

Rescue removal of disrupted balloon catheter from right coronary artery and aortic arch

Ratunkowe usunięcie przerwanego cewnika balonowego z prawej tętnicy wieńcowej i łuku aorty

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Abstract

We present the case of a 70-year-old female patient diagnosed with unstable angina, who was qualified to coronarography in a peripheral interventional cardiology department. Critical stenosis of right posterior descending artery was found. During percutaneous coronary intervention, after-stent balloon catheter interrupted and was left partially in the right coronary artery sticking out of the aortic arch. In a second attempt at removal, using an Amplatz GooseNeck snare, operators managed to take the broken balloon out of the intravascular space.

Key words: removal of disrupted balloon catheter, removal of catheter

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A 70-year-old female patient with arterial hypertension, hypercholesterolaemia, and diabetes mellitus type 2 was admitted to an interventional cardiology department due to increasing episodes of chest pain. Troponin I level on admission was < 0.01 ng/mL (cutoff level 0.03). In the ECG, sinus rhythm with a heart rate of 80 bpm was noted. Echocardiogram revealed normal contractility of the left ventricle with ejection fraction of 60%. In coronary angiogram done through the right radial artery, a non-significant (30–40%) stenosis of the left anterior descending artery (LAD) and a 90% stenosis of the right posterior descending artery (RPD) were found.

The patient was qualified for immediate percutaneous coronary intervention (PCI) of RPD. To do this, the operators used a Sheathless Eucath 6.5 F guiding catheter, BMW, Whisper MS, and Whisper ES wires and balloon catheters (BC) of sizes 2.0×15 mm, 2.5×15 mm, and 3.0×15 mm, respectively — expanded up to 12 atmospheres (atm). After the implantation of a drug-eluting stent (DES) Resolute 3.5×15 mm (14 atm), the operators decided to implant another DES Resolute Integrity 3.5×38 mm (14 atm) to the distal part of the right coronary artery (RCA). During removal of the post-stent BC, there was break in the BC shaft. The

proximal part of the BC remained in the RCA and caused occlusion of ostial and proximal RCA with TIMI 0 flow. The distal part of the BC on fluoroscopy was seen in the aortic arch. Whisper MS wire was executed to distal portion of RCA and predilatations with BC's size: 1.5×15 mm, 2.0×15 mm, 2.5×15 mm and 3.0×15 mm were performed (up to 14 atm). All these procedures led to the obtaining of distal TIMI 2 flow.

The operators decided to expel the remaining BC from the RCA. They used an AndraSnare AS (Andramed GmbH, Germany); however, the attempt was unsuccessful. In the middle of the procedure, the patient remained in cardiogenic shock, also a short circulatory arrest was noticed: this responded well to external heart massage and the use of catecholamines. Because of a tendency to bradycardia, an endocavitary electrode was inserted to the right ventricle and rigid stimulation of 100/min was set up. The patient was transferred to the coronary care unit. Also i.v. infusion of integrelin and unfractionated heparin in weight-adjusted doses was implemented. After patient stabilisation, she was transferred to the 2nd Department of Cardiology in Krakow. On admission, the patient was in stable condition, with no

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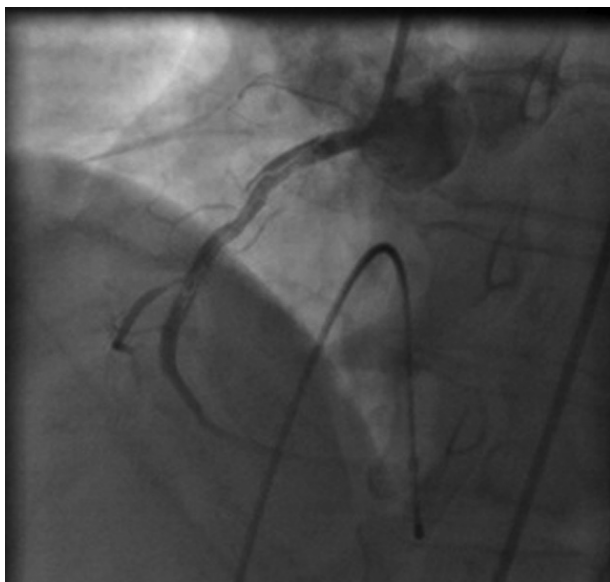


Figure 1. Contrast media injection to right coronary artery — spiral dissection visible in proximal part of the vessel

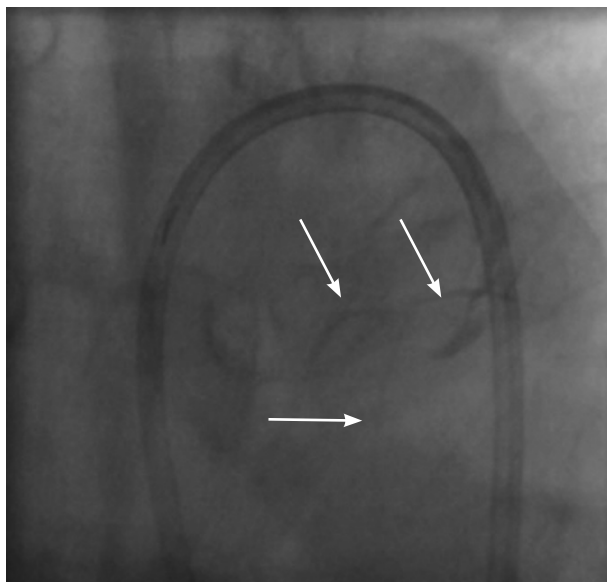


Figure 3. After modification of fluoroscopy projection, distal part of ruptured balloon catheter is visible in the aortic arch (marked with arrows)

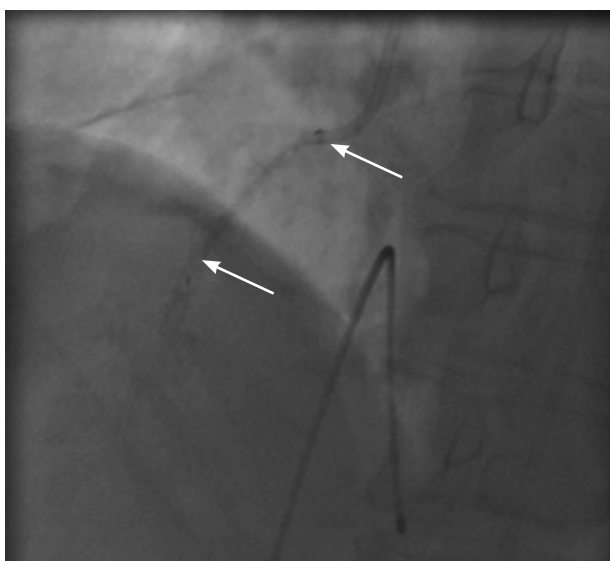


Figure 2. Visible deflated post-stent balloon catheter (marked with arrows)

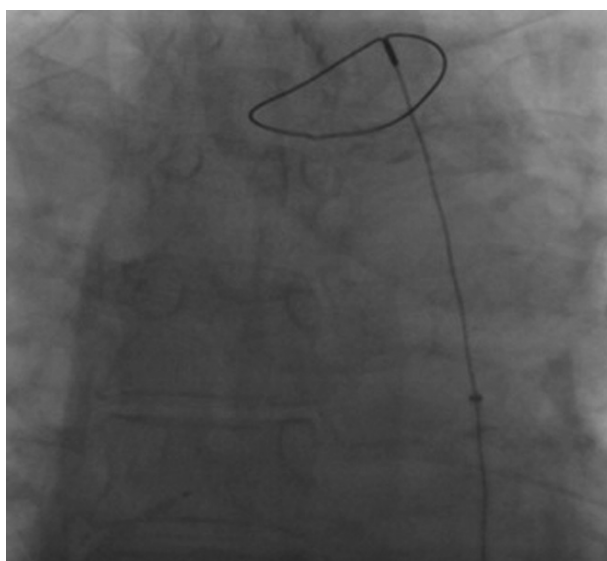


Figure 4. Attempt to catch distal part of broken balloon catheter made with Amplatz GooseNeck®

chest pain. In the control coronary angiogram of the RCA, the spiral dissection was found in the ostium, and I and II segment of artery (Fig. 1). The proximal part of the ruptured BC was also visualised (Fig. 2).

On the day of admission, there was a procedure to remove the broken BC from the RCA. Using the femoral access (7 F) primary to RCA BMW guidewire was inserted. Because of the difficulty of executing the wire through the dissected part of the vessel, the operators replaced it sequentially for guidewires: BHW, Progress 80 and then Floppy II Extra Support.

Because of no progress in wires propagation, the decision was made to use an *over-the-wire* Apex Push microcatheter of 1.5 × 8 mm. After achievement of distal (non-dissected) part of the RCA in order to achieve left BC system, an Amplatz GooseNeck® was used (maximal loop diameter 2 mm). Repeated attempts to catch the proximal part of the BC had no success.

Unfortunately, the shaft of the broken BC had not been measured before it had been thrown away in the peripheral cathlab, so the operators in the Clinic initially had a problem

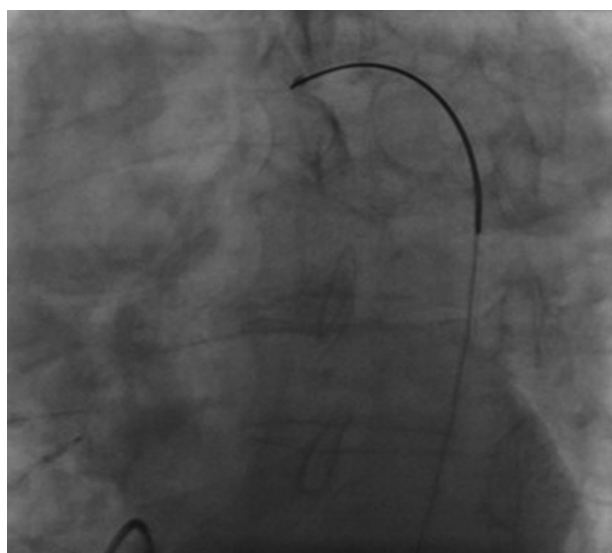


Figure 5. Successful attempt to grip broken balloon catheter. Visible clamped loop

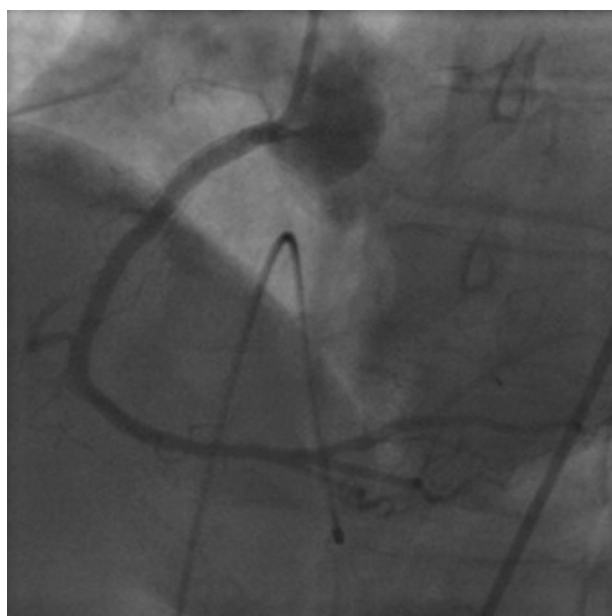


Figure 6. Final results of percutaneous coronary intervention of proximal segment of right coronary artery with stent implantation

estimating the length of broken BC. By using the fast frame function of fluoroscopy, operators visualised the proximal end of the broken BC in the area of ostium of the left subclavian artery (Fig. 3). Using the Amplatz GooseNeck® (maximal loop

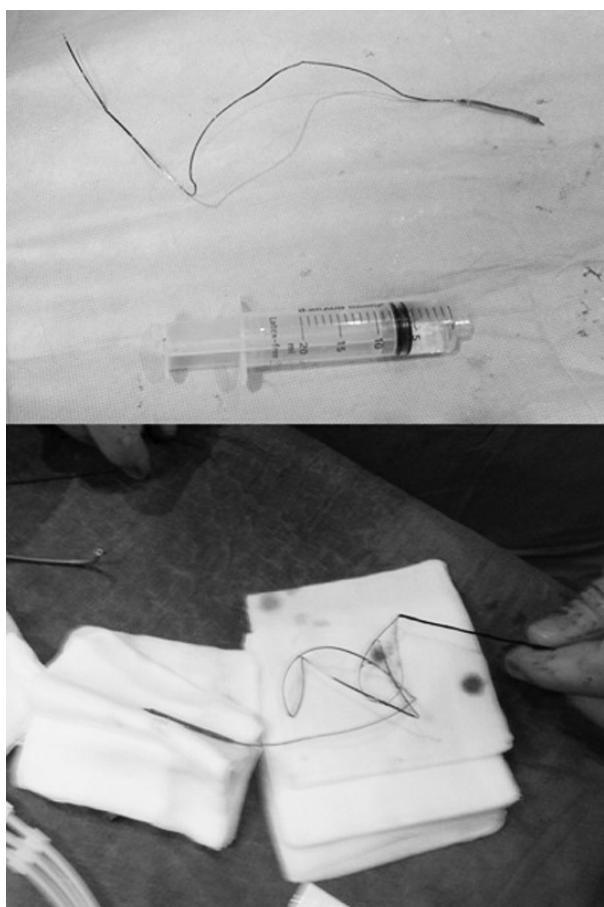


Figure 7. Removed broken balloon catheter from right coronary artery and aortic arch

diameter 20 mm), after a few attempts the proximal part of the BC was captured (Figs. 4, 5) and then removed. PCI of RCA with DES Resolute Integrity 3.5 × 22 mm — 14 atm and Resolute Integrity 3.0 × 16 mm — 14 atm (distal RCA) was performed. Additional inflation in ostium up to 22 atm was also done (Fig. 6). The shaft of the BC after removal was approximately 30 cm in length and was removed as a whole (Fig. 7). The second procedure lasted 130 min. Radiation dose was 1.14 Gy, and total contrast media volume was 300 mL. The patient was discharged home in good condition after a five-day hospitalisation.

Skill in treating PCI complications and knowledge of removal equipment capabilities is crucial for minimising the risk of the procedure and the risk of thoracotomy.

Conflict of interest: none declared