

Transcutaneous Puncture and Successfully Retrieval of Undelected Peripheral Angioplasty Balloon

Sönmemiş Periferik Anjiyoplasti Balonunun Transkütanoz Ponksiyonla Başarıyla Geri Alınması

CASE REPORT OLGU SUNUMU

ABSTRACT

Percutaneous transluminal angioplasty has gained increasing popularity in the treatment of peripheral artery disease. However, the increase in the frequency of this procedure also increases the risk of complications. Percutaneous transluminal angioplasty has serious and general complications in terms of device and technique at puncture and dilatation sites. In this case, we describe the easy and practical management of deflating an undelected balloon in the right superficial femoral artery.

Keywords: Complication, percutaneous transluminal angioplasty, peripheral artery disease, undelected balloon

ÖZET

Perkütan transluminal anjiyoplasti periferik arter hastalığı tedavisinde artan bir popüleriteye ulaşmıştır. Ancak bu işlemin zaman zaman ponksiyon ve dilatasyon yerlerinde cihaz ve teknik açısından ciddi komplikasyonları ve genel komplikasyonları vardır. Biz bu vakamızda yüzeysel femoral arter içinde sönmemiş bir balonun geri alınmasının kolay ve pratik yönetimini anlattık.

Anahtar Kelimeler: Komplikasyon, perkütan transluminal anjiyoplasti, periferik arter hastalığı, sönmemiş balon

Percutaneous transluminal angioplasty (PTA) has achieved increasing popularity in the treatment of peripheral artery disease (PAD).¹ However, this procedure occasionally has serious complications at the puncture and dilatation sites, regarding the device and technique, and general complications.² In this case, we explained the easy and practical management of an undelected balloon inside the right superficial femoral artery (SFA).

Case Report

A 72-year-old man with claudication was referred to our clinic. Prior to the intervention, the patient was informed and the written informed consent was obtained. His lower extremity angiogram showed total occlusion of the right SFA (Video 1*) and PTA was considered. Following heparinization at a dose of 100 U/kg, a 6F sheath was placed into the left common femoral artery (CFA). A destination sheath has positioned as a crossover to the right CFA. The occlusion was crossed using a stiff hydrophilic wire with the support of a microcatheter, and a 6.0 × 100 mm drug-eluting balloon was performed (Video 2*). After 4 minutes of inflation, the balloon was tried to deflate, but it resisted deflating back despite repeated attempts. Firstly, we changed the device, as it could not deflate the balloon this time. We changed the contrast agent with saline and used a couple of inflators, but all the attempts were futile. We inflated the balloon from 12 to 14 ATMs and tried again to deflate it back, but this maneuver was also inconclusive. Later, we cut the distal hub of the balloon, but this did not work. Finally, we drained the balloon transcutaneously with a Seldinger needle under the guidance of fluoroscopy and consequently, the balloon was retrieved successfully (Video 3*). The last angiography showed optimal recanalization of the target lesions without the development of any complication (Video 4*).

Khagani İsgandarov, M.D.¹ 

Abdulrahman Naser, M.D.¹ 

Müslüm Şahin, M.D.² 

Tolga Sinan Güvenç² 

¹Department of Cardiology, VM Medical Park Pendik Hospital, İstanbul, Turkey

²Department of Cardiology, İstinye University, İstanbul, Turkey

Corresponding author:

Khagani İsgandarov
✉ kisgandarov88@gmail.com

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Discussion

PTA is an established method in the treatment of occlusive PAD; however, it can cause a variety of complications.^{1,2} The usual complication of PTA are access site complications, thromboembolism, dissection, and acute kidney injury.

Failure to deflate the balloon is a rare but potentially serious complication in PTA. Different mechanisms have been reported regarding this event. Acute recoil of a severely calcified lesion after balloon inflation with compression of the deflating balloon around the entry port, strangulation of the proximal end of the balloon by the guiding catheter before complete deflation, and an invisible kink in the metallic hypotube, which allows positive pressure inflation but not negative pressure deflation, are the possible reasons for undeflation.^{3,4} The viscosity of the contrast agent also plays an important role during balloon deflation. The higher viscosity may prolong balloon deflation times which could be detrimental during interventions.⁵ Finally, manufacturing defect and reused materials may also be the possible reasons for the undeflated balloon.¹⁰ As the system was intact and the lesion was not heavily calcified, prolonged inflation of a long balloon with high viscosity contrast agent was considered as the possible mechanism of deflation failure in this case.

An undeflated balloon will occlude the vessel and this can result in critical complications, so it requires emergency bailout. There are no validated bailout methods for this complication and balloon entrapment during PTA often requires emergency surgery.⁶ Several methods have been proposed for the treatment of this problem. The best is to deal with the related underlying mechanism. Firstly, applicable options include dilution of the contrast media with saline to reduce its viscosity and respectively negative aspiration of the balloon. This technique did not work in our case. A classic bailout method is to burst the balloon by prolonged inflation and forcing well. This maneuver should be performed in a large vessel such as an aorta to avoid arterial rupture.⁴ The hard tip of a stiff guidewire, a cutting balloon, or a small guiding catheter are usually used for bursting an inflated balloon as well;^{7,8} however, this approach has a significant risk of vessel damage.⁹ The previous 2 maneuvers were not performed in our case. Transecting the shaft of the balloon to facilitate passive balloon deflation³ also could not deflate the balloon in our case.

Pulling out the whole system as reported in 1 case¹⁰ was not considered in our patient, as it requires aggressive traction that

could result in arterial trauma. In another case, the operator pulled back all the system from the coronary artery which was then stuck in the small and vasospastic radial artery that was finally punctured transcutaneously.⁴ In the last case, however, the operator removed the balloon. This method carries the risk of damaging the integrity of the vessel and causes serious discomfort due to vascular spasm.

In the present case, we retrieved the stuck balloon inside the SFA by direct transcutaneous aspiration without damaging the vessel and disturbing the patient.

Transcutaneous puncture of an undeflated balloon can easily be performed in the SFA with the guidance of fluoroscopy.

*Supplementary video files associated with this article can be found in the online version of the journal.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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ABBREVIATIONS

CFA	Common femoral artery
PTA	Percutaneous transluminal angioplasty
PAD	Peripheral artery disease
SFA	Superficial femoral artery