Commentary: Cooking up a durable valve-sparing root replacement: Great ingredients make great outcomes

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Any respectable chef knows that preparing a good meal starts with collecting good ingredients. Similarly, with valve-sparing root replacement (VSRR), what one starts with has a profound effect on the result that is produced. In this issue of the *Journal*, Rosinski and colleagues explore the effects that patient, valve, and surgical technique have on short- and long-term durability of the aortic valve. They compared patients with residual aortic insufficiency (AI) after VSRR with those with no residual AI to determine the factors associated with this finding. Among 756 patients, residual AI was a rare occurrence, seen in 65 (8.6%) patients, and a majority were mild (87% mild, 11% moderate). A key finding was that patients with residual AI were more likely to have suboptimal valve characteristics such as severe preoperative AI, cusp thickening, cusp abnormality requiring repair, and need for multiple return to cardiopulmonary bypass for re-repair. In essence, those who started with “good ingredients,” such as smaller aneurysms, less AI, and normal cusps, were more likely to have no residual AI and better durability.

To be a master chef, one must know how to create delicious dishes, even when ingredients may be imperfect, and when to discard unacceptable ingredients. With VSRR, it is well-established that operative risk is extremely low, as demonstrated by the 0% mortality and minimal morbidity in this study. This success has led to an expansion in indications to aneurysms with more AI, larger size, and cusp abnormalities. However, expanded indications may bring inferior durability. Rosinski and colleagues have shown that residual AI leads to progression of AI grade on late follow-up. At 10 years, preoperative severe AI and residual AI were associated with moderate or greater AI, with 48% of the residual AI group progressing to moderate or greater AI. Other groups have shown that residual mild AI is unlikely to progress. In our recent series of 487 VSRRs, 15 patients had residual mild AI but only 1 patient progressed, developing severe AI. The Cleveland Clinic group also found that complex cusp repairs requiring multiple repair components were associated with residual AI. Other groups have had similar findings of worse durability when complex cusp repair is performed but simpler repairs, such as central plication, are more durable. As with cooking, it is not any single step that leads to success or failure but the symphony of the entire operation, including patient selection, graft sizing, cusp repair strategy, and immeasurable other parameters. The Cleveland Clinic group developed a method that works well, as demonstrated by their excellent results. However, to retain our Michelin star, we must demonstrate excellent outcomes over a prolonged period of time. The current study is limited by the median echocardiographic follow-up time of only 1.9 years. Other groups have seen an increasing incidence of moderate or greater AI, especially beyond 5 years of follow-up. Longer follow-up and analysis of known factors associated with late AI such as coaptation length and cusp prolapse would

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be helpful. It will be interesting to see how this cohort fares with additional long-term data.

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