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Background: Directional coronary atherectomy (DCA) followed by drug-coated balloon (DCB) angioplasty is a useful stentless strategy for ostial left anterior descending artery (LAD) and bifurcation lesions. Plaque debulking can minimise carina shift and preserve future treatment options. However, the long-term consequences of deep vessel-wall injury during DCA remain unclear.

Case presentation: A woman in her 60s presented with medically refractory exertional angina. Coronary computed tomography angiography and invasive angiography revealed severe ostial LAD stenosis. Percutaneous coronary intervention with DCA followed by DCB angioplasty was performed. Post-atherectomy intravascular ultrasound (IVUS) suggested a deep cut extending to the adventitia. Histopathological examination of the excised tissue confirmed thickened intima with focal medial and adventitial components. At 8 months, angiography showed only mild ectatic change in the proximal LAD; however, severe recurrent ostial LAD stenosis developed 3 years after the index procedure.

Discussion: At repeat intervention, IVUS and computed tomography demonstrated progression of mixed plaque at the original atherectomy site. We hypothesised that deep injury involving the adventitia provoked chronic inflammation and initial aneurysmal dilatation, followed by reparative tissue proliferation and late restenosis.

Conclusion: Although DCA can avoid complex stenting, excessively deep resection may predispose to aneurysmal change and unexpected late restenosis. Accurate IVUS interpretation and meticulous control of atherectomy depth are essential to minimise vessel-wall injury and improve long-term outcomes.