Stentless Porcine Prosthesis Root Enlargement: Simple Solution for Avoiding Full Root Replacement and Optimizing Lifetime Management

Objective: Stentless porcine prostheses offer excellent hemodynamics and durability with versatile implantation options. Reoperation for a failed stentless valve, however, poses significant challenges. We introduce a simple reoperative technique to facilitate the implantation of larger stented prostheses without necessitating a full redo aortic root replacement.

Case Video Summary: Reoperation after stentless prosthesis root procedure typically necessitates a full root replacement with frequent technical challenges. Stented prosthesis implantation within stentless prosthesis facilitates simple and rapid valve replacement but at a price of valve downsizing and possible difficulty of future valve-in-valve transcatheter aortic valve replacement (TAVR). The case in the video is a 69-year-old male who underwent a total aortic root replacement using a 25 mm stentless prosthesis 15 years ago presented with a large ascending aortic aneurysm and severe aortic insufficiency. The enclosed video outlines the key steps involved in stentless prosthesis aortic root enlargement, performed concurrently with hemiarch aortic repair. A 27 mm stented bovine pericardial prosthesis was implanted within the 25 mm stentless prosthesis, obviating the need for full root replacement. Between December 2022 and August 2023, 11 patients underwent a redo aortic valve replacement with stentless prosthesis root enlargement and various concomitant procedures. The median age was 67 years (interquartile range [IQR] 54–69) and two were female. The original valve labelled size, intraoperatively measured size within stentless prosthesis prior to root enlargement and implanted stented valve size after root enlargement was 27 mm (IQR 25–27), 23 mm (IQR 21–25) and 29 mm (IQR 27–29), respectively. The cardiopulmonary bypass and aortic cross-clamp times were 147 minutes (IQR 124–181) and 109 minutes (IQR 99–132). The mean transvalvular gradient was 5 mmHg (IQR 4–6). There were no operative mortality, stroke or renal failure requiring newly initiated dialysis. There was one permanent pacemaker implantation.

Conclusions: In the context of the perceived complexity of reoperations following stentless prosthesis root replacement, this technique offers a simple and viable solution. It enables avoidance of full redo root replacement, facilitates the implantation of even larger stented prosthesis compared to the original stentless prosthesis and optimizes aortic root anatomy for future TAVR.

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