

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

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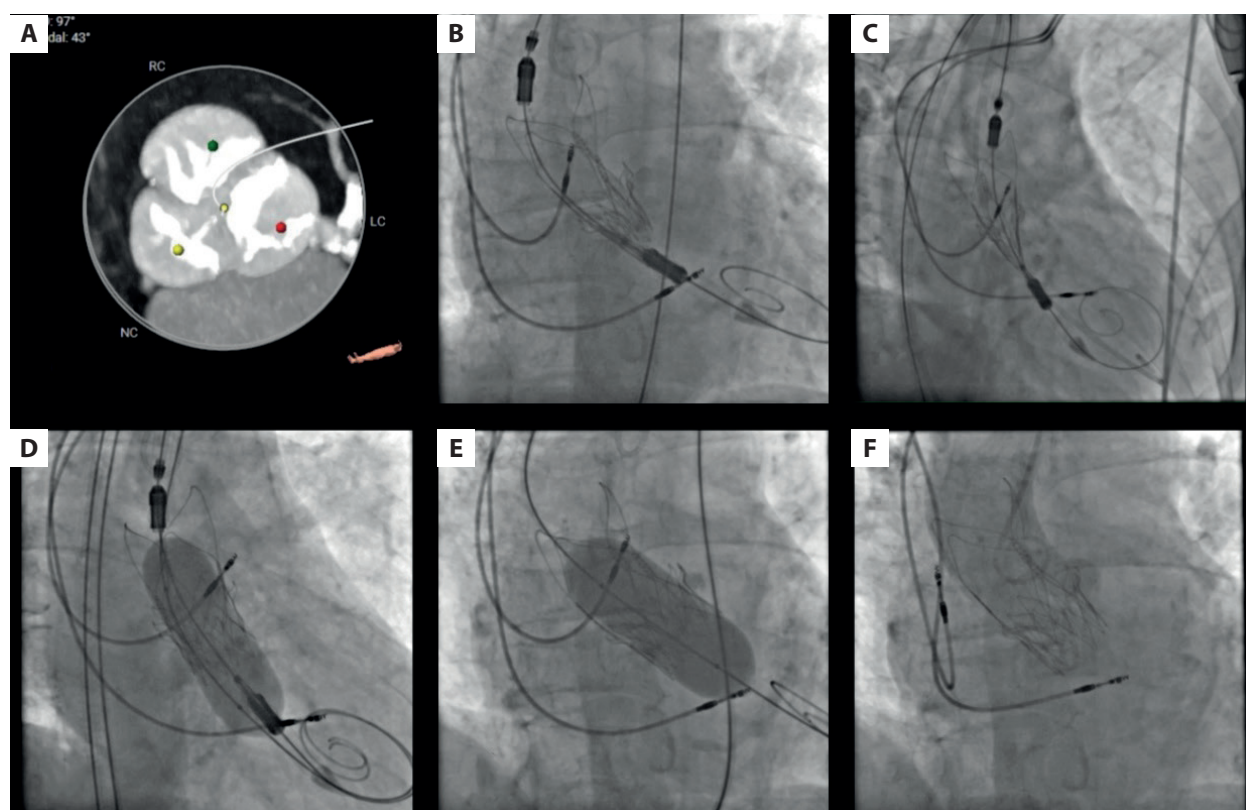
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Severe prosthesis underexpansion during transcatheter aortic valve implantation (TAVI) may have serious consequences and requires immediate corrective measures. Migration of the device into the aorta can be solved interventionally or conservatively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

A 77-year-old female patient was referred for elective TAVI. She had earlier received a permanent pacemaker for a complete atrio-ventricular block. Her comorbidities included osteoporosis, dyslipidemia, and previous hip replacement. Baseline transthoracic echocardiography (TTE) documented severe aortic stenosis with mean gradient of 67 mm Hg while left ventricular ejection fraction was preserved. Coronary angiography revealed no significant coronary lesions. A computed tomography scan showed diffuse iliac and aortic atherosclerosis but no contraindications to the left transfemoral approach. The right femoral artery was rather unsuitable for any sheath bigger than 8 F. The aortic valve was confirmed as tricuspid with extensive diffuse leaflet calcification (Figure 1A). An aortic annulus perimeter of 72.2 mm combined with an expandable hydrophilic 14 F delivery sheath (iSleeve, Boston Scientific, Marlborough, MA, US) facilitated ACURATE neo2 M (Boston Scientific) device choice [2].

Right radial access was used for 6 F pigtail insertion. Proglide-assisted 14 F sheath insertion over the Amplatz Ultra Stiff guidewire was completed with some difficulties, followed by a standard introduction of Safari S (Boston Scientific) pre-shaped guidewire. Based on an area-derived annular diameter of 22.6 mm, a non-compliant 22/40 mm VACS III (Osypka, Germany) balloon was chosen for aggressive predilatation, which was successfully executed with the support of left-ventricular guidewire rapid pacing (Supplementary material, Video S1). Then, 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 the delivery system impossible without increased risk for valve pop-out. As both the hemodynamic status of the patient and valve position remained stable, initially a 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 into the right femoral artery and used for standard ACURATE neo2 valve crossing and parallel Safari S introduction, followed by 8 F-compatible semi-compliant 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



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

system removal. As moderate paravalvular leak (PVL) was still present, final valve postdilatation with a non-compliant 22/40 mm Osypka VACS III (Osypka, Germany) balloon was performed (Supplementary material, *Video S3*). Both the final aortogram (Figure 1E) and TTE confirmed optimal valve position and function with only trace PVL and 13/6 mm Hg gradient (Figure 1F). The patient was discharged two days later as per local practice and remains asymptomatic in short-term follow-up.

Significant ACURATE neo2 valve underexpansion precluding safe delivery system removal can occur in the 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](https://journals.viamedica.pl/kardiologia_polska).

### Article information

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### REFERENCES

- Kim WK, Schäfer U, Tchetché D, et al. Incidence and outcome of peri-procedural transcatheter heart valve embolization and migration: the TRAVEL registry (Transcatheter HeArt Valve EmBoLization and Migration). *Eur Heart J*. 2019;40(38):3156–3165, doi: [10.1093/eurheartj/ehz429](https://doi.org/10.1093/eurheartj/ehz429), indexed in Pubmed: [31230081](https://pubmed.ncbi.nlm.nih.gov/31230081/).
- Scotti A, Pagnesi M, Kim WK, et al. Haemodynamic performance and clinical outcomes of transcatheter aortic valve replacement with the self-expanding ACURATE neo2. *EuroIntervention*. 2022;18(10):804–811, doi: [10.4244/EIJ-D-22-00289](https://doi.org/10.4244/EIJ-D-22-00289), indexed in Pubmed: [35678222](https://pubmed.ncbi.nlm.nih.gov/35678222/).
- Wiktorowicz A, Wit A, Malinowski KP, et al. Paravalvular leak prediction after transcatheter aortic valve replacement with self-expandable prosthesis based on quantitative aortic calcification analysis. *Quant Imaging Med Surg*. 2021;11(2):652–664, doi: [10.21037/qims-20-669](https://doi.org/10.21037/qims-20-669), indexed in Pubmed: [33532265](https://pubmed.ncbi.nlm.nih.gov/33532265/).
- Kleczyński P, Dziewierz A, Daniec M, et al. Impact of post-dilatation on the reduction of paravalvular leak and mortality after transcatheter aortic valve implantation. *Kardiol Pol*. 2017;75(8):742–748, doi: [10.5603/KP.2017.0152](https://doi.org/10.5603/KP.2017.0152), indexed in Pubmed: [28819953](https://pubmed.ncbi.nlm.nih.gov/28819953/).