

Sirolimus-Eluting Stent Fracture

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ABSTRACT

The reported incidence of stent fracture after sirolimus-eluting stent implantation ranges from 1.9 to 16% according to different series and has been associated with increased rate of restenosis and long-term cardiac events.

We describe the case of a patient with a telescoped stent fracture, associated with stent occlusion after 6 years of telescoped sirolimus-eluting stent implantation, which was detected using multislice computed tomography and invasive angiography.

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Key words >

Rhabdomyosarcoma – Neoplasm - Heart

Abbreviations >

Atm	Atmospheres	BMI	Body mass index
AV	Atrioventricular	SES	Sirolimus-eluting stent
SF	Stent fracture	64-MSCT	64-Row multislice computed tomography

INTRODUCTION

Several studies have shown that sirolimus-eluting stents (SES) significantly reduce the incidence of restenosis and the need for repeat revascularization compared with bare-metal stents. (1, 2) Stent fracture (SF) is a complication reported after SES implantation, associated with increased restenosis rate (15-60%) and long-term cardiac events. (3-6)

CASE REPORT

We report the case of a 60-year-old male patient with multiple coronary risk factors: dyslipidemia treated with rosuvastatin, type 2 diabetes under oral medical treatment, smoking and overweight (BMI 34).

He underwent coronary angioplasty in January 2006 with two telescoped SES (Cypher® 2.25 × 28 mm and 2.5 × 23 mm) implanted in ramus intermedius, on a diffuse lesion from the ostium, and in a curved arterial segment.

Both stents were deployed at a pressure of 14 atmospheres (atm), and post-dilation with non-distensible 3.0 × 15 mm balloon at 14 atm was achieved in the telescoped segment. Angioplasty with a similar stent (Cypher® 3.5 × 18 mm at 16 atm) was also performed in the middle third of the right coronary artery.

The patient made good progress under optimal medical treatment for 5 years and 6 months. At that point, he developed progressive angina, functional class II-III.

A rest-stress myocardial perfusion study revealed moderate ischemia in lateral and inferior walls, and the ergometric test was positive for angina and ST at moderate workload.

Later, a non-invasive coronary angiography performed with a 64-detector row CT scanner (CT64, Philips Brilliance) revealed right coronary artery stent patency, and a de novo lesion in the proximal segment of the atrioventricular (AV) branch. It also showed lack of patency of the stents implanted in the ramus intermedius. A strut-free area in the distal segment to the telescope, associated with dislocation of the stent midline, might correspond to SF (Figure 1). The anterior descending coronary artery showed a moderate non-calcified lesion.

Afterwards, he was submitted to invasive coronary angiography (Innova 2100, General Electric, MI, USA) with planned angioplasty to the right coronary artery AV branch. The study confirmed the 64-MSCT findings, and angioplasty with everolimus-eluting stent was performed to the AV branch without complications.

This study confirmed the occlusion of telescoped stents in the ramus intermedius and complete SF in both proximal and distal segments to the telescope. Dynamic images showed a hinge-like ascending and descending movement of the ramus intermedius in the fracture site distal to the telescope. A gap at the level of both fractures allowed its characterization as complete frac-

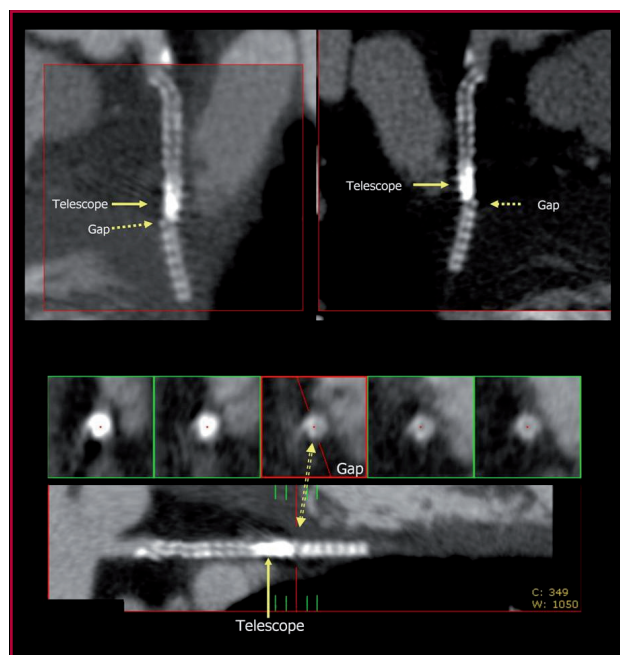


Fig. 1. 64-Row multislice computed tomography. MIP (maximum intensity projection) images. It shows two telescoped stents and a strut-free segment (gap).

ture without migration (Figures 2 and 3).

DISCUSSION

Several factors have been referred to as mechanisms responsible for SF. Oversized balloon used for post-dilation and high dilation pressure (> 14 atm), shear force due to movement and the hinge-like (systole-diastole) mechanism, greater length and smaller diameter of the stent, the telescope between stents, lack of protection from neointimal growth in the SES, artery tortuosity and angulation after stent implantation are mechanisms related to SF.

According to different studies, the estimated incidence of SF after SES implantation is between 1.9% and 16%, and it is associated with focal intrastent restenosis, thrombosis and intrastent occlusion, and cardiac events. (3-8)

In a recent study of over 800 patients, the incidence of SF after SES implantation was 8% (70/874) and was associated with higher late in-stent loss, higher restenosis rate, and greater need for repeat revascularization at 6 to 9 month angiographic follow-up. (9)

In our case, the 64-MSCT determined stent occlusion and suspected fracture. The telescope of both stents generates a partial-volume artifact that prevents the correct visualization of the fracture. Invasive angiography with high-definition equipment (Flat Panel) confirmed SF and occlusion.

Regarding the fracture mechanism, several associated predisposing factors such as length and diameter, telescope, tortuosity and post-stent angulation and shear forces due to movement may have been the cause of fracture.

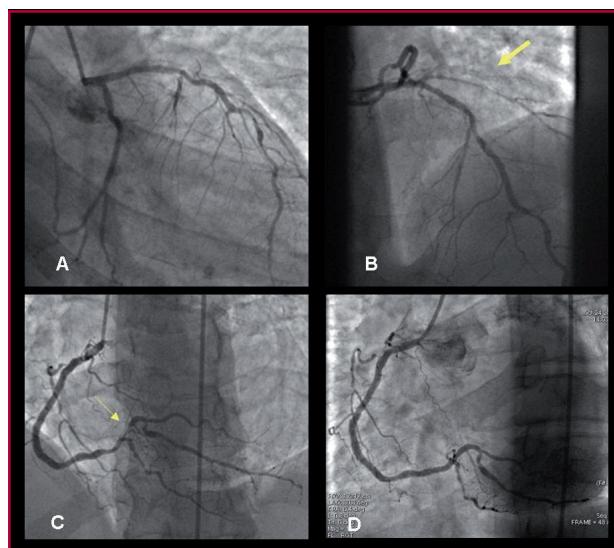


Fig. 2. Invasive angiography. **A.** Left coronary artery, right anterior oblique projection. **B.** Left coronary artery, right cranial projection. The arrow shows the telescoped stents in the ramus intermedius. **C.** Right coronary artery, left cranial oblique projection. The arrow shows an atrioventricular branch lesion. **D.** Right coronary artery, left anterior oblique projection after stent implantation in the atrioventricular branch.

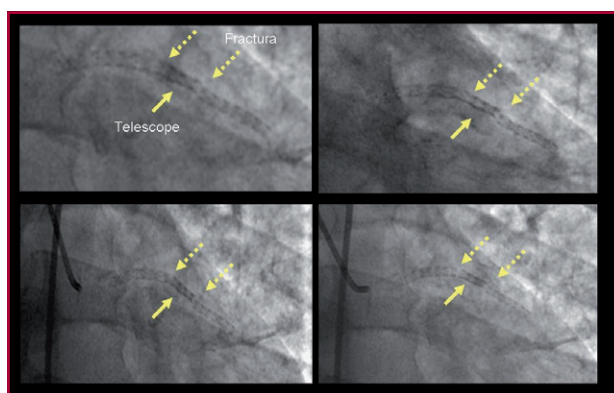


Fig. 3. Invasive angiography. Fluoroscopy images showing two telescoped stents, the telescope segment, and the stent fracture on both sides.

Clinical manifestations suggest its course was progressive rather than an acute occlusion due to stent thrombosis.

It is important to point out that advanced imaging technology paves the way to diagnose this type of condition.

RESUMEN

Rhabdomyosarcoma cardíaco

La fractura del stent es una complicación que se ha comunicado luego del implante de stents liberadores de sirolimus con una frecuencia que oscila entre el 1,9% y el 16% según las series y que se asocia con una tasa mayor de reestenosis y de eventos cardíacos a largo plazo.

En esta presentación se describe el caso de un paciente en

el que, casi 6 años después del implante de dos stents liberadores de sirolimus telescopados, a través de tomografía computarizada multidetector y angiografía invasiva se evidenció la fractura de los stents telescopados, asociada con oclusión del stent.

Palabras clave > Angioplastia - Stents - Angiografía - Tomografía computarizada multidetector

Conflicts of interest:
None declared.

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