3,4] Some other complications including myocardial infarction (MI),^[5] bleeding, or vascular access complications,^[6] stent deployment failure,^[7] contrast nephropathy, stroke, tamponade, stent thrombosis and radiation skin injury^[8] are also associated with the use of PCIs. High rates ranging from 5% to

30% of patients undergoing PCI, are reported to have evidence of a peri-procedural MI.^[5] Being an invasive procedure, PCI may lead to mechanical complications requiring emergent cardiac surgery. In such cases, prompt management of the patient along together with cardiovascular surgery is mandatory. Coronary artery perforation is one of these serious mechanical complications requiring emergent cardiac surgery which may lead to cardiac tamponade. Fukui et al.^[9] reported the incidence of coronary artery perforation during PCI to be between 0.2% and 0.8% with a reported rate of 2.9% by Patel et al.^[8] Device entrapment, as seen in our case, also requires emergent cardiac surgery in most cases.^[10] Despite low complication rates, these complications still occur. Therefore, it would be unreasonable to perform these invasive procedures without surgical back-up. Such an approach should be justified only if the complication rates were zero.

We believe that cardiac surgery and interventional cardiology are complementary to each other for the best care of the patients with coronary artery disease. Since complications still do occur, surgical back-up is essential in hospitals where PCIs are performed. Although primary PCI is considered to be reasonable in hospitals without on-site cardiac surgery in 2011 ACCF/AHA/SCAI PCI Guidelines (Class IIa, level of evidence B), our case is a good example of the definite need for surgical back-up and may be the one of many other similar cases that are not reported by surgeons and cardiologists.

Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Oqueli E. Current state of the performance of percutaneous coronary intervention in centres without on-site cardiac surgery. *Intern Med J* 2012;42 Suppl 5:58-67.
2. Levine GN, Bates ER, Blankenship JC, Bailey SR, Bittl JA, Cercek B, et al. 2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. *Circulation* 2011;124:e574-651.
3. Cuttone F, Saplacan V, Sabatier R, Buklas D. Angioplasty balloon catheter entrapment. *Asian Cardiovasc Thorac Ann* 2012;20:491.

4. Hamamoto M, Futagami D. Successful surgical removal of an entrapped intravascular ultrasonography catheter in the left circumflex coronary artery. *Gen Thorac Cardiovasc Surg* 2012;60:830-3.
5. Prasad A, Herrmann J. Myocardial infarction due to percutaneous coronary intervention. *N Engl J Med* 2011;364:453-64.
6. Tavis DR, Wang Y, Jacobs S, Gallauresi B, Curtis J, Messenger J, et al. Bleeding and vascular complications at the femoral access site following percutaneous coronary intervention (PCI): an evaluation of hemostasis strategies. *J Invasive Cardiol* 2012;24:328-34.
7. Nikolsky E, Gruberg L, Pechersky S, Kapeliovich M, Grenadier E, Amikam S, et al. Stent deployment failure: reasons, implications, and short- and long-term outcomes. *Catheter Cardiovasc Interv* 2003;59:324-8.
8. Patel VG, Brayton KM, Tamayo A, Mogabgab O, Michael TT, Lo N, et al. Angiographic success and procedural complications in patients undergoing percutaneous coronary chronic total occlusion interventions: a weighted meta-analysis of 18,061 patients from 65 studies. *JACC Cardiovasc Interv* 2013;6:128-36.
9. Fukui T, Takanashi S, Mihara W, Ishikawa K, Hosoda Y. Coronary endarterectomy and stent removal after iatrogenic perforation. *Ann Thorac Surg* 2004;77:708-11.
10. Iturbe JM, Abdel-Karim AR, Papayannis A, Mahmood A, Rangan BV, Banerjee S, et al. Frequency, treatment, and consequences of device loss and entrapment in contemporary percutaneous coronary interventions. *J Invasive Cardiol* 2012;24:215-21.