

Late Spontaneous Recanalization of In-Stent Chronic Total Occlusion Facilitating Successful Percutaneous Coronary Revascularization of the Right Coronary Artery: Case Report

Sağ Koroner Arter Stent İçi Kronik Total Darlığının Perkütan Koroner Yolla Başarılı Revaskülarizasyonunu Kolaylaştıran Spontan Rekanalizasyon Olgusu

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ABSTRACT Percutaneous revascularization of chronic total occlusions (CTO) is often complicated by the inability to cross or dilate the lesion, as well as a high incidence of restenosis and reocclusion. Although spontaneous coronary recanalization can occur in patients undergoing catheterization for acute myocardial infarction or failed percutaneous coronary intervention due to coronary dissection, it is rare event in CTOs, particularly in native coronary arteries. There may be multiple small non-functional recanalized channels throughout the occlusions or one central lumen for recanalization and these neomicrochannel or channels connecting the proximal and distal lumens may serve as a route for a guidewire to reach the distal vessel and hence may have therapeutic value. We present the interesting case of a delayed spontaneous recanalization of CTO of instent restenosis (Mehran classification IV) facilitating successful percutaneous revascularization of the right coronary artery.

Key Words: Angioplasty, transluminal, percutaneous coronary; coronary occlusion

ÖZET Kronik total oklüzyon (KTO)'lardaki perkütan koroner girişim, yüksek restenoz oranları yanında sıklıkla lezyonun geçilmesi ya da dilate edilmesindeki güçlükler nedeniyle zor işlemlerdir. Spontan rekanalizasyon ise sıklıkla ya akut miyokard infarktüsünün doğal seyirinde ya da koroner diseksiyon gelişmesine bağlı başarısız perkütan koroner girişimler sonrası görülebilmekte olup; KTO'lar sonrası nadirdir. KTO boyunca gelişen çok sayıda fonksiyonel olmayan kanalcıklar ya da tek bir küçük kanal aracılığıyla lezyon öncesi ve sonrası kan akımı tekrar sağlanabilmekte ve oluşan bu kanal ya da kanalcıklar lezyon distaline kılavuz tel ilerlemesi kolaylaştırarak perkütan koroner işlem başarısını artırabilmektedir. Bu olgu sunumunda, tekrarlayan instent restenoz sonrası kronik total oklüzyon gelişmesi nedeni ile başarısız perkütan koroner girişim uygulanan, ancak daha sonra takipte spontan koroner rekanalizasyon gelişmesi ile başarılı perkütan koroner girişimi gerçekleştirildiği bir olgu sunulmuştur.

Anahtar Kelimeler: Anjiyoplasti, translüminal, perkütan koroner; koroner tıkanma

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Although spontaneous coronary recanalization can occur in patients undergoing catheterization for acute myocardial infarction or failed percutaneous coronary intervention (PCI) due to coronary dissection it is rare event in chronic total occlusions (CTO), particularly in native coronary arteries.^{1,2} We present the interesting case of a delayed spontaneous recanalization of CTO of instent restenosis (ISR) (Mehran classification IV) facilitating successful PCI of the right coronary artery (RCA).

CASE REPORT

A 55-year-old diabetic man who had been treated with multiple PCI presented with exertional angina that had lasted 2 months. He had smoked two packs of cigarettes daily beginning at the age of 16 years but had stopped smoking at the age of 50. His medications were aspirin 100 mg; clopidogrel 75 mg, metoprolol 100 mg, lisinopril 10 mg, metformine 1000 mg 2x1 and atorvastatin 20 mg. There was a history of hypertension, hyperlipidemia and coronary artery disease, and the patient had had an acute inferior myocardial infarction five years before this admission (April 2005), for which he had undergone a primary PCI (2.0x20 mm Neich balloon and 3.0x15 mm Carbostent; Sorin Biomedica) for the acute total occlusion of RCA. Ten months later (February 2006), he had undergone control coronary angiography due to exertional angina, which revealed in-stent CTO of RCA treated by successful elective PCI with bare metal stents due to insurance problems (1.5x20 mm, 2.0x20 mm, 2.5x20 mm Sprinter balloons with 3.0x20 mm, 3.0x20 mm and 3.0x13 mm Lecton coronary stents; Figure 1A, arrows). Repeated coronary angiogram was performed due to positive efor test result 8 months later (December 2006), which showed string-like in-stent CTO of RCA (Figure 1B, arrow); but, coronary revascularization could not be performed due to inability to cross the lesion and the patient discharged with maximal medical therapy. Because of patient new developing chest pain,

a new angiogram was carried out 4 years later (March 2010) and demonstrated the spontaneous recanalization of CTO of the RCA (Figure 1C) with minimal occlusive disease in other coronary arteries. Successful PTCA of the RCA without stenting was performed (Figure 2), and he was discharged home with conventional medical therapy.

DISCUSSION

ISR presents with various angiographic patterns, which has been classified angiographically by Mehran et al., that provide important prognostic information.³ Diffuse intrastent, proliferative, and totally occluded ISRs represent a spectrum of increasing disease severity (exaggerated neointimal response), which determines, along with diabetes and previous episodes of recurrent ISR, long-term outcome. An intrinsic patient-related process seems to be responsible for the high ISR classes, which suggests that such clinical presentations may be due to a distinct biological process.³

Percutaneous revascularization of CTOs is often complicated by the inability to cross or dilate the lesion, as well as a high incidence of restenosis and reocclusion.⁴ Particularly relevant to PCI strategies for CTO recanalization is the histological finding that approximately half of all CTOs are <99% stenotic when observed by histopathology, despite the angiographic appearance of total occlusion with TIMI grade 0 antegrade flow⁵ ation. Furthermore, spontaneous

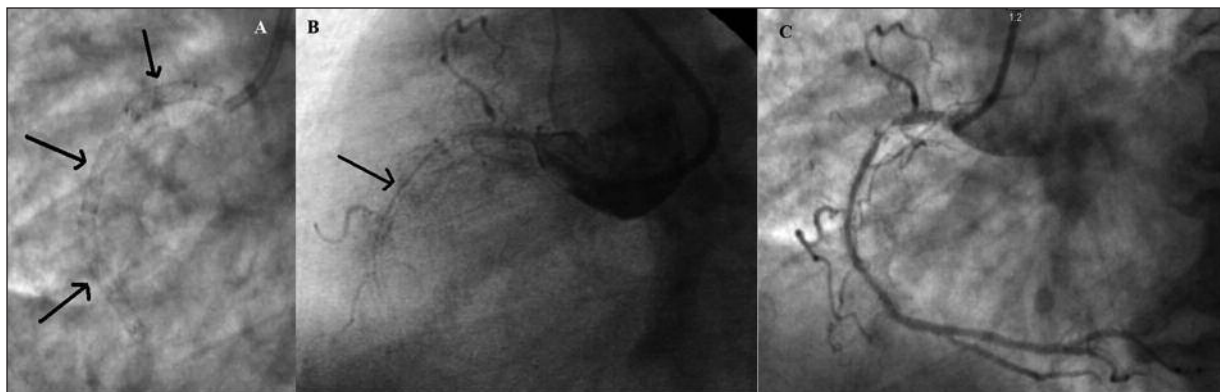


FIGURE 1: Three coronary stents (arrows in A) and the string-like in-stent CTO of RCA (arrow in B) are seen. Spontaneous recanalization of CTO of the RCA is seen in C panel.

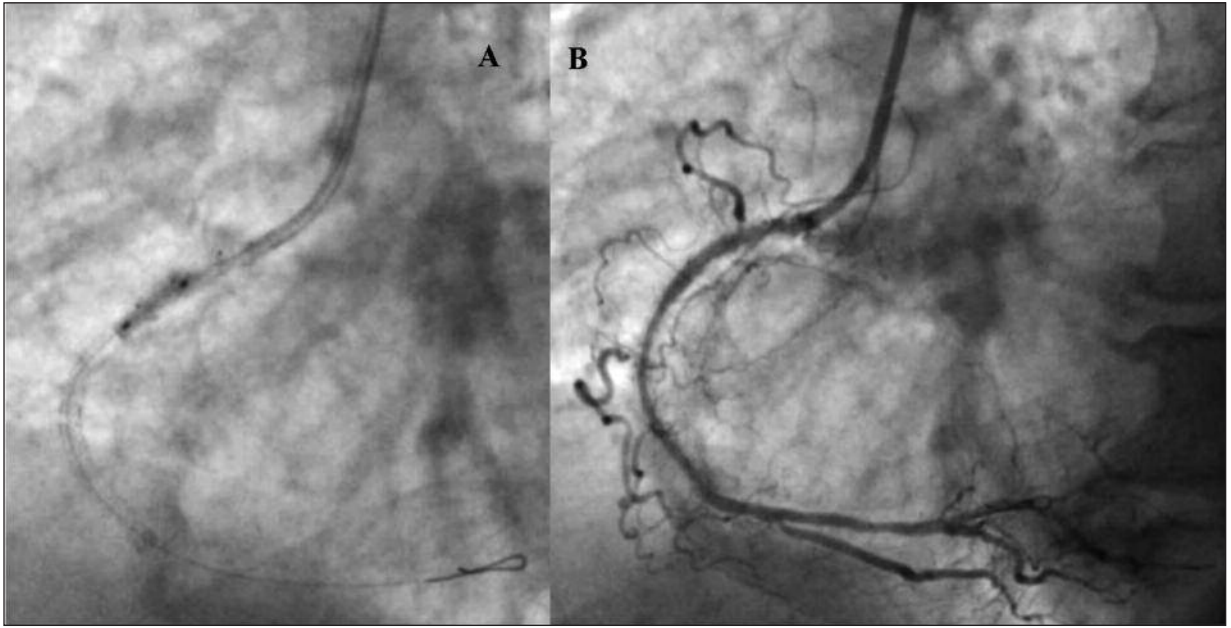


FIGURE 2: The result of the successful PCI is seen.

recanalization can occur by the release of factors, activators and inhibitors of fibrinolysis, from the endothelium, neutrophils and monocytes or thrombus-derived angiogenic stimulus causing neovascularization.^{5,6} Capillary density and angiogenesis increase with increasing occlusion age. In CTOs <1 year old, new capillary formation is greatest in the adventitia. In CTOs >1 year old, the number and size of capillaries in the intima have increased to a similar or greater extent than those present in the adventitia. Relatively large (>250 μm) capillaries are frequently present throughout

the CTO vessel wall, even in young occlusions, suggesting that angiogenesis within the CTO is an early event.^{5,6} Although there may be multiple small non-functional channels throughout the occlusions rather than one central lumen for recanalization and these spontaneously recanalized channels may be responsible for failures due to their dead-end pathways and misdirecting of the guidewires; these neo-microchannels connecting the proximal and distal lumens may serve as a route for a guidewire to reach the distal vessel and hence may have therapeutic value, as in presented case.

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