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CLINICAL VIGNETTE

Successful rotational atherectomy for abdominal aortic stenosis with severe calcification in a patient treated with transfemoral transcatheter aortic valve implantation

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An 84-year-old woman was diagnosed with symptomatic severe valvular aortic stenosis. Computed tomography showed an aortic annulus area of 293 mm^2 and significant abdominal aortic stenosis with severe calcification (indicated with a yellow arrow, Fig. 1A–C). Transcatheter aortic valve implantation (TAVI) was performed via the right transfemoral approach. The introducer of a 14-Fr e-sheath (Edwards Lifesciences Inc., Irvine, CA, USA) on a Lunderquist® wire (Cook Medical, Bloomington, IN, USA) was successfully advanced through the stenosis of the abdominal aorta. However, the e-sheath could not pass through due to heavy resistance (Fig. 1D–E). Intravascular ultrasound (IVUS) confirmed a focal stenosis with a napkin-ring calcification (Fig. 1D, a–c). An 8-Fr Judkins right guiding catheter was advanced from the left femoral artery. Subsequently, rotational atherectomy (RA) with a 2.25-mm burr was started at a rotational speed of 230,000 rpm. To create multiple cracks in the calcification, the guiding catheter was rotated to change the RA pathway during the procedure (Fig. 2A–C). RA was repeated also from the right side (Fig. 2D). Dilation with a 6.0-mm cutting balloon was performed afterwards (Fig. 2E). Serial IVUS confirmed a significant increase in the lumen area at the site of the stenosis (Fig. 2a–c), and the 14-Fr e-sheath was smoothly advanced. A 20-mm Sapien3 (Edwards Lifesciences Inc.) was successfully advanced and deployed (Fig. 3A, B) in the optimal position with no paravalvular leak. Postprocedural aortography and IVUS showed no evidence of major dissection or perforation at the site of the stenosis (Fig. 3C, D). Intravenous drip infusion of alprostadil was given at 10 μg per day for three days. There were no adverse events such as lower-limb ischaemia due to potential embolisation from the abdominal aorta. The patient remained in good condition at six-month follow-up. Furthermore, computed tomography showed no evidence of significant restenosis in the abdominal aorta (Fig. 3E, F). To the best of our knowledge, there have been no reports regarding the safety and efficacy of RA for calcified abdominal aorta stenosis. Recent papers have reported better outcomes with transfemoral TAVI than with non-transfemoral approaches. However, one of the potential anatomical issues interfering with transfemoral TAVI is calcified stenosis on the access route. There are well-known percutaneous techniques to tackle this problem, such as the use of a stiffer wire, step-by-step upsizing of dilators, balloon dilation, and smearing propofol on the sheath as a lubricant. Theoretically, the coronary RA system is too small for the aorta. However, we would like to emphasise our technique in which the guiding catheter was rotated to change the RA pathway during the procedure, thereby creating multiple cracks in the calcified ring. One of the potential complications of these manoeuvres is major dissection or even rupture of the abdominal aorta; however, this was not detected by postprocedural aortography or IVUS. Other complications may include the slow-flow phenomenon and/or distal embolisation to the lower limbs due to downstream fragments. In our case, post-operative intravenous drip infusion of alprostadil might have been effective.

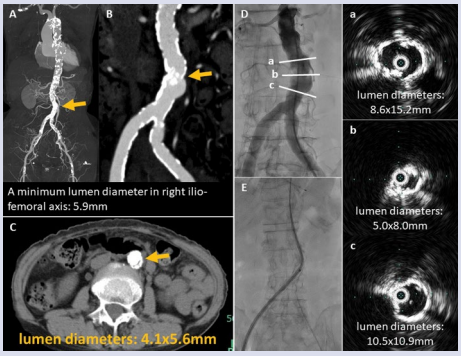

Figure 1. Preprocedural computed tomography, aortography and intravascular ultrasound

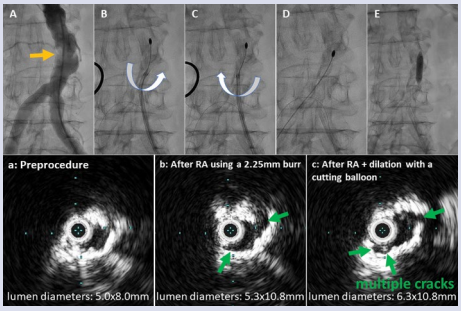

Figure 2. Serial intravascular ultrasound confirming a significant increase in the lumen area at the site of the stenosis

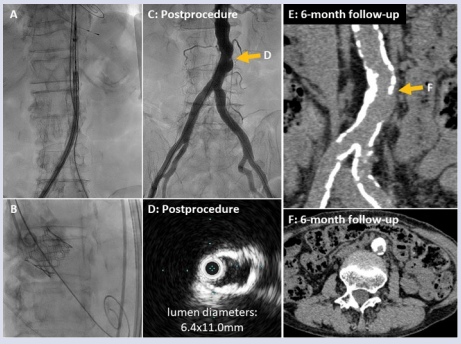

Figure 3. Postprocedural aortography and intravascular ultrasound, and 6-month follow-up computed tomography

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Conflict of interest: *Toru Naganuma: a clinical proctor for Edwards Lifesciences*