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Successful treatment of a severe ACURATE neo2 valve underexpansion in a setting of a severe aortic stenosis with massive calcifications

Short title: Treatment of severe underexpansion of THV

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Severe prosthesis underexpansion during transcatheter aortic valve implantation (TAVI) may have serious consequences and requires immediate corrective measures. Migration of the device into aorta can be solved interventionally or conservatively or even surgically in case of aortic injury [1]. Deep ventricular embolization, on the other hand, requires urgent open-heart surgery in vast majority of cases [1].

A 77-year-old female was referred for an elective TAVI. She earlier received permanent pacemaker for a complete atrioventricular block. Her comorbidities included osteoporosis,

dyslipidemia and previous hip replacement. Baseline transthoracic echo (TTE) documented severe aortic stenosis with a mean gradient of 67 mmHg while left ventricular ejection fraction was preserved. Coronary angiography revealed no significant coronary lesions. Computed tomography scan showed diffuse iliac and aortic atherosclerosis but no contraindications to left transfemoral approach. Right femoral artery was rather unsuitable for any sheath bigger than 8 F. Aortic valve was confirmed as tricuspid with an extensive diffuse leaflet calcification (Figure 1A). Aortic annulus perimeter of 72.2 mm combined with expandable hydrophilic 14 F delivery sheath (iSleeve, Boston Scientific, US) facilitated Acurate neo2 M (Boston Scientific, US) device choice [2].

Right radial access was used for 6F pigtail insertion. Proglide-assisted 14F sheath insertion over Amplatz Ultra Stiff guidewire was completed with some difficulties, followed by a standard introduction of Safari S (Boston Scientific, US) preshaped guidewire. Based on area-derived annular diameter of 22.6 mm non-compliant 22/40 mm VACS III (Osypka, Germany) balloon was chosen for an aggressive predilatation, which was successfully executed with a support of left-ventricular guidewire rapid pacing (Supplemantery material, *Video S1*). Then, a routine Acurate neo2 M valve implantation was performed. To our surprise, unexpected high-grade valve underexpansion was visualized in both 3-cusp and overlap views (Figure 1B, C) which made removal of delivery system impossible without increased risk for valve pop-out. As both patient hemodynamic status and valve position remained stable, initial conservative strategy was chosen but there was no spontaneous improvement of valve expansion after 10 minutes of watchful waiting. An 8 F sheath was inserted to the right femoral artery and used for a standard Acurate Neo 2 valve crossing and parallel Safari S introduction, followed by 8F-compatible semicompliant 20/40 mm Osypka VACS II balloon (Osypka, Germany) postdilatation (Figure 1D, Supplementary material, *Video S2*). It resulted in partial but significant valve expansion, which allowed for successful delivery system removal. As moderate PVL was still present, a final valve postdilatation with non-compliant 22/40 mm Osypka VACS III (Osypka, Germany) balloon was performed (Supplementary material, *Video S3*). Both final aortogram (Figure 1E) and TTE confirmed optimal valve position and function with only trace PVL and 13/6mmHg gradient (Figure 1F). Patient was discharged two days later as per local practice and remains asymptomatic in a short-term follow-up.

Acurate neo2 valve significant underexpansion, precluding safe delivery system removal can occur in a presence of massive aortic valve calcifications [3]. If not resolved spontaneously, it can be treated with parallel guidewire insertion and postdilatation [3, 4].

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/kardiologia_polska

Article information

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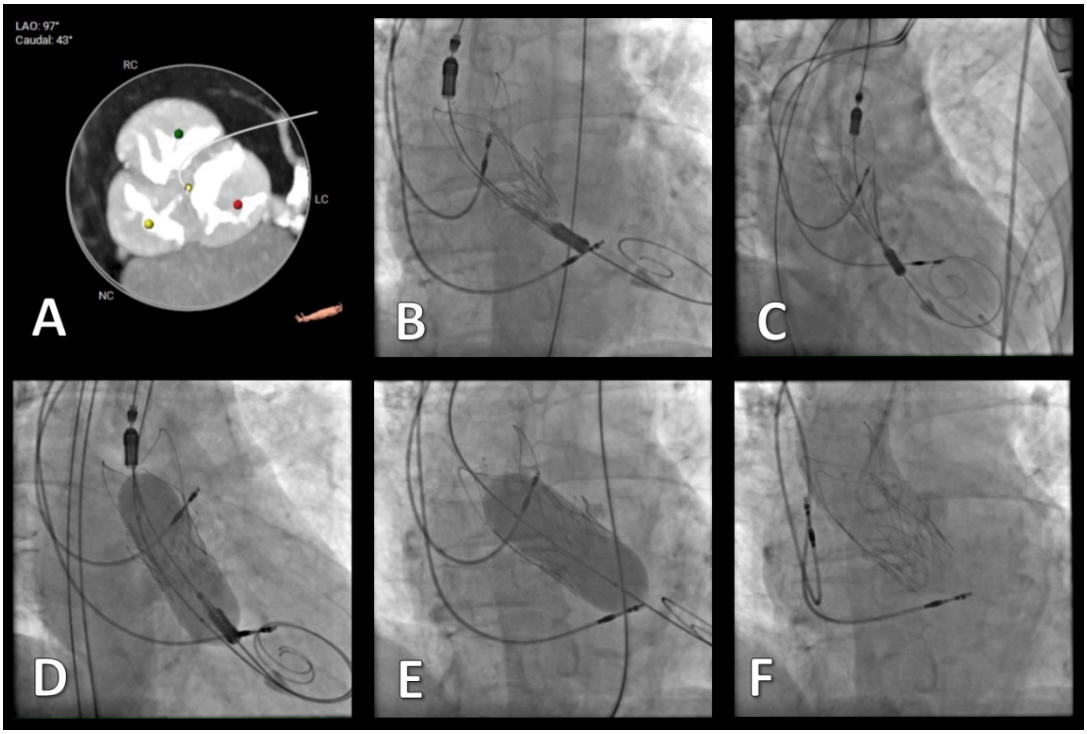

Figure 1. A. Massive aortic valve calcifications showed in computed tomography. **B.** Severe valve malopening, three cusp coplanar view. **C.** Extreme valve malopening, cusp overlap coplanar view. **D.** Initial postdilatation with semicompliant 20 mm/40 mm 8 F sheath compatible balloon via additional guidewire inserted into the left ventricle across the valve prosthesis. **E.** Postdilatation with non-compliant 22 mm/40 mm balloon. **F.** Final angiographic result of Accurate neo2 implantation