A 73-year-old hypertensive, dyslipidemic man with known complex coronary artery disease has had operative revascularization twice in the last 10 years. He has also undergone multiple angioplasty procedures on the saphenous vein graft (SVG) to the obtuse marginal (OM) and right coronary arteries. The left internal mammary artery conduit to the left anterior descending artery remains patent.

The SVG to the OM was treated for in-stent restenosis with Excimer laser angioplasty, and the patient was included in the SVG Washington Radiation for In-Stent restenosis Trial (WRIST) protocol. No additional stent was placed. After the intervention, the patient received intracoronary $\gamma$-radiation therapy (iridium-192 ribbon $\times$9 seeds; 35 mm; Best Medical International). The prescribed dose was 15 Gy to a distance 2.0 mm from the surface of the source. The patient received Plavix (clopidogrel 250 mg BID) for 1 month and is now taking aspirin (325 mg) every day.

He did well until recently, when he presented with exertional chest discomfort. Thallium stress testing demonstrated lateral wall ischemia. An angiogram taken 6 months after $\gamma$-radiation showed focal edge stenosis at the proximal margin of the stent in the SVG to OM (Figure 1). Intravascular ultrasound pullback at 0.5 mm/s (3.2 F, 30 MHz, Boston Scientific/CVIS) showed a soft concentric plaque (Figure 2), which was subjected to directional atherectomy (DVI Inc) and balloon angioplasty. Two pieces of the edge restenotic tissue were analyzed histologically; they showed typical hypocellularity or acellularity after brachytherapy (Figure 3).
Figure 2. Intravascular ultrasound images taken 6 months after γ-radiation and 1 mm apart show soft plaque.

Figure 3. Photomicrographs of serial histological sections of an atherectomy specimen retrieved from the proximal edge of the stent 6 months after brachytherapy (magnification ×50). A, Section stained using Movat pentachrome methods shows a predominant blue-green-colored proteoglycan-rich matrix with amorphous brownish material resembling fibrin. B, Immunohistochemical identification of platelets using an anti-CD61 antibody; note the persistent platelet deposition within the lesion. C, Fibrin II staining showing diffuse immunoreactivity. D and E, Identification of smooth muscle cells and macrophages by anti-α-actin and anti-CD68 antibodies, respectively. Smooth muscle cells are the predominant cell type. F, Polarization microscopy after picrosirius red staining shows a mixture of collagen types I (yellow-red) and III (green).
Edge Stenosis After Intracoronary Radiotherapy: Angiographic, Intravascular, and Histological Findings
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