Acta Clin Croat (Suppl. 1) 2024; 63:9-13
doi: 10.20471/acc.2024.63.s1.1

Case Report

STENT CATHETER TOO SHORT TO SOLVE A BIZZARE STENT EMBOLIZATION: WHAT TO DO?

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ABSTRACT – Coronary stent dislodgement with migration and/or embolization is a relatively rare complication of percutaneous coronary intervention. In case of stent dislodgement or embolization in the coronary artery without the coronary wire passing through the dislodged stent, retrieval with a snare device is often the safest and the most effective procedure. We report a rare case of coronary stent dislodgement in the culprit right coronary artery, its migration and embolization in the left coronary artery, and successful retrieval with a short single-loop snare through a shortened guiding catheter.

Key words: *dislodged stent, stent migration, stent retrieval, snare*

Introduction

Coronary stent dislodgement, migration and/or embolization is a rare complication of percutaneous coronary intervention (PCI) and occurs in 0.3% to 1.3% of procedures involving coronary stent implantation (1). It is often associated with major comorbidity and is mostly related to tortuous and/or calcified anatomy or inadequate calcific lesion preparation. Dislodged stent migration may cause embolic cerebrovascular or peripheral events, and it very rarely affects another coronary artery not related to the index procedure (2). Retrieval of a migrated unexpanded stent can be percutaneous or surgical, with percutaneous approach being more favourable because of comorbidities and ongoing drug therapy during PCI. Devices used for retrieval include small balloons only for dislodged stents that remain on the coronary wire, two or more additional wires technique, single-loop snares and multiple-loop snares, and grasping forceps or basket retrieval devices for migrated stents. In case of coronary artery embolization, micro-loop snares or additional wire technique are mostly used (2). We present a case of a patient with a subtotal calcific stenosis of a tortuous right coronary artery, stent dislodgement and migration from the ostium of a right coronary artery to the proximal circumflex artery (CxA) and left main coronary artery (LM) during PCI, as well as the technique used to successfully retrieve the stent.

Case report

A 79-year-old male patient was admitted with unstable angina pectoris (progressive chest pain in minimal exertion, non-specific inferior electrocardiographic changes and normal high-sensitive troponin-I level). The patient had a history of a myocardial infarc-

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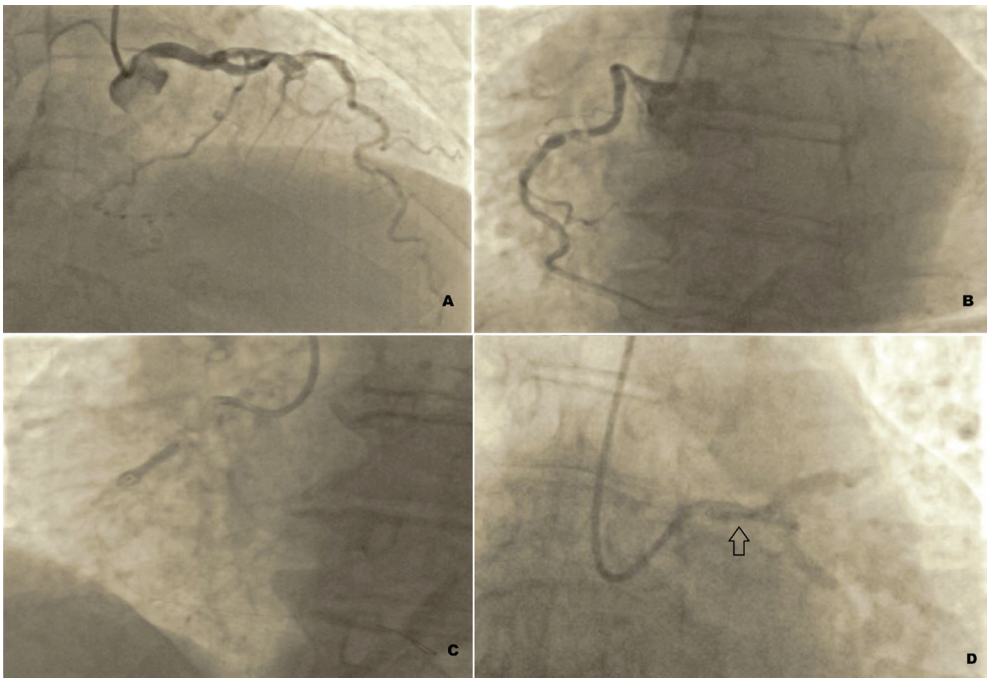

Figure 1. A: Normal left coronary artery. B: Subtotal stenosis of tortuous and moderately calcified right coronary artery. C: Right coronary artery 1:1 NC balloon predilatation. D: Migrated stent in the left coronary artery.

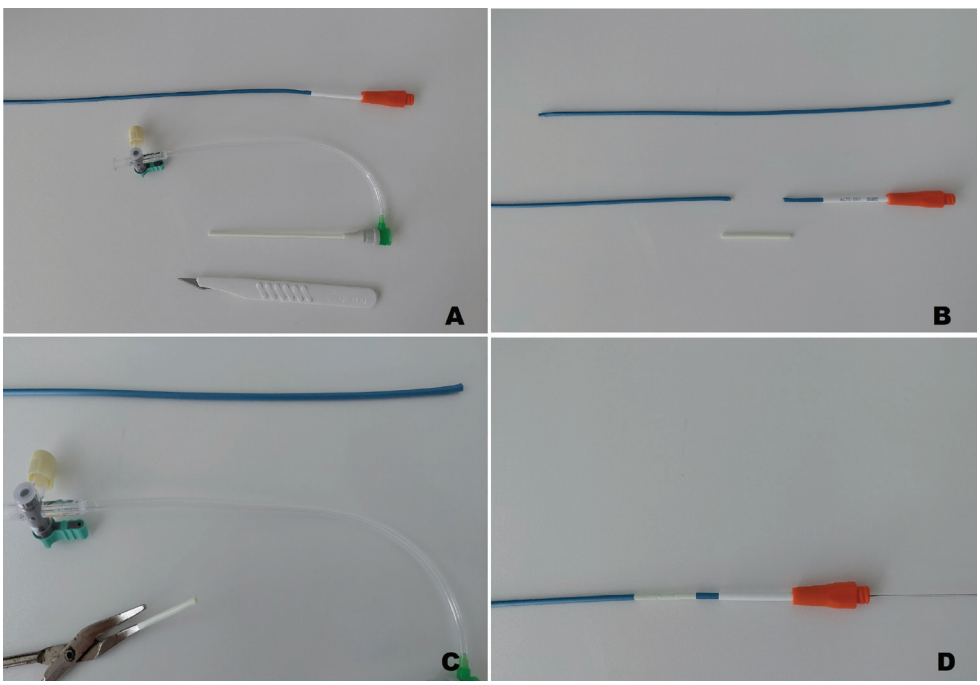

Figure 2. Step by-step guiding catheter shortening procedure. A: Inventory: a guiding catheter, 1 size smaller arterial sheath (i.e., 7 F guide -> 6 F sheath) and sharp scalpel or scissors. B: Cut 4-5 cm of the tip of the arterial sheath and cut the guiding catheter at the access port and at the desired length. C: Flare both ends of the arterial sheath part with blunt forceps. D: Connect firmly proximal and distal part of the shortened catheter with the cut sheath part to achieve torque ability and optimal sealing.

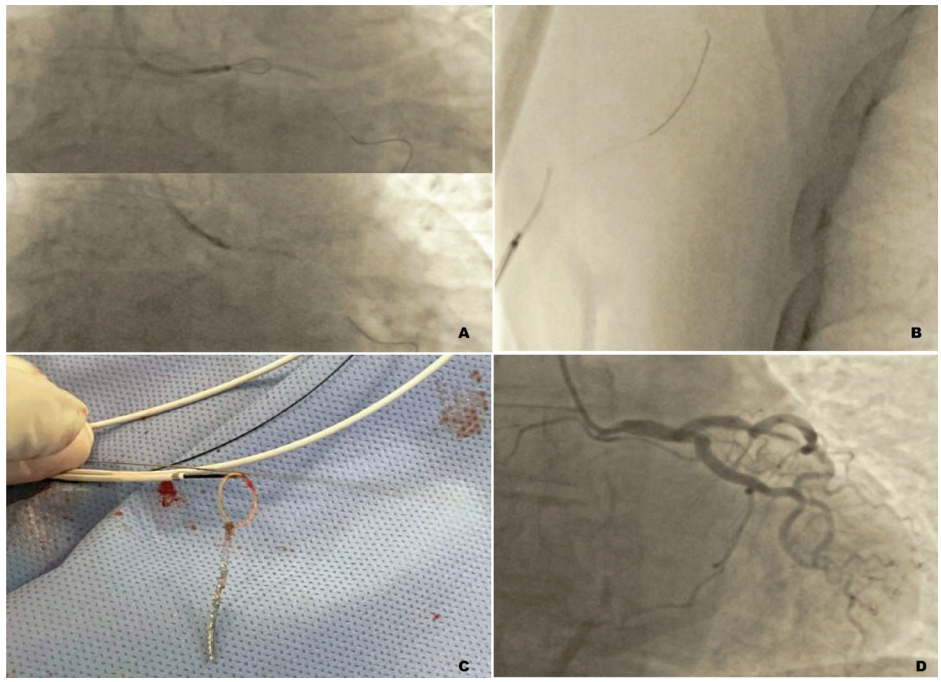

Figure 3. A: Snare catheter delivered adjacent to migrated stent with a safety coronary wire placed distally through the shortened guiding catheter; snare loop closed, and stent capture confirmed by pulling the snare catheter. B: While applying pullback force on the snared stent the whole system (short guide with protruding guidewire, closed snare loop with captured stent and snare catheter) was retrieved without any resistance into the 7F brachial artery sheath. C: Retrieved stent caught in the snare loop. D: Normal left coronary artery after stent retrieval.

Figure 4. Successful stenting of the right coronary artery using extra support wire, a 6 F guiding extension device and one long drug eluting stent

tion treated conservatively 25 years ago, with arterial hypertension, dyslipidemia, and chronic renal insufficiency with normal diuresis and electrolyte metabolism. Coronary angiography showed a normal left coronary artery and a culprit subtotal moderately calcified stenosis in mid-segment of the tortuous right coronary artery (Figure 1A, and B). Because of calcified and tortuous subclavian arteries, right radial artery was used to selectively cannulate the left coronary artery, whereas selective cannulation of the right coronary artery was possible only through the left radial artery. Using left radial approach, Amplatz left 0.75 6 F guiding catheter and workhorse floppy wire were used to negotiate the lesion, and successful 3.0 mm non-compliant bal-

loon dilatation was performed without guiding and/or wire support related issues during balloon delivery and retrieval (Figure 1C). After failed delivery of the 3.0x22 mm drug elution stent (DES) in the culprit lesion, stent dislodgement from the balloon-catheter occurred during unexpanded stent withdrawal in the tortuous proximal segment of the right coronary artery. There was immediate notable tension release in the guiding catheter and the wire, causing complete wire and guiding catheter displacement. However, on control fluoroscopy immediately after stent and wire dislodgement, we noted stent migration in the left coronary artery, protruding from the proximal CxA segment into the LM (Figure 1D). Using right radial approach, an extra backup (EBU) 3.5 guiding catheter was placed in the ostial LM. Double wire technique was unsuccessful and single-loop snare was selected as the preferred device for stent retrieval. However, only a 120 cm long 10 mm single-loop snare with 100 cm 4 F retrieval catheter was available at that moment and it was too short to reach the migrated stent in the LM. Right radial approach was switched to right brachial approach and a shortened EBU 3.5 6F catheter was used to successfully reach the stent with the single-loop snare. Step-by-step shortening procedure of the guiding catheter to a desired length needed for a specific anatomic situation is shown in Figure 2A-D. The stent was snared successfully through a shortened guiding catheter, extracted in its entirety into the brachial 7F sheath, and inspected for potential material loss or other damage that were not found (Figure 3 A-C). After confirming a normal control left coronary artery angiography (Figure 3D), the culprit lesion of the right coronary artery was successfully stented with one 3.0/3.5x50 mm DES, using an extra support wire and a 6F guiding catheter extension device through an Amplatz 0.75 7 F guiding catheter (Figure 4). Both radial artery puncture sites were closed with wrist bands, whereas brachial artery puncture site was closed with a suture-mediated percutaneous closure system. There were no other complications, with normal haemostasis of all three vascular access sites used for the intervention. During the rest of the hospital stay, there was no bleeding or hematoma, and no contrast induced kidney injury. The patient was discharged in good condition after 3 days.

Discussion

Most cases of stent dislodgment and migration occur in calcified and/or tortuous coronary arteries (1). In this case, a lesion in the calcified tortuous right coronary artery that appeared well-prepared for stenting lead to a stent migration during the undeployed stent withdrawal. However, we have not yet found a published case report of a dislodged coronary stent migrating from the culprit right coronary artery to the normal left coronary artery that was successfully retrieved with a single-loop snare through a brachial artery 7F sheath (2). In this case, it was particularly important to preserve the normal left coronary artery and to avoid distal embolization, undeployed stent thrombosis or the need for bail-out implantation of an additional stent in the normal LM. Also, due to migrated stent localization, comorbidities and antiplatelet therapy, surgical extraction was also unacceptable. Single loop snares are simple to use, and relatively safe and effective. There are several 175 to 200 cm long single or triple loop snares with 150 to 175 cm long retrieval catheters, and loop diameters ranging from 2 to 8 mm in the market that should be readily available in every cath-lab. Also, all interventional cardiologists performing 24/7 PCI should be familiar with their use and complication management. However, if there are only short snare devices available, retrieval is possible using more proximal vascular access and a shorter guiding catheter. Short guiding catheters are rarely readily available, so all interventional cardiologists should be familiar with the fast procedure of guiding catheter shortening using a piece of one size smaller sheath as the steerable sealed connection point. However, if any notable resistance during undeployed stent withdrawal is felt, it is sometimes safer to pull together the whole system (the guiding catheter, wire and the stent together) into the sheath as there is less chance of stent dislodgement and migration. Finally, additional lesion preparation and the use of extra support wires and guiding extensions that overpass tortuous anatomy proximal to the culprit lesion should be considered in order to prevent stent dislodgement and facilitate optimal stenting in the calcified and/or tortuous coronary arteries.

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Sažetak

KATETER OMČE ZA UKLANJANJE BIZARNO EMBOLIZIRANOG STENTA JE PREKRATAK: ŠTO ĆU SADA?

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Gubitak, migracija i embolizacija neproširenih koronarnih stentova relativno su rijetke komplikacije perkutane koronarne intervencije. U slučaju dislokacije ili migracije neproširenog stenta koji je skliznuo s balona i žice za koronarnu intervenciju, vađenje stenta nitinolskom omčom najsigurniji je i najučinkovitiji način liječenja. Ovdje prikazujemo slučaj gubitka stenta u desnoj koronarnoj arteriji koji je migrirao u lijevu koronarnu arteriju i koji je uspješno uklonjen kratkom omčom kroz skraćeni vodeći kateter.

Ključne riječi: *pomaknuti stent, migracija stenta, uklanjanje stenta, omča*