CASE IMAGE

Usefulness of optical coherence tomography imaging for diagnosis of in-stent restenosis due to a stent fracture and morphological assessment

Stent kırılmasına bağlı stent içi restenoz görüntülenmesi ve morfolojik değerlendirilmesinde optik koherens tomografinin yararı

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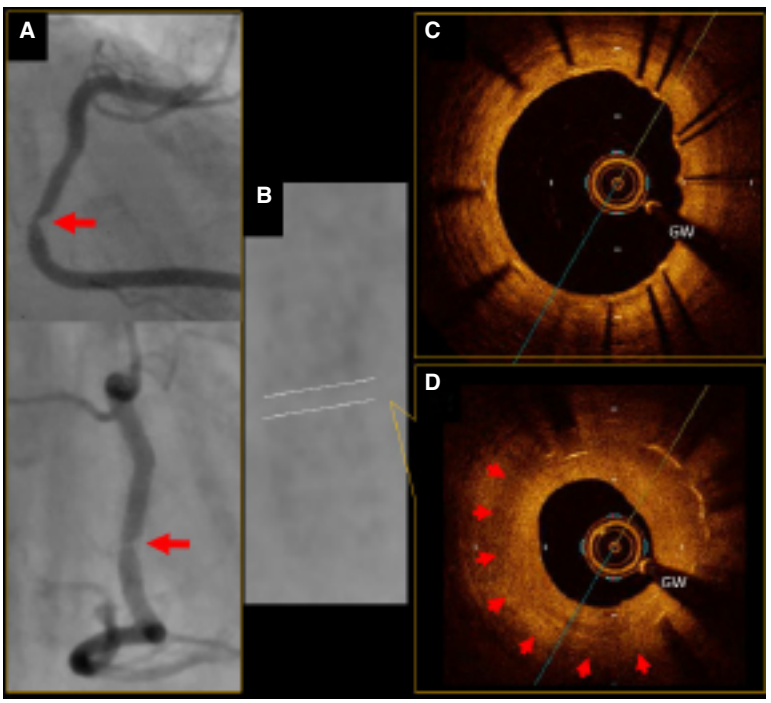
A 71-year-old Japanese woman underwent a percutaneous coronary intervention for treatment of the worsening exertional angina. Coronary angiography revealed stenosis in the right coronary artery. An intravascular ultrasound showed attenuated plaque without a calcium burden in the culprit lesion. A 3.0×16-mm drug-eluting stent (DES) (Synergy; Boston Scientific, Marlborough, MA) was implanted and inflated to nominal size. Since the final angiographic and intravascular ultrasound results were satisfactory for the targeted lesion, balloon post-dilation was not performed. Ten months later, a coronary angiogram revealed in-stent restenosis (ISR) due to a total separation-type stent fracture (Figures A and B, Video 1*). Although the image seen in Figure C showed circumferentially covered stent struts, when viewed with optical coherence tomography (OCT), the homogeneous neointima pattern suggested smooth muscle cells and extracellular matrix at the fracture site (Figure D). Excessive pressure during stent deployment and aggressive balloon post-dilation and the resultant damage to the stent strut are considered risk factors for the development of stent fractures; however, we were able to exclude those factors in our patient's case. It has been suggested that vessel tortuosity and the sharp angle of the hinge motion of vessels may increase metal fatigue during a cardiac cycle and lead to stent fracture. Since the main reason for the ISR in this case was probably persistent mechanical stress, and because a previous study has reported that ISR lesions with a homogeneous structure were suited to paclitaxel-coated balloon dilatation, we did not implant a new DES; rather, we performed angioplasty with a 3.0×15mm paclitaxel-coated balloon (SeQuent Please; B. Braun Melsungen AG, Melsungen, Germany) after performing plain balloon angioplasty with a 3.0×13mm balloon (Lacrosse NSE Alpha; Goodman Product Co., Nagoya, Japan) due to a decreasing inflammatory response. Although DES implantation has dramatically reduced the rate of ISR compared with bare metal stents, ISR due to stent fracture remains a possibility. The use of OCT can be effective for diagnosing ISR due to a stent fracture and for morphological assessment of ISR tissue.



Figures– (A) Coronary angiogram illustrating in-stent restenosis in the right coronary artery; **(B)** The stent fracture as seen on the coronary angiogram; **(C)** Two-dimensional cross-sectional optical coherence tomography (OCT) revealed circumferentially covered stent struts and a guidewire artifact (GW); **(D)** Two-dimensional cross-sectional OCT indicating the lack of stent struts (red arrow) and homogeneous neointima pattern. **Supplementary video file associated with this presentation can be found in the online version of the journal.*