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Letter: Beyond frame expansion: interpreting the implications of routine post-dilatation

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We read with great interest the study by Husain et al[1] and applaud the authors for this elegant and methodologically rigorous investigation. The authors combined benchtop and *in vivo* evaluations of routine "double-tap" post-dilatation at nominal volume following transcatheter aortic valve implantation with a balloon-expandable valve (BEV). Using a fluoroscopic calibration of valve commissural post height, they demonstrated that nominal-pressure reinflation increased frame expansion by approximately 9% across all SAPIEN 3 Ultra (Edwards Lifesciences) valve sizes, without excess procedural or 30-day adverse events[1].

In a study from our group (Leone et al[2]), we evaluated a similar concept solely focusing on the 23 mm SAPIEN 3 Ultra, a size particularly susceptible to clinically relevant underexpansion and prosthesis-patient mismatch (PPM). Quantitative frame assessment was performed using pigtail-based fluoroscopic calibration, referencing the 10 mm spacing between radiopaque markers. This method provides a wider calibration baseline and minimises proportional measurement error compared with catheter width-based methods[3]. Nonetheless, this technique is inherently subject to interobserver variability, and unlike the commissural post height method, no correlation with computed tomography is available[4]. Distinct from the DOUBLE-TAP protocol, our trial protocol allowed additional volume of the delivery balloon during the "double-tap" (+1-2 mL in 37% of patients) and selective use of non-compliant balloons. Compared with a control group without routine post-dilatation, this strategy yielded greater valve expansion, lower transvalvular gradients, and a reduced incidence of PPM. The haemodynamic benefit was primarily observed in patients with normal flow, while those with low-flow physiology derived little measurable improvement.

Both studies, albeit with different methodologies, converge on the principle that optimisation of frame geometry may favourably influence forward-flow haemodynamics. This effect is likely most pronounced in smaller valves and in patients with a larger body surface area, where even modest gains in frame expansion can improve transvalvular gradients and attenuate PPM (non-structural valve dysfunction)[5]. By contrast, in larger valve sizes, post-dilatation may have little measurable impact on immediate haemodynamics yet could still mitigate leaflet malcoaptation and pinwheeling related to underexpansion – phenomena that can exacerbate leaflet stress, induce asymmetric coaptation, and predispose patients to hypoattenuated leaflet thickening over time; these mechanisms are plausibly linked to structural valve degeneration and impaired durability[6,7]. Taken together, these considerations reinforce the idea that not all valves or patient anatomies require routine post-dilatation for immediate haemodynamic optimisation, while the potential long-term benefit on leaflet durability remains an open and important question for future study.

Nevertheless, direct evidence linking optimised expansion to improved durability remains inferential. The recent PARTNER 3 data demonstrated that, despite post-dilatation in only ~21% of cases, the mean gradient at 7 years remained stable at 12 mmHg, and the cumulative reintervention rate was 6% between years 1 and 7[8]. Although these data imply that routine post-dilatation may not be essential for maintaining favourable long-term valve function and durability, both

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our data and the DOUBLE-TAP findings confirm that there is little to no price to pay in terms of adverse events, thus, a tailored yet liberal approach could be reasonable to adopt.

While we commend the authors for highlighting the prevalence of BEV underexpansion, the clinical significance of nominal-volume "double-tapping" remains to be proven beyond geometric correction. Extended durability will be essential to determine whether routine post-dilatation should evolve from an optimisation tool into a standardised procedural step.

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Conflict of interest statement

A. Latib has served on the advisory board for Medtronic, Abbott, Boston Scientific, Edwards Lifesciences, Shifamed, NeoChord, V-dyne, and Philips. The other authors have no conflicts of interest to declare relevant to the contents of this paper.

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