

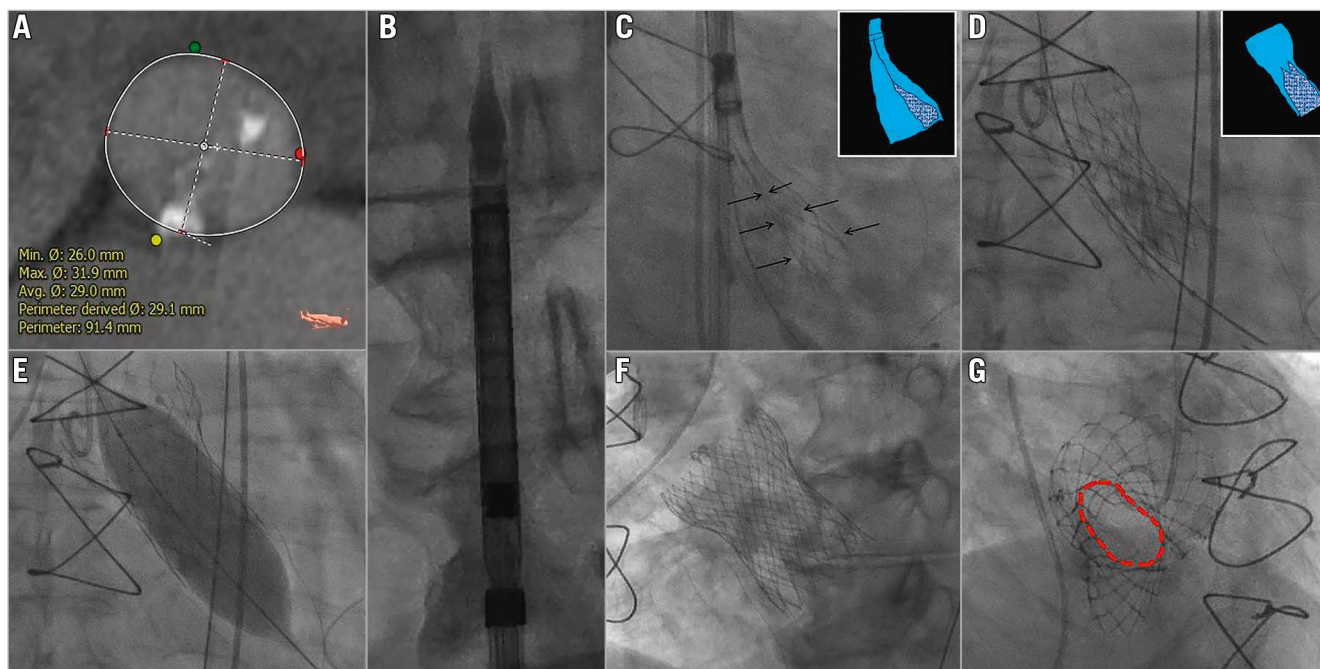
# Infolding of a self-expanding bioprosthesis due to loss of nitinol memory during transcatheter aortic valve implantation



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This paper also includes supplementary data published online at: <https://eurointervention.pconline.com/doi/10.4244/EIJ-D-20-00204>



**Figure 1.** Computed tomography of native aortic annulus and serial fluoroscopic images of transcatheter aortic valve implantation procedure. A) Computed tomography of aortic annulus shows calcium at clock positions 2 and 6. B) In vitro fluoroscopic confirmation of the appropriately loaded 34 mm Evolut R valve system. C) Infolding of the valve frame is shown in between the arrows (dotted dark blue area in the cartoon inset). D) Underexpanded valve frame after complete release of the valve (dotted dark blue area in the cartoon inset). E) Balloon dilation of the underexpanded valve frame with a 25 mm × 5 cm Z-MED II balloon. F) Complete expansion of the 34 mm Evolut R valve. G) The oval annulus of the completely expanded 34 mm Evolut R in en face view is shown as red dotted lines.

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A 78-year-old gentleman had transcatheter aortic valve implantation using an Evolut™ R valve (Medtronic, Minneapolis, MN, USA). On computed tomography (CT) the perimeter-derived annulus diameter was 29.1 mm (**Figure 1A**). A 34 mm Evolut R was precisely loaded and the same was confirmed fluoroscopically before insertion into the sheath (**Figure 1B**). The Evolut R was recaptured twice due to unsatisfactory positioning. During the third release, following confirmation of annular position, the valve was deployed. Post deployment the patient had cardiac arrest and prompt cardiopulmonary resuscitation was initiated. It was then noticed that in the previous cine frame at 85% deployment there was infolding of the valve frame which had been overlooked (**Figure 1C, Moving image 1**). The underexpansion of the valve frame led to non-functioning of the Evolut R leaflets, which resulted in cardiac arrest (**Figure 1D, Moving image 2**). A swift post-dilatation with a 25 mm × 5 cm Z-MED™ II balloon (NuMED, Hopkinton, NY, USA) under rapid pacing expanded the valve completely with return of spontaneous circulation (**Figure 1E, Figure 1F, Moving image 3**). The *en face* view of the Evolut R valve post procedure confirmed the optimal expansion (**Figure 1G, Moving image 4**). In a previous report, infolding of the valve frame resulted in paravalvular leak but a normally functioning valve<sup>1</sup>. In a second report, infolding of the valve frame was recognised before complete release of the valve, hence it was recaptured and a new valve was implanted<sup>2</sup>. The nitinol memory of a large self-expanding valve (Evolut R; 34 mm) can be lost

when there is severe annular calcium or prolonged exposure to higher core body temperature.

## Conflict of interest statement

The authors have no conflicts of interest to declare.

## References

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## Supplementary data

**Moving image 1.** Infolding of the valve frame at 85% deployment.

**Moving image 2.** Underexpanded valve frame after complete release of the valve.

**Moving image 3.** Post-dilatation with a 25×50 mm Z-MED II balloon.

**Moving image 4.** *En face* view of the completely expanded valve.

The supplementary data are published online at:  
<https://eurointervention.pcronline.com/doi/10.4244/EIJ-D-20-00204>

