

Late stent fracture – A potential role of left ventricular dilatation



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Background: Coronary stent fracture is an under-recognized event but one that has been reported frequently in the drug-eluting stent era. Most reported cases of stent fracture occurred within days to two years after implantation, and are related to stent thrombosis and restenosis.

Case report: Presentation of a 69-year-old male with a history of arterial hypertension and previous percutaneous coronary intervention (PCI), and with implantation of three overlapping drug-eluting stents (DES) on proximal-to-middle left anterior descending artery (LAD). At five-year outpatient evaluation, the patient was found to have a new left bundle branch block associated with mild elevation in Troponin-I value and severe left ventricular dysfunction. The patient recovered as non ST-segment elevation myocardial infarction (NSTEMI) and consequently a new coronary angiography showed total occlusion of proximal LAD with multiple stent fracture. Here we discuss the role of left ventricular dilatation as a contributing factor to late drug-eluting stent fracture.

Conclusion: Different anatomical coronary settings have been described as predisposing factors to stent fracture. Consequently, the remodeling of the left ventricle, together with the rise in diastolic pressure, may have affected the shear stress of LAD stents by increasing mechanical forces produced in the diastolic phase on the epicardial vessel. In addition, left ventricular enlargement could have increased the elongation forces on the stent frames by altering the curvature of the stent. All predisposing factors of stent fracture, including coronary and left ventricular issues, need to be considered before stent implantation to avoid stent fracture and clinical sequelae.

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Keywords: Drug-eluting stents (DES), Left ventricular remodeling, Percutaneous coronary intervention, Stent fracture

Introduction

Stent fracture (SF) after drug-eluting stents implantation has been reported in 1–8% [1,2] of cases, and is associated with stent

thrombosis, myocardial infarction, and recurrent angina [2]. Predisposing factors for SF include: right coronary artery location, vessel tortuosity, overlapping and long stents, and stent implantation in angulated vessels ($\geq 45^\circ$) and in saphenous

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vein grafts [2] and longitudinal stent distortion [5]. We report a case of multiple stent fracture causing total occlusion in the left anterior descending artery.

Case report

A 69-year-old male with history of arterial hypertension and previous percutaneous coronary intervention (PCI) on ramus with bare medical stent implantation presented to our department due to unstable angina. Coronary angiography revealed diffuse disease with multiple lesions in proximal and middle segments of left anterior descending artery (LAD). PCI was performed with implantation of three overlapping drug-eluting stents (DES) on proximal-to-middle LAD (Cypher 2.75/33 mm & 2.75/23 mm, Cordis Warren NJ, USA; plus Taxus 2.5 × 16 mm, Taxus® Boston Scientific Corp., Natick, MA) (Fig. 1). Subsequent yearly follow-up was uneventful until the fourth year. An outpatient evaluation at the fifth year revealed new left bundle branch block associated with mild elevation in Troponin-I value (TnI 0.053 ug/L) and severe left ventricular

Abbreviations

LAD	left anterior descending artery
LBBB	left bundle branch block
SF	stent fracture
RAO	right anterior oblique
LV	left ventricle

dysfunction (EF 25%). At that time, the patient was free of symptoms. A new coronary angiography showed total occlusion of proximal LAD with multiple stent fracture (type V). The fracture was best visible in fluoroscopy without contrast injection, clearly showing acquired transection and discrete gap in the stent body (type V) (Fig. 2). Unfortunately, the patient refused any further intervention for revascularization or any other evaluation such as implantable cardioverter/defibrillator. He was thus discharged on medical therapy only.

Discussion

Coronary stent fracture is an under-recognized event but one that has become more frequent in the DES era. Most reported cases of stent fracture

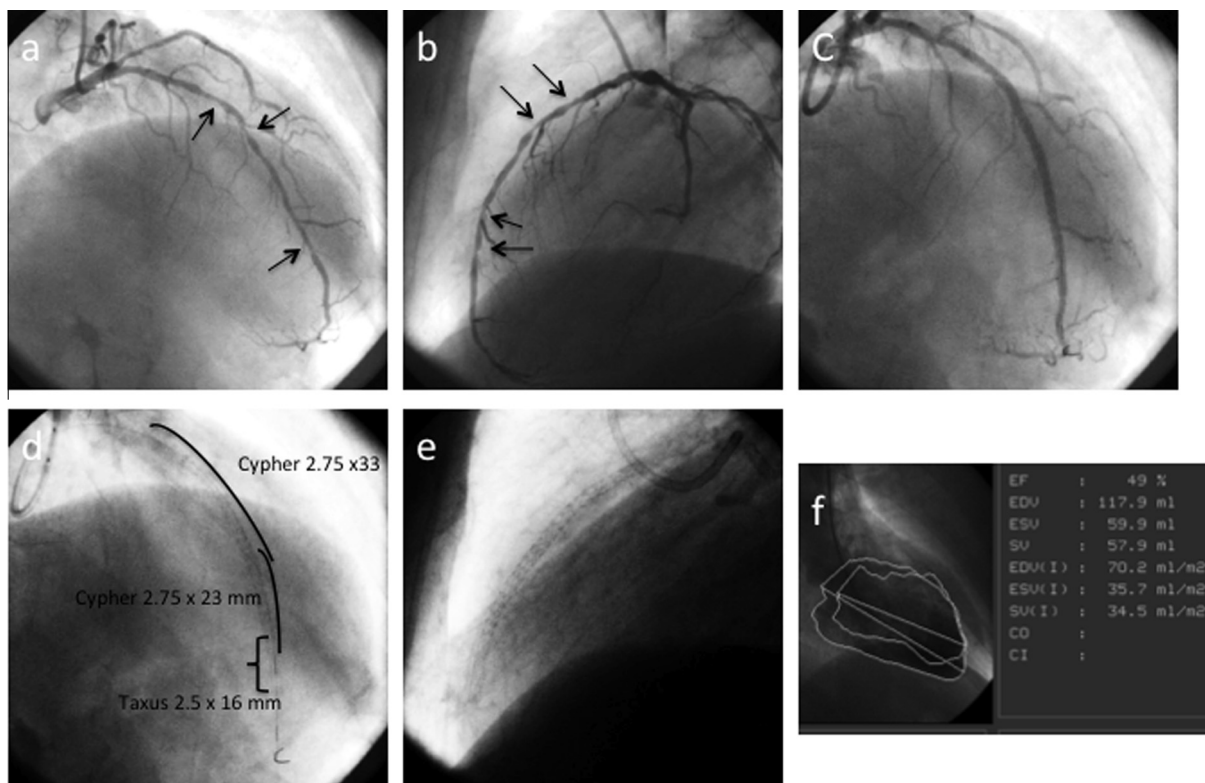


Figure 1. Baseline coronary angiogram (2005) in the setting of unstable angina, showing multiple tight stenosis on LAD (arrows) (a) AP cranial view, and (b) lateral view. Post intervention angiogram showing angiographic success after three overlapping drug-eluting stents (c). Coronary angiography demonstrating no disruption of stent struts (d) RAO cranial view, and (e) lateral view. Left ventricular angiography revealed moderate left ventricular dysfunction (f).

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