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IMAGES IN CARDIOVASCULAR INTERVENTION

Vascular responses to a Viabahn stent graft: evaluation with computed tomographic angiography, angiography, and angioscopy

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Case

A 72-year-old woman with persistent atrial fibrillation underwent an implantation of a heparin-bonded expanded polytetrafluoroethylene (ePTFE)-covered stent (Viabahn, W. L. Gore, Flagstaff, AZ, USA) in her superficial femoral artery (SFA) with severe stenosis including yellow plaques (Fig. 1a, e). The distal reference vessel diameter measured by intravascular ultrasound was 4.5 mm × 5.1 mm. After the implantation of the Viabahn (5 mm × 100 mm), a final angiogram showed it had well-expanded (Fig. 1c). She received uninterrupted antithrombotic therapy with adjusted-dose warfarin and aspirin after the procedure. One year later, duplex ultrasound showed no in-stent restenosis, and a follow-up computed tomographic angiogram showed no in-stent restenosis except at the stent edges, which were unevaluable because of metallic artifact (Fig. 1b). To manage the antithrombotic therapy, follow-up angiography was performed and confirmed there was no in-stent restenosis (Fig. 1d), and angioscopy detected yellow plaques seen through the ePTFE, mural thrombi without neointima coverage (Fig. 1f; Supplement Movie 1), and a small gap between the proximal stent edge and luminal vessel wall (Fig. 1f; Supplement Movie 2), which might have been caused by a weak radial force.

Discussion

Previous studies reported that Viabahn had better patency than bare-metal stents (BMSs), irrespective of the lesion length [1]. Vascular responses after their implantation have not yet been adequately studied.

The main findings of this case were as follows; (1) mural thrombi occurred in the Viabahn stent with heparin-bonded ePTFE under uninterrupted antithrombotic therapy; (2) the ePTFE was transparent, and the folds could not be confirmed; (3) the radial force of the proximal stent edge might have been weak.

Ishihara et al. previously reported that drug-eluting stents implanted in the SFA had a higher heterogeneity and thrombus frequency than BMSs [2]. In this case, the Viabahn had mural thrombi, however, there were not so many. This could be mainly because the Viabahn had heparin-bonded ePTFE. The ePTFE folds at the proximal stent edge might cause a malapposition and subsequent edge restenosis [3]. However, current angioscopy could not visualize the ePTFE folds. A higher resolution angioscope or other imaging modalities may be needed.

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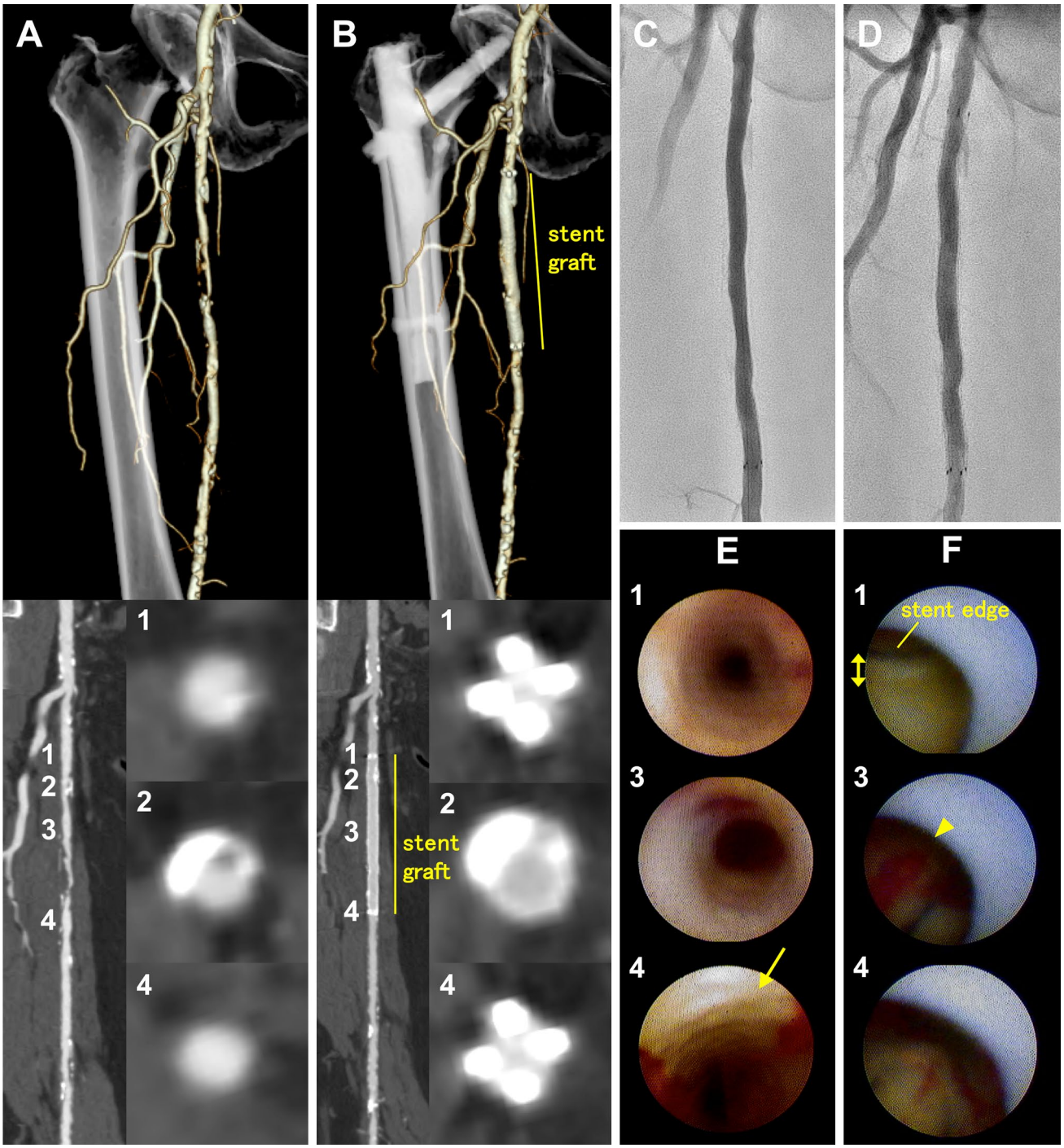

Fig. 1 **a** Pre-procedural images of the computed tomographic angiography (CTA) and curved planer reconstruction (CPR) show severe stenosis in the middle superficial femoral artery (SFA) and mild calcification in the proximal SFA (location 2). **b** Follow-up procedural CTA images and CPR show no in-stent restenosis except for at the stent edges, which are unevaluable because of metallic artifact (locations 1 and 4). **c** Post-procedural angiography shows the stent graft has well-expanded. **d** Follow-up angiography confirms no in-stent restenosis. **e** Pre-procedural angioscopy detects yellow plaques (arrow). **f** Follow-up angioscopy detects yellow plaques, which are seen through the expanded polytetrafluoroethylene, mural thrombi (location 3, arrowhead) and a small gap (two-way arrow) between the proximal stent edge and luminal vessel wall

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