



DISTAL EMBOLIZATION OF CALCIFIED ATHEROSCLEROTIC PLAQUE FRAGMENT RESULTING IN “BALLOON UNCROSSABLE LESION” DURING ELECTIVE PERCUTANEOUS CORONARY INTERVENTION

Ivica Paulić¹, Joško Bulum^{2,3}, Mario Stipinović¹, Ivica Premužić Meštrović¹, Maro Dragičević¹ and Tomislav Letilović^{1,2}

¹Merkur Clinical Hospital, Zagreb, Croatia

²University of Zagreb School of Medicine, Zagreb, Croatia

³University Hospital Centre Zagreb, Zagreb, Croatia

ABSTRACT – Distal embolization during coronary intervention of thrombotic material resulting in compromised coronary flow is a common complication usually described in the context of invasive treatment of the acute ST-segment elevation myocardial infarction (STEMI). In our case we report distal embolization, presumably with calcified atherosclerotic plaque fragment. It occurred during elective percutaneous coronary intervention on subostial part of right coronary artery. Fortunately, this embolization did not compromise distal flow but it resulted in a significant de novo lesion of the right coronary artery crux. This lesion was uncrossable for dilatation balloons using a variety of different basic and advanced tools and techniques. Therefore, we decided to perform rotational atherectomy that enabled a successful percutaneous coronary intervention with stent implantation.

Key words: PCI (percutaneous coronary intervention), distal embolization, calcium, atherosclerotic plaque, balloon uncrossable lesion, rotational atherectomy

Introduction

Distal embolization, spontaneous or during percutaneous coronary intervention (i.e., Iatrogenic or procedural) may occur as a result of fragmentation of thrombotic material, atherosclerotic plaque, air bubbles or endoprosthetic material and its propagation into distal parts of the coronary arteries¹. Sometimes it can cause a significant coronary circulation obstruction with angiographically visible filling defect and distinct clinical as well as electrocardiographic consequences.

Corresponding author:

Ivica Paulić, MD,

Department of Cardiology, University Department of Medicine, Merkur Clinical Hospital, Zajčeva 19, HR-10000 Zagreb, Croatia

E-mail: paulic.ivica@gmail.com

The approach to this kind of acute cardiac coronary PCI complications includes procedures such as aspirational thrombectomy, balloon angioplasty, stent placement and utilization of embolization protection device during specific high risk interventions². Our case is reported of distal embolization, presumably of calcified atherosclerotic plaque fragment, in a female patient with severely calcified coronary arteries.

Case report

A 66-year-old female with cardiovascular risk factors in the form of arterial hypertension, type 2 diabetes and obesity was hospitalized for elective coronary angiography due to the electrocardiographically verified asymptomatic episode of non-sustained VT. At the time, the patient was treated with DOAC because

of the recently diagnosed proximal deep vein thrombosis of the left lower extremity. Coronary angiogram ruled out significant coronary disease of the left coronary artery. Right coronary artery angiogram revealed a subtotal calcified lesion in the subostial segment right coronary artery together with a borderline lesion of its crux (Fig 1). We proceeded with the percutane-

ous coronary intervention and, after several predilatations with non-compliant balloons, one drug eluting stent was implanted to the ostium of RCA with a good result in the treated segment. At the end of the procedure, the newly formed and roughly limited fragment that significantly narrowed the lumen was noticed at the crux (Figs 2-3). Fortunately, it did not compro-

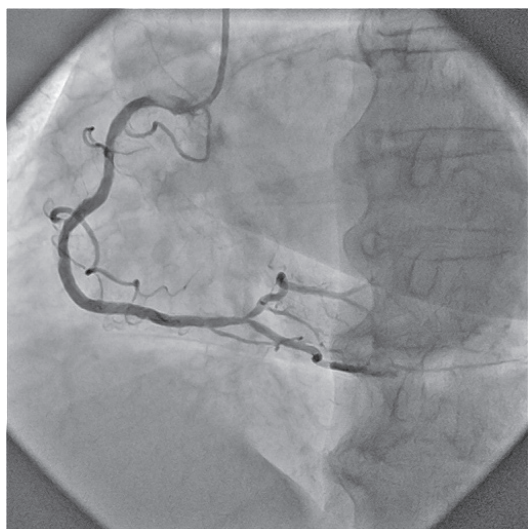


Figure 1. Coronary angiogram of the right coronary artery (LAO 30° projection): Subtotal calcified lesion in the subostial segment and borderline lesion of the crux are visible



Figure 2. Coronary angiogram of the right coronary artery (LAO 30° projection): Good final result after PCI and stent implantation: in the proximal segment



Figure 3. Coronary angiogram of the right coronary artery (LAO 30° projection): Newly formed roughly limited fragment in the crux that significantly narrows lumen with a good distal flow

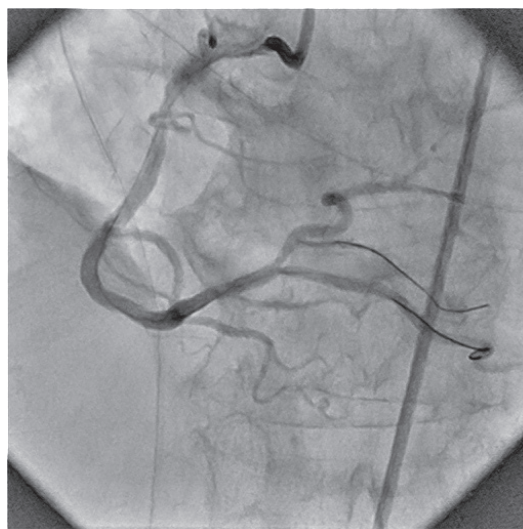


Figure 4. Final coronary angiogram of the right coronary artery crux after rotablation (LAO 5°/CRA 15° projection)

mise the distal coronary flow, nor it resulted in clinical or electrocardiographic signs of ischemia. We tried to pass it with a variety of small balloons and using microcatheters and catheter extensions but without success. Because the lesion was uncrossable, we decided to, subsequently, several days later, perform rotational atherectomy. In this transitional period, the patient was prescribed triple antiplatelet therapy with DOAC, TxA2 and P2Y12 inhibitor. PCI using rotational atherectomy was performed with the temporary pacemaker protection implanted via the right femoral vein. We used guiding AL 1 to engage RCA ostium, then the Fielder FC workhorse wire through microcatheter Corsair to cross the lesion at the crux and advanced to PD that we subsequently exchanged for Rotawire floppy. Rotational atherectomy was performed with Rotablator burr size 1,25 mm at 150 000 Rpm. After five repeated gentle, pecking „back and forth“ movements in total duration up to 10 seconds with caution not to come close to the tip of the Rotawire, we successfully advanced through the lesion. This allowed us to cross the lesion with a dilatation balloon, as well as to perform a successful percutaneous coronary intervention with stent implantation and with good angiographic result (Fig 4). After initial triple antiplatelet therapy (TAT) during first 7 days, we advised the continuation of dual antiplatelet therapy throughout 12 months total. One-year postprocedure, follow-up coronary angiography showed excellent result in the treated segment at the crux of the right coronary artery.

Discussion

In available literature, most of the cases of procedural (iatrogenic) distal embolization, specifically of thrombotic material, are described in the context of percutaneous coronary intervention during the acute ST-segment elevation myocardial infarction^{3,4}. Distal embolization of calcified atherosclerotic plaque fragments is described only in several cases during transcatheter aortic valve implantation⁵. Morphological characteristics and inability to pass through allowed us to consider this newly formed lesion to be a distal (macro)embolization with a calcified fragment of the proximal atherosclerotic plaque. The precise identification of its content, by using intravascular imaging methods, would give us a definitive answer⁶. Yet, this was impossible given that the lesion was uncrossable. Alternative approaches to balloon uncrossable lesions include increasing the support by using more suitable

guide catheters, support wires and guidewire extensions, by using small balloons or utilizing balloon anchoring technique. If the lesion is crossed, it can be modified with modifying or cutting balloons or intravascular lithotripsy procedure². Theoretically, a single coronary artery bypass grafting using VSM to PD could also be considered as a treatment option². In our case, rotational atherectomy allowed us to perform a successful percutaneous coronary intervention⁷.

Conclusion

Distal embolization of coronary arteries is a potentially dangerous phenomenon that can result in vessel occlusion and acute myocardial infarction. In our case, it led to a balloon-uncrossable lesion that required more specific approach by using small and specialty balloons, microcatheters and catheter extensions. Ultimately, rotational atherectomy allowed us to perform a successful percutaneous coronary intervention with stent implantation and with an excellent angiographic result.

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Sažetak

DISTALNA EMBOLIZACIJA FRAGMENTOM KALCIFICIRANOG ATEROSKLEROTSKOG PLAKA SA FORMIRANJEM “BALONOM NEPROLAZNE LEZIJE” TIJEKOM ELEKTIVNE PERKUTANE KORONARNE INTERVENCIJE

I. Paulić, J. Bulum, M. Stipinović, I. Premužić Meštović, M. Dragičević i T. Letilović

Proceduralna distalna embolizacija sa kompromitacijom koronarnog protoka najčešće je opisivana kao trombotska komplikacija u sklopu invazivnog liječenja akutnog infarkta miokarda sa elevacijom ST segmenta (STEMI). U našem prikazu slučaja distalna embolizacija nastala je fragmentom kalcificiranog aterosklerotskog plaka. Tijekom elektivne perkutane koronarne intervencije na kalcificiranoj leziji subostijalnog segmenta desne koronarne arterije uočena je „de novo“ lezija račvišta arterije. Lezija srećom nije imala kliničkih ili angiografskih reperkusija, ali je nije bilo moguće proći dilatacijskim balonom unatoč upotrebi različitih osnovnih, ali i naprednih alata i tehnika. S obzirom na “balonom neprolaznu leziju”, odlučili smo se na postupak rotacijske aterektomije kojom smo na kraju učinili uspješnu perkutanu koronarnu intervenciju uz ugradnju stenta.

Ključne riječi: *PCI (perkutanu koronarnu intervenciju), distalna embolizacija, kalcij, aterosklerotski plak, balonom neprijelazna lezija, rotacijska aterektomija*