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We encourage authors to submit their manuscripts to *WJC*. We will give priority to manuscripts that are supported by major national and international foundations and those that are of great basic and clinical significance.

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Very late bioresorbable scaffold thrombosis and reoccurrence of dissection two years later chronic total occlusion recanalization of the left anterior descending artery

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Abstract

We describe the case of a patient presenting with ST-segment elevation myocardial infarction due to very late scaffold thrombosis. The patient was already admitted for an elective percutaneous recanalization of a chronically occluded left anterior descending artery (LAD). The procedure was performed according the sub-intimal tracking and re-entry (STAR) technique with 4 bioresorbable vascular scaffolds implantation. However, even though the coronary flow was preserved at the end of the procedure, the dissected segment was only partially sealed at the distal segment of the LAD. After 18 mo of regular assumption, dual antiplatelet therapy was discontinued for 10 mo before his presentation at the emergency room. This is the first reported case of a very late scaffold thrombosis after coronary chronic total occlusion (CTO) recanalization performed according to the STAR technique. This case raises concerns about the risk of very late scaffold thrombosis after complex CTO revascularization.

Key words: Bioresorbable vascular scaffolds; Scaffold dismantling; Scaffold thrombosis

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Core tip: We describe a case of a 53-year-old male patient who was admitted with anterior ST-elevation myocardial infarction 28 mo after elective percutaneous revascularization of a chronically occluded left anterior descending (LAD) treated with 4 bioresorbable vascular scaffolds (BVS) in order to seal a long flow limiting dissection after sub-intimal tracking and re-entry technique. Coronary angiography showed a large thrombus at the proximal segment of the proximal BVS and a long dissection was evident from mid to distal LAD. In this case, the progressive reduction of both scaffolds radial strength and structure dismantling might have been responsible for both intraluminal thrombosis and reoccurrence of vessel dissection.

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INTRODUCTION

Bioresorbable vascular scaffolds (BVS) represents the latest revolution in the field of interventional cardiology. Providing temporary scaffolding and disappearing few years later, BVS results particularly appealing for the treatment of long segments of coronary arteries such as it usually occurs for percutaneous revascularization (PCI) of chronic total occlusions (CTO). However, limited data are available about the long-term efficacy of BVS in this particular setting. Herein we report a case of a very late scaffold thrombosis after CTO revascularization.

CASE REPORT

A 53-year-old male patient, with hypertension and dyslipidemia, presented with anterior ST-elevation myocardial infarction, 28 mo after elective percutaneous coronary intervention (PCI) of the chronically occluded left anterior descending artery (LAD), with implantation of 4 marker-to-marker bioresorbable vascular scaffolds (BVS, Absorb Abbott Vascular, Abbott Park, Illinois), performed in another cath-lab. BVS implantation followed chronic total occlusion (CTO) recanalization unintentionally performed according the subintimal tracking and re-entry (STAR) technique. The dissected segment was only partially sealed up to the distal segment of the LAD (Figure 1). The patient completed 18 mo of dual antiplatelet therapy (DAPT) 10 mo before his presentation at the emergency room. The

index coronary angiography showed a large thrombus at the proximal segment of the proximal BVS followed by a long dissection up to the very distal LAD segment (Figure 2). Thrombus aspiration and proximal drug eluting stent (DES) implantation was performed, while medical treatment was suggested for the distal chronic dissection (Figure 3). DAPT with ASA and Ticagrelor was finally resumed and clinical follow up planned.

DISCUSSION

To the best of our knowledge, this is the first clinical case reporting on a very late scaffold thrombosis and reoccurrence of coronary dissection after PCI of a chronic coronary total occlusion. Since neither optical coherence tomography (OCT) nor intravascular ultrasound (IVUS) were available at the time of both baseline and index procedures, the mechanism subtending the BVS failure in this particular case remains unknown. However, we might speculate that intraluminal scaffold dismantling together with scaffold discontinuity and restenosis during the resorption process, might have been responsible of thrombus formation at the mid-LAD, as previously described^[1-3]. In addition, the gradual scaffold resorption process, together with the incomplete scaffold coverage of the dissected segment at the time of the CTO PCI, might have been responsible of incomplete dissection healing, with progressive expansion of the subintimal hematoma, resulting in a "dual lumen" coronary artery^[4,5]. CTOs are the most challenging coronary lesions for PCI, mainly because of two reasons: (1) Procedure related: CTO remains technically challenging, in fact PCI failure is reported in up to 35% of CTOs and > 40% of CTOs are not attempted and treated either with medical therapy or with CABG; (2) Patient related: Identification of those patients for whom PCI of CTO does not bring any significant clinical benefit, despite successful revascularization, is still debatable^[6]. By the way, the use of BVS for CTO revascularization is particularly appealing mainly because PCI normally involves long coronary segments, thereby limiting future surgical interventions and increasing the risk of late malapposition after Drug Eluting Stents (DES) implantation^[7,8]. However, limited data are available about the use of BVS for PCI of CTOs. In fact, most of the randomized controlled trials conducted so far compared BVS and DES in simple or intermediate coronary artery stenosis, thereby the long-term efficacy of such new devices for percutaneous revascularization of complex stenosis, such as CTOs is still not clear. Recently, a propensity score adjusted analysis of 537 patients undergoing to PCI of a CTO showed a trend toward a higher adjusted risk of ischemia-driven target lesion revascularization for patients undergoing to BVS implantation as compared with DES^[9]. However, larger randomized studies are warrant in order to better define the role of BVS in CTO-PCI.

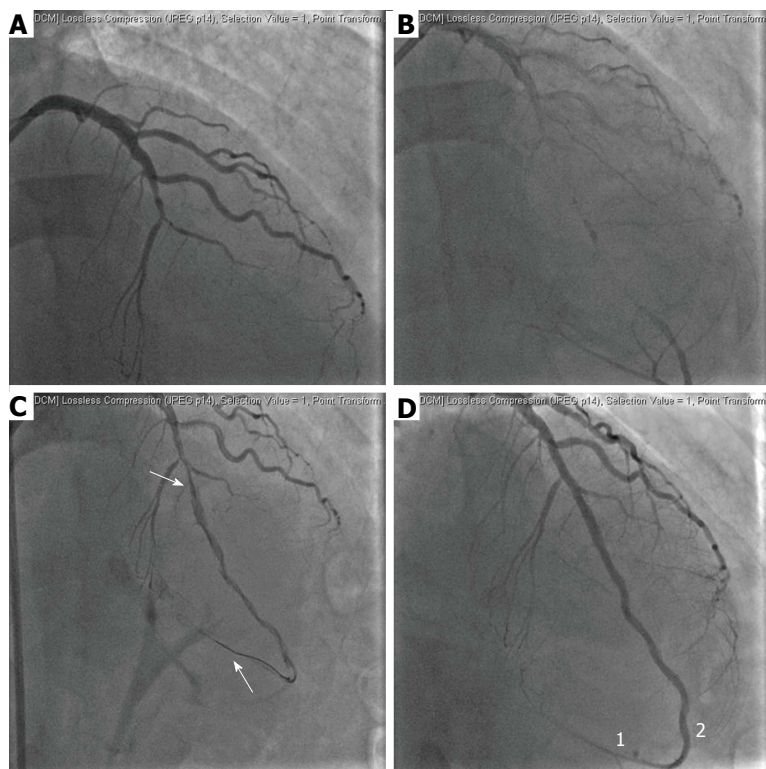


Figure 1 Baseline chronic total occlusion-percutaneous revascularization of the left anterior descending. A and B: Mid-LAD occlusion with omolateral reperfusion of the distal segment; C: Dissected segment after CTO recanalization and balloon dilation (white arrows); D: Final result after four BVS implantation and (2) contrast staining at the distal LAD suggesting the presence of subintimal hematoma with the occlusion of the distal apical branch (1). BVS: Bioresorbable vascular scaffolds; LAD: Left anterior descending; CTO: Chronic total occlusion.

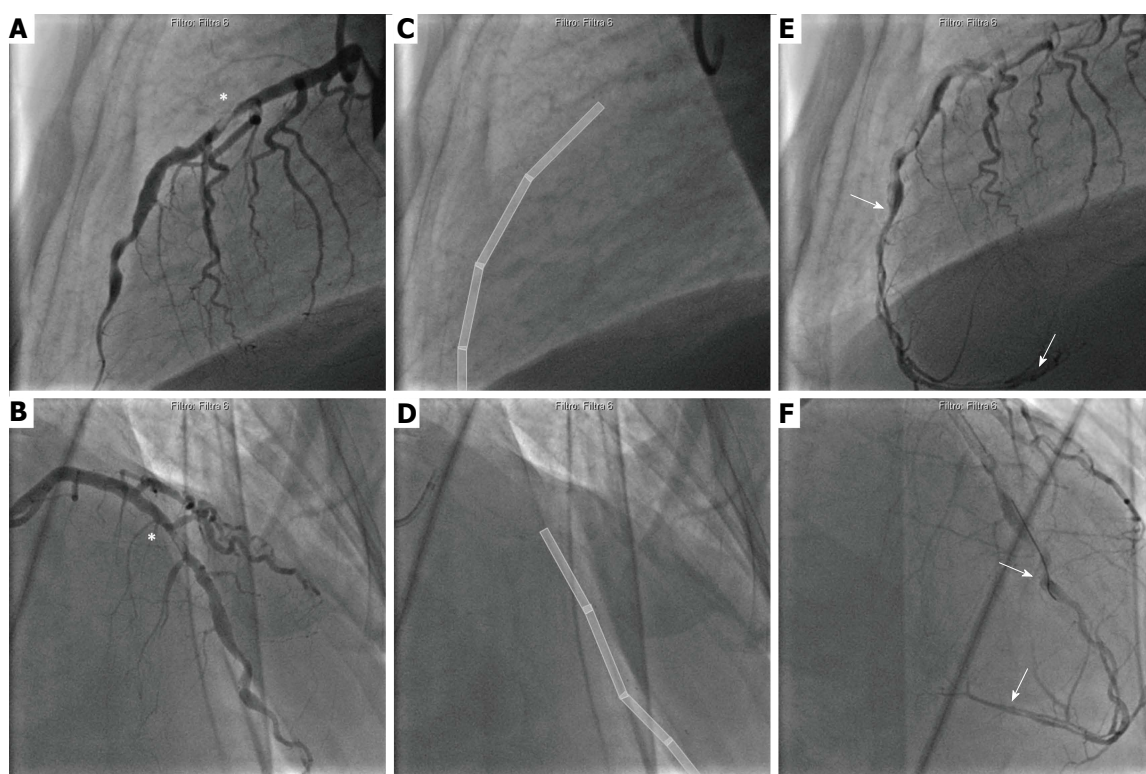


Figure 2 Coronary angiography of the left anterior descending at 28 mo after chronic total occlusion recanalization. A and B: Large in-scaffold thrombus at the proximal edge of the previously implanted BVS (C, D, white boxes), at the mid LAD (*); E and F: Dissected segment (white arrows) from the mid-LAD up to the distal segment, with a resulting image of a “dual lumen” LAD. LAD: Left anterior descending; BVS: Bioresorbable vascular scaffolds.

Conclusion

This case raises concerns about the risk of very late scaffold thrombosis and the use of BVS in complex CTO-PCI, particularly when “full polymer jacket” is not

warranted for the entire dissected coronary segment. A prolonged DAPT should be encouraged while a complete sealing of the dissected segment should be considered^[10].

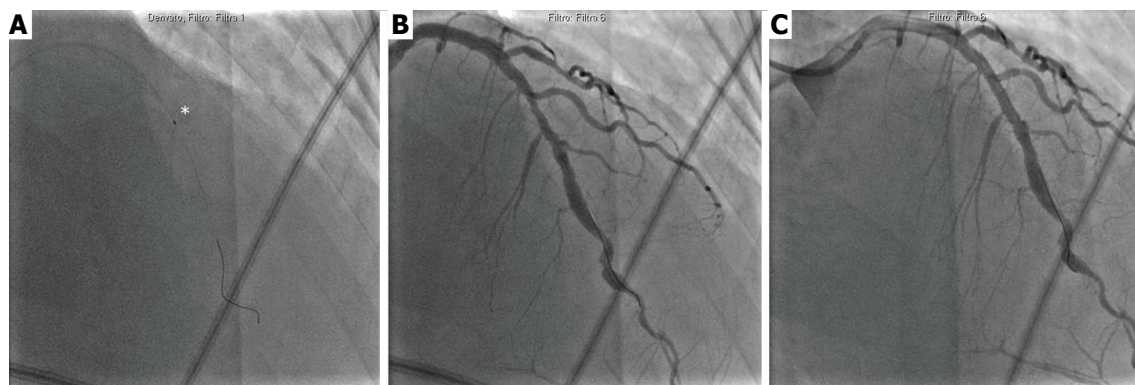


Figure 3 Percutaneous revascularization of the left anterior descending. A and B: After coronary wire crossing, thrombus aspiration was successfully performed (*) and a drug eluting stent was finally implanted with good final result (C).

COMMENTS

Case characteristics

A 53-year-old male patient presenting with chest pain for an anterior ST-elevation myocardial infarction.

Clinical diagnosis

Anterior ST-elevation myocardial infarction due to very late scaffold thrombosis.

Differential diagnosis

Clinical characteristic, patient's medical history and echocardiography were useful for differential diagnosis between pericarditis and aortic dissection.

Laboratory diagnosis

High sensitive Troponin-I increased together with myoglobin and creatine kinase-MB.

Imaging diagnosis

Definite diagnosis was possible with invasive coronary angiography which showed a large thrombus at the proximal segment of the proximal bioresorbable vascular scaffolds (BVS) followed by a long dissection up to the very distal left anterior descending segment.

Pathological diagnosis

In the acute setting of the coronary syndrome, no thrombus was kept for pathological analysis.

Treatment

Thrombus aspiration and proximal drug eluting stent implantation was performed, while medical treatment was suggested for the distal chronic dissection.

Related reports

To our knowledge, there are only few case reports about very late scaffold thrombosis.

Experiences and lessons

This case raises concerns about the use of BVS in complex chronic total occlusion percutaneous revascularization (PCI), thereby suggesting a prolonged dual-antiplatelet therapy tailored according to both patients' clinical characteristics and PCI procedures.

Peer-review

This case report of late thrombosis after chronic total occlusion recanalization with bioabsorbable scaffold is well organized.

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