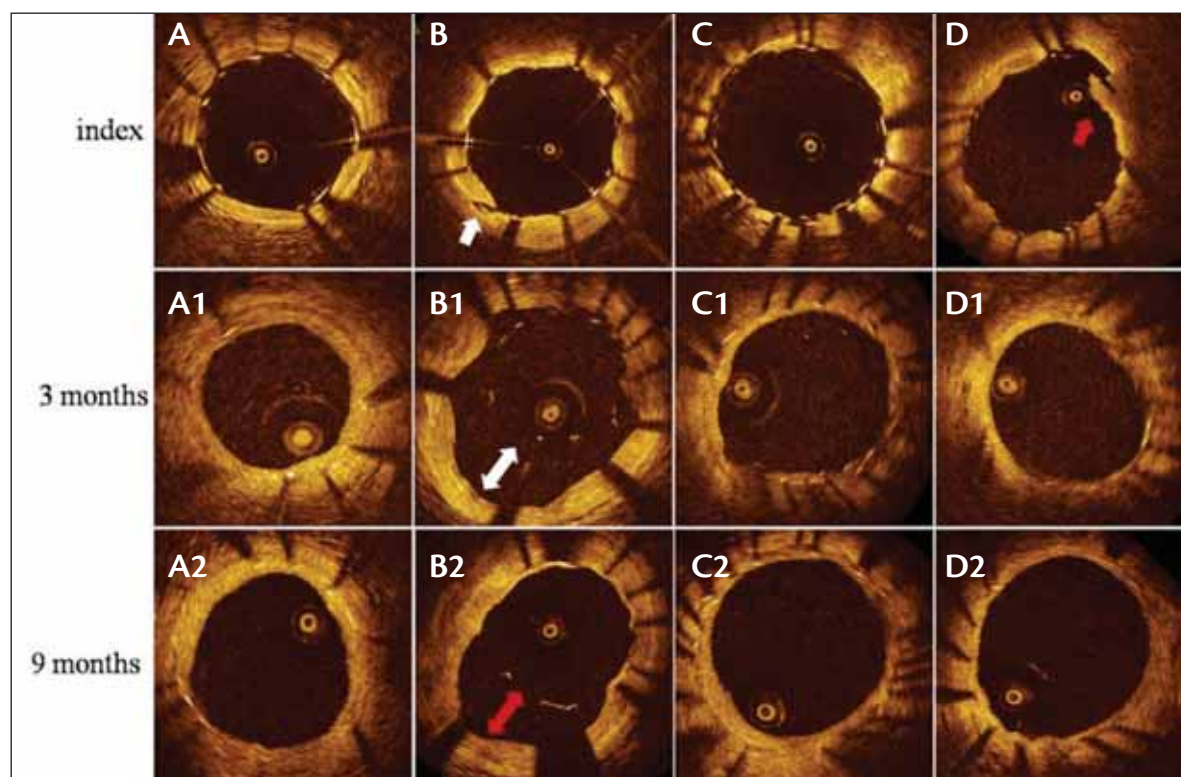


Not too little, not too much: using optical coherence tomography to guide stent expansion.

Stent underexpansion is associated with restenosis and subacute stent thrombosis. Construction of the perfect implant, with stent struts closely in contact with the internal walls of the arteries and a symmetric expansion, is difficult to achieve due to the heterogeneity of atherosclerotic plaques. Accurate judgement of the expansion of coronary stents by standard coronary angiography is limited to the radiopaque contour of the stent, with some amelioration due to signal enhancement (boost). Intravascular ultrasound more accurately detects inadequate stent expansion than coronary angiography. The current standard of care in stent implantation with high-pressure deployment was introduced thanks to intravascular ultrasound studies.

However, attempts to obtain perfect strut apposition at any cost may result in additional vessel damage. Optical coherence tomography, which has an axial resolution of 15 μm , is able to detect subtle details that, until now, have not been available. The figure illustrates a rare case in which the use of high-pressure dilation for stent optimization resulted in media rupture with early positive remodeling and aneurysm formation, as detected by serial optical coherence tomographic examination. ■

Vasile Sirbu, MD, and Giulio Guagliumi, MD, are with the Cardiovascular Department at the Ospedali Riuniti di Bergamo in Bergamo, Italy.



Time-domain optical coherence tomography of the treated lesion after stent implantation (multiple cross-sections A–D) and at 3-month (A1–D1) and 9-month follow-up (A2–D2). The distal segment showing symmetric and well-expanded struts with full coverage and mild neointima response (A) at 3 and 9 months (A1,A2). The mid-distal segment showing the dissection plane extending deeply into the media at implantation (6–7 o'clock) (B; white arrow), resulting in early aneurysm formation with completely uncovered struts at 3 months and incompletely sealed at 9 months (B1,B2; white and red arrows). The stent segment with overlap (C) shows a double layer of struts that did not result in vessel remodeling or stenosis at 6- and 9-month follow-up (C1,C2; 12–6 o'clock). The proximal segment shows good expansion with the small protruding plaque (1 o'clock) (D; red arrow) completely sealed at 3 months (D1) and persistence of a good result at 9-month follow-up (D2).