

CASE REPORT

Successful PROMUS Stent Retrieval through Radial Access Site.

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Abstract

Background: Stent dislodgment is a rare but catastrophic complication of percutaneous coronary interventions. In this era of innovation and minimalist approach, successful trans-radial retrieval of dislodged stents and other scaffolds remains a significant challenge because of the small artery, small sheath and catheter sizes, multiple resistance points at acute turns, looped angulations, and curves.

Case presentation: A case of dislodged 4.0 x 12mm EES Promus (Boston scientific) in left circumflex coronary artery due to a calcified lesion.

Management and Results: We successfully retrieved the same assembly with two twisted run-through floppy wires and a 1.5 x 06mm Euphora balloon through the same right radial access site.

Conclusion: It can be safely retrieved through Radial Access points.

Keywords

Stent, Retrieval, Transradial, NICVD, CAD, Calcified Lesion, Crushed Stent.

Introduction

Interventional hardware detachment and embolization is a nightmare for every interventionalist with grave consequences for his patient, particularly when dealing through radial approach which nowadays is a common access site¹. The most common devices to embolise are stents with an Incidence of 0.32 % for manufacturer balloon-mounted stents²; previously hand mounted stents were prone to dislodge about 3% from their balloons³. Dislodged stents have worse prognosis with myocardial infarction (3.9 %), CABG (17 %), death (6.2 %)⁴; a systemic review by Alomar et al reports complications in 19 % patients in which 57 % undergone CABG, 18 % had MI, 19 % died, 6 % required transfusion, 3 % experienced vascular complications and 0.6 % developed stroke⁵.

Peripheral embolization, particularly below renal arteries, is unlikely to have sequelae clinically over six years after stent loss⁶. Risk factors for stent dislodgment are patient, hardware, or operator related like highly calcified lesions, moderate to severe tortuosity, prior CABG, recent non-endothelialised stents, rigid stents, stenting without proper preparation of lesion with pre-dilation, respectively. There are different approaches to dealing with this grave complication: either retrieve or deploy or crush by another stent at an intended area. Retrieval can be done percutaneous or by surgery either from coronaries or the peripheral locations where percutaneous retrieval is not possible.

To date, most of the studies have shown important data regarding Femoral percutaneous retrieval, whereas radial retrieval is a great challenge for the interventional cardiologists to bring out detached metal; there are very few successful reported cases Globally like case reports by Aurtur⁷, Ahmar et al.⁸, Patel TM et al.¹⁰, Italo Porto¹¹, Jin Gon Park¹² and one case of antegrade brachial access retrieval by Moo Hyun Kim⁹. Therefore, Validated Percutaneous retrieval techniques have been successfully demonstrated in literature with different interventional gadgets starting with simple wire twisting, balloons assisted to sophisticated loop snares, biotomes, biliary

forceps, and Cook fragment retriever. If metal is unable to be retrieved may lead to major consequences of stent loss.

Case Report

A 65 years old hypertensive lady presented with worsening chest pain for the previous 10-15 days and resting retrosternal burning and choking sensation and leaked biomarkers of myocardial necrosis in blood admitted as a case of NSTEMI on maximally tolerated medical therapy; her relevant physical examination is unremarkable and relevant blood test results show Hb - 10.4 g/dl, WBC - 9.2×10^9 , Platelets - 272×10^9 , urea - 36 mg/dl, creatinine - 0.9 mg/dl, albumin 3.5 g/dl, serum sodium 136 mEq/L, serum potassium 4.3 mEq/L, serum Chloride 97 mEq/L, bilirubin(T) 0.6 mg/dl, gamma GT 16 U/L, ALT 15 U/L, AST 20 U/L.

Her echocardiography shows EF 50 %, normal-sized chambers, and valves without segmental wall motion abnormalities. Her coronary angiography reveals proximal to mid LAD 70 - 80 % diffuse diseases, left circumflex proximal to distal 70 - 80 % involving both obtuse marginals from their Ostia, proximal to mid segment of right coronary artery (80 % diseased) and all three coronary vessels had mild to moderate calcification. Her syntax is 24, and her euro score is 1.2.

We took EBU 3.06 F Gudier with run through floppy wire and attempted to cross left circumflex artery, wire was parked distally in a large OM and lesion prepared with 2.0 x 10 invader semi-compliant balloon then 4.0 x 12 mm PROMEUS (EES; Boston scientific) stent was taken but it didn't cross the angulated proximal portion, where stent struts stuck up probably in intra-coronary calcium, we were unable to push the stent forward or pull it back meanwhile stent was partially dislodged from its balloon, we tried to catch it with same ball on but couldn't get the stent in guider, as stent was in distal Left main (LM) to Left circumflex (LCX) so it was not suitable to deploy over there; initially we tried to twist it in between two wires and pullback but it was difficult, then tried with 1.5 x 06 mm EUPHORA balloon at distal edge of stent and inflated at 6 atmospheric pressure (Atm) and pulled

the stent in the mouth of guider which was successfully traversed back through the tortuous loops of Subclavian artery upto the proximal right radial artery where again stent and balloon were stuck up and unable to be gently pulled out with guider, ones again took help of mighty thin serpentine wires and removed out the balloon; there was a significant resistance while out wires, so we thought to deploy the stent proximal or go

for surgical extraction of stent from fore vessel, here we thought to try something new to take the stent in the guider or the sheath, so we crushed the stent with guider and upgraded radial sheath to 7F to ease the exit of crushed stent and finally hammered stent was in our hands now (Fig 1). To the best of our knowledge this is the only case with crushing technique and retrieval through right Radial approach (Fig 2).

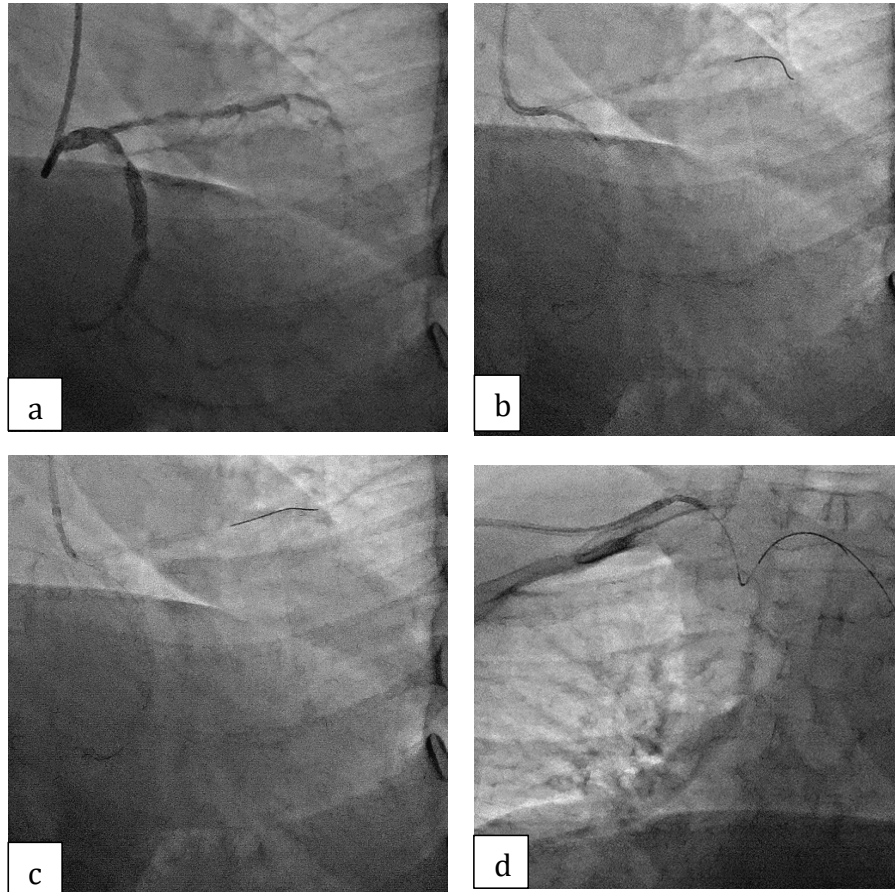


Figure 1: angiogram showing disease (a), dislodged stent and its balloon in LM to Lcx (b), two twisted and tangled wires holding stent at the mouth of guider and stent is being retrieved from coronary artery (c) two twisted and tangled wires holding stent at the mouth of guider while traversing from the right subclavian artery (d).

In the end, we took diagnostic shots of the radial artery and left the system, which showed no significant post-procedure complications (Fig 3). Later on, the case was discussed with the patient family and re-discussed in the heart team and planned for CABG.

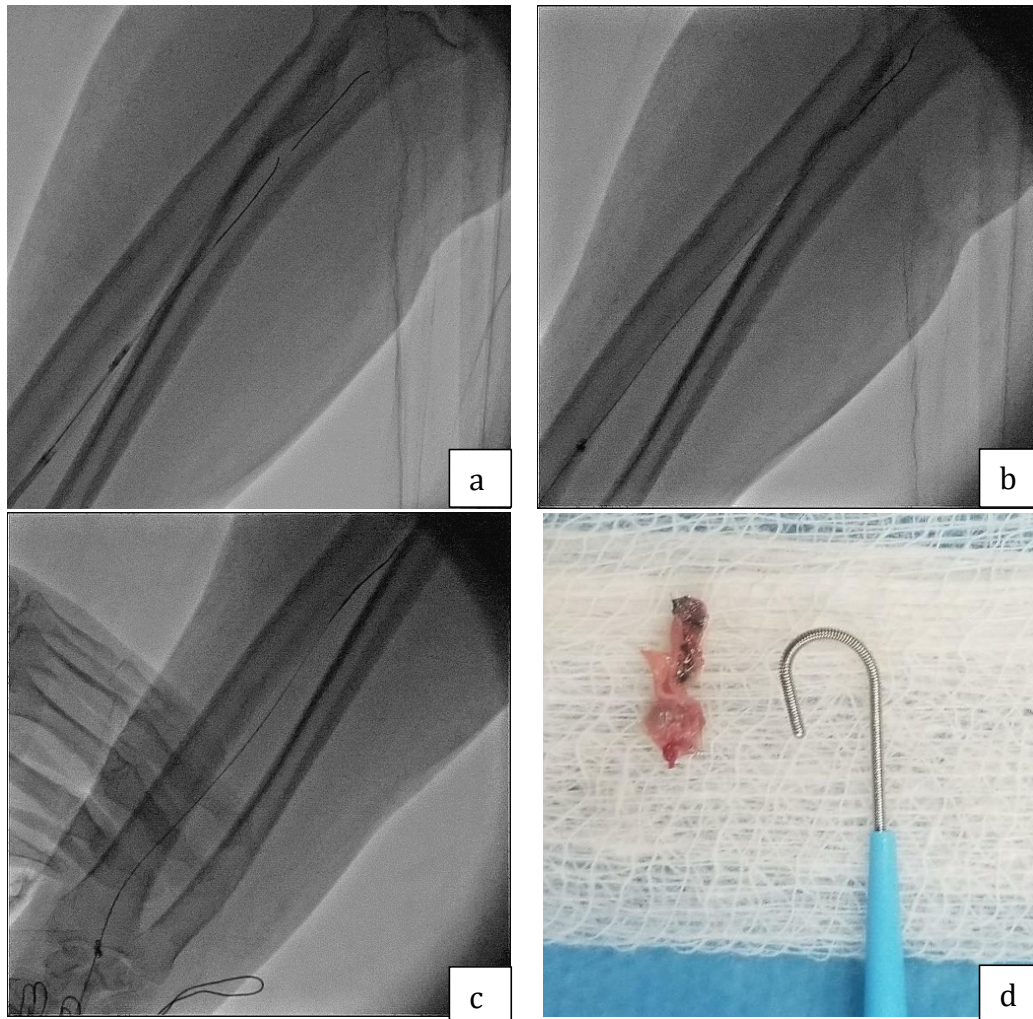


Figure 2: Forearm: crushed stent at the distal end of sheath being pulled out (a), crippled pellet shaped deformed stent pulled out at distal tip of sheath (b), at distal radius crushed and crimped stent looking like pellet being extracted from radial artery (c), crushed and deformed stent meshed up with fibrous strands and gauze seen outside of body (d)

Case Discussion

Transradial access is increasingly used and more favorable due to its reduced rate of complications, both vascular and bleeding; in addition; it has a mortality benefit in cases of acute ST-elevation myocardial infarction¹³. We also started with the right radial and tried to place the stent but failed to reach the target area, possibly because of angulation and calcification in the LCx, and the procedure was complicated by stent loss; it was a very difficult and stressful situation for us to switch over to the Femoral access site and then retrieve after thoughtful discussion decided to make an

attempt from radial before switching. Due to the smaller size of the radial artery, it limits options for complex procedures and bailout requiring multiple interventional gadgets, as in our case. After thoughtful and labors successful stent retrieval from radial access, we conclude that firstly patient selection, secondly appropriate access, and third proper lesion preparation are vital in high-risk coronary artery intervention; after all, these stent dislodgments can be managed with careful and gentle maneuvers with stent crushing then retrieval can be performed well without damaging radial artery¹⁴.

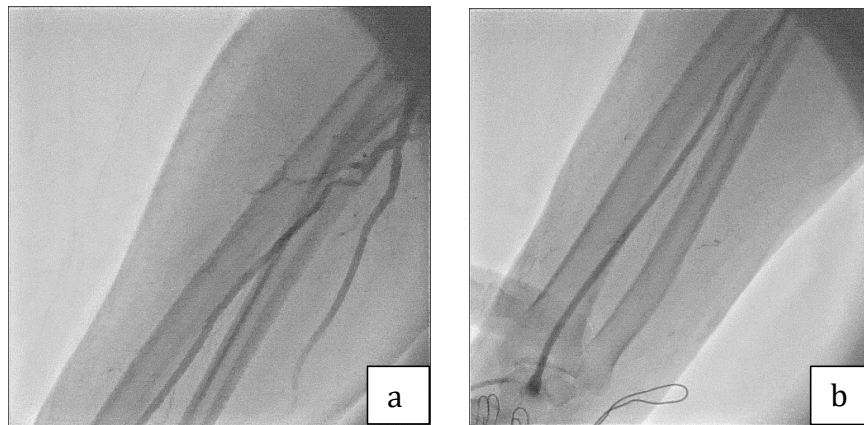


Figure 3: post stent retrieval angiogram showing normal blood flow in radial artery (a,b)

Conclusion

Although difficult but yet Stents retrieval can be tried through radial access, as in our case. Because of its deformation it was unable to be drawn into guider or sheath, then ultimately it was crimped into pellet shape.

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