A fate worse than death

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The complication of stroke after aortic valve replacement is thought by many patients to be *a fate worse than death*.

The current Society of Thoracic Surgeons stroke rate after surgical aortic valve replacement (SAVR) in patients who are operative candidates is quite low: 1.4%. Stroke in patients after transcatheter aortic valve replacement (TAVR) is investigated in the recent publication by Gleason and colleagues.¹ Detailed neurologic complications of patients enrolled in the CoreValve Trial are reported up to 2 years.¹ The authors note that the report is in response to the previously reported “increased” risk (although not statistically significantly different) (Table 1) of stroke in high-risk patients undergoing TAVR when compared with standard treatment or SAVR.^{2,3} The current article also provides data on a substudy of 199 patients who underwent additional neurologic testing.¹

Comparisons between the current study and previously reported TAVR studies are difficult because of the variety of patients included and different definitions of stroke (Table 1). Both Placement of Aortic Transcatheter Valve (PARTNER) trials used retrospective review, and the first included only patients deemed too high risk for surgery.^{2,3} With more sensitive and specific methods to confirm

Ascending aorta with significant wall calcification.

Central Message

The choice of transcatheter approach does not increase the stroke rate in high-risk patients undergoing aortic valve replacement.

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stroke, the CoreValve Trial and the current report found higher rates of stroke for both TAVR and SAVR.^{1,4} Yet, it is important to note that comparisons of stroke rate between TAVR and SAVR have never shown a statistically significant difference.^{3,4} Gleason and colleagues¹ conclusion appropriately summarizes, “equivalent post procedural risk, extent and degree of cognitive change following TAVR or SAVR in a high risk population.”

When comparing the technical aspects of TAVR and SAVR, each has multiple unique sources of stroke, including a heavily diseased aorta (Figure 1). Although

TABLE 1. Comparison of stroke rates after transcatheter aortic valve replacement and surgical aortic valve replacement in published trials

Trial	Risk	CVA 30 d	CVA 1 y	CVA 2 y	Stroke defined
PARTNER ²	Deemed nonoperative by 2 surgeons;	TAVI 5.0%*	TAVI 7.8%*		Neurodeficit; retrospective
TAVI vs best standard treatment	STS score 10% operative death; 30 d death 15%; 50% 30 d death or serious complication				
PARTNER ³	Death 15% by 30 d	SAVR 2.1% TAVR 3.8%	SAVR 2.4% TAVR 5.1%		Neurodeficit; retrospective
CoreValve ⁴	Risk of death 30 d 15% or more and risk of death or irreversible complications 30 d <50%	SAVR 6.2% TAVR 4.9%	SAVR 12.6% TAVR 8.8%		Confirmation by specialist, imaging, or LP
CoreValve ¹	Risk of death 30 d 15% or more and risk of death or irreversible complications 30 d <50%			SAVR 16.6% TAVR 10.9%	Confirmation by specialist, imaging, or LP

CVA, Cerebrovascular accident; PARTNER, Placement of Aortic Transcatheter Valve; TAVI, transcatheter aortic valve implantation; STS, Society of Thoracic Surgeons; SAVR, surgical aortic valve replacement; TAVR, transcatheter aortic valve replacement; LP, lumbar puncture. *Significantly higher than standard therapy; all others, no significant difference between TAVR and SAVR.

FIGURE 1. Ascending aorta with significant wall calcification.

Gleason and colleagues¹ present data up to 2 years, it seems more reasonable to consider a stroke within the first 5 days due to the procedure itself. Within the first 5 days, 12 patients who underwent TAVR and 13 patients who underwent SAVR had a stroke (again, not a statistically significant difference). Stroke after 30 days more likely is due to patient disease rather than the procedure. It would be interesting to know if the rate of stroke in these patients after 30 days is equivalent to that in age-matched patients who do not undergo aortic valve surgery.

A significantly higher mortality was noted in TAVR cases compared with SAVR cases at 2 years after any stroke, but not in patients who only had a stroke at 30 days.¹ The knowledge of cause of death would be helpful in deciphering these results. Reports suggest that TAVR provides reduced risk of death due to severe aortic stenosis and places patients back on the same survival trajectory as the

age-matched population⁵; however, death may have been due to other causes, including stroke (that occurred after 30 days). It is also important to note that few patients remained at risk at up to 2 years in these estimates.

Little information is gained from the neurologic substudy.¹ Presumably, these were patients who consented to additional testing, and therefore additional bias may exist. Minor ischemic stroke and encephalopathy were higher in patients who underwent SAVR at 30 days, 1 year, and 2 years, and hemorrhagic stroke was more frequent in patients who underwent SAVR at 2 years.¹ However, these findings must be considered with caution because medications were not known at each time point (only discharge medications were documented). For similar reasons, the authors' conclusion "It must be emphasized that despite differing medication regimens, this study provides some evidence that dual antiplatelet therapy may lead to reduced stroke rates, particularly with TAVR"¹ is not supported because the medications actually taken at each time point were unknown.

Gleason and colleagues¹ should be commended for attempting to improve stroke recognition after aortic valve replacement. With this added information, there was still no difference in the rate of stroke when comparing high-risk patients randomized to TAVR or SAVR.¹ Time will bring innovation and improvements in both techniques. With TAVR, it will be important to obtain a stroke rate equivalent to the current reported Society of Thoracic Surgeons rate for SAVR to prevent *a fate worse than death* when this technology is extended to lower-risk populations.

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