

Double Trouble: Two Types of Stent Fracture in a Drug-Eluting Stent Secondary to Traction From a Saphenous Vein Graft

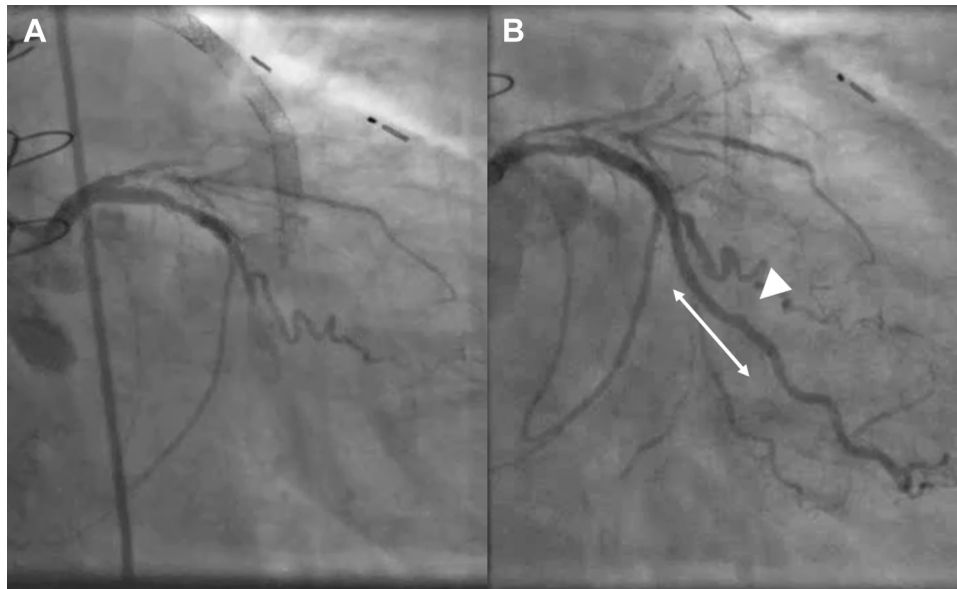


Nilesh Pareek, MA, MBBS,^a Athanasios Kosovitsas, MD,^a Michael Rubens, MBBS,^{a,b} Ranil de Silva, MBBS, PhD^{a,b}

A 74-year-old woman with prior coronary artery bypass grafting presented with CCS (Canadian Cardiovascular Society) class III angina and underwent disobliteration of a circumflex coronary artery occlusion (**Figure 1**). Seven months later, she

developed a recurrence of effort angina. Repeat coronary imaging confirmed an in-stent occlusion secondary to fracture with the appearance of complete arterial disconnection on retrograde injections. Computed tomography (CT) coronary angiography

FIGURE 1 Angiography Images of Disobliteration of Circumflex Chronic Total Occlusion

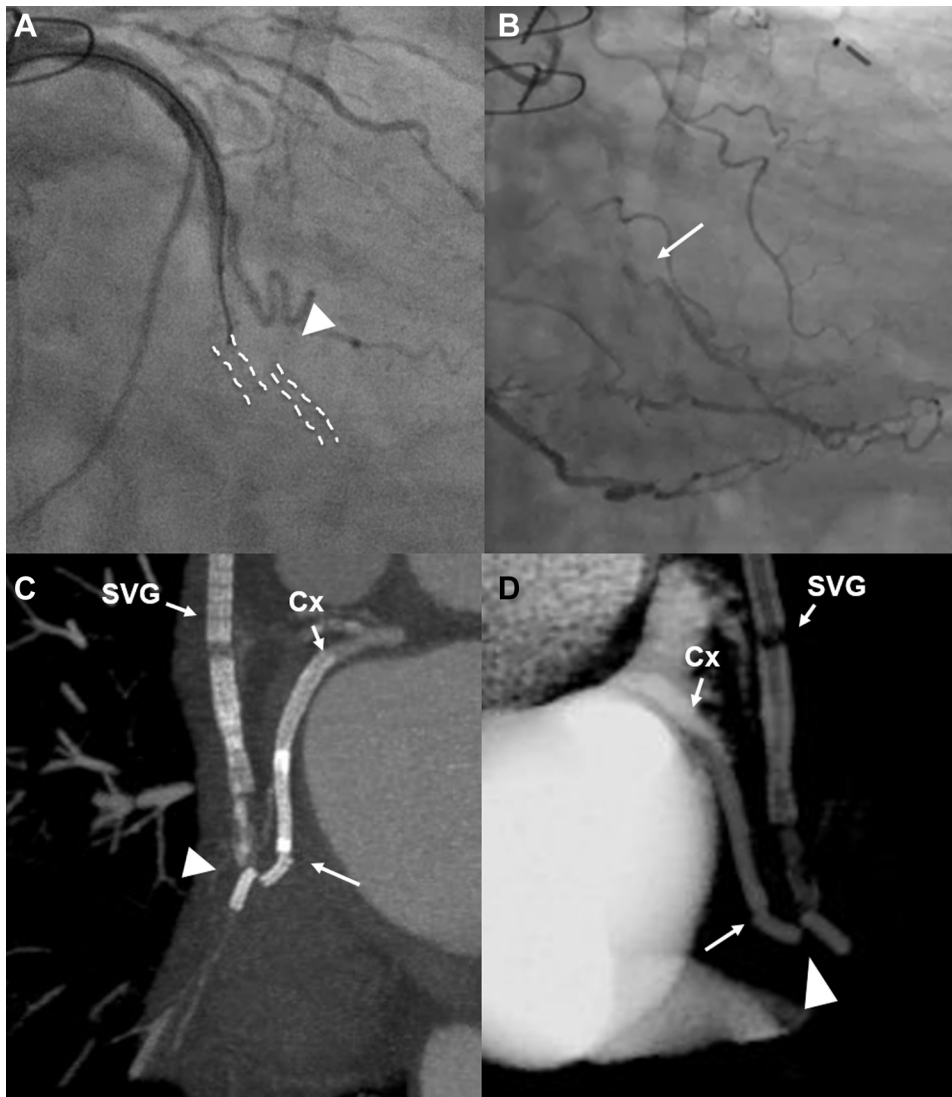


(A) Chronic occlusion of the circumflex coronary artery. **(B)** The final result (**white arrowhead** indicates the saphenous vein graft anastomosis; **double-headed white arrow** indicates proximal and distal stent markers of distal stent).

From the ^aRoyal Brompton and Harefield NHS Foundation Trust, London, United Kingdom; and the ^bNational Heart and Lung Institute, Imperial College, London, United Kingdom. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received September 28, 2017; revised manuscript received October 17, 2017, accepted October 24, 2017.

FIGURE 2 Angiography and CT Images Showing SF



(A) Antegrade injection confirms re-occlusion of the artery within the distal stent (**dashed lines** depict distal stent transection; **white arrowhead** indicates the anastomosis point). **(B)** Retrograde injection shows a Z-shaped filling defect (**white arrow**) ([Online Videos 1 and 2](#)). **(C and D)** Computed tomography (CT) coronary angiography confirms 2 distinct stent fractures (SF). (**White arrow** indicates Type III SF, and **white arrowhead** indicates Type V SF.) Cx = circumflex coronary artery; SVG = saphenous vein graft.

TABLE 1 Nakazawa Classification for SF

Grade	Classification
I	Single-strut fracture
II	Two or more strut fractures without deformation
III	Two or more strut fractures with deformation of the stent
IV	Multiple strut fractures with acquired transection, but without a gap
V	Multiple strut fractures with acquired transection and gap in the stent body

SF = stent fracture.

revealed 2 distinct stent fractures (SF) within the distally implanted stent (**Figure 2, Online Videos 1 and 2**). There are several angiographic classifications for SF, the most common being the Nakazawa criteria

(**Table 1**) (1). In this case, the proximal SF involves ≥ 2 struts with deformation (Type III), and the distal fracture involves multiple struts with complete acquired transection of the stent with a gap (Type V) (**Figure 2, Online Videos 1 and 2**). The early development of 2 distinct forms of SF within the same drug-eluting stent implicates chronic traction from the vein graft at the anastomosis as the primary mechanism. Vein graft anastomosis sites should be considered as a risk factor for SF.

ADDRESS FOR CORRESPONDENCE: Dr. Ranil de Silva, Royal Brompton and Harefield NHS Foundation Trust, London SW3 6NP, United Kingdom. E-mail: r.desilva@imperial.ac.uk.

REFERENCE

1. Nakazawa G, Finn AV, Vorpahl M, et al. Incidence and predictors of drug-eluting stent fracture in human coronary artery a pathologic analysis. *J Am Coll Cardiol* 2009;54:1924-31.

KEY WORDS drug-eluting stent(s), restenosis, stent fracture

APPENDIX For supplemental videos, please see the online version of this paper.