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## Heart valve surgery associated with cognitive decline



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A new systematic review and meta-analysis finds that heart valve surgery is associated with cognitive decline over the six months after surgery, although outcomes beyond six months are unclear. Aortic valve surgery – performed more commonly in older adults – entails greater risk of early cognitive dysfunction within the first month after surgery than mitral valve surgery, but cognition in both groups appears to converge by six months.

These findings, published in *Journal of the American Geriatrics Society*, highlight the cognitive vulnerability of this population, especially older adults with aortic stenosis.

"Because randomisation is not possible for most individuals undergoing VHD [valvular heart disease] surgery, this current meta-analysis represents the cumulative best evidence regarding the cognitive vulnerability of this unique surgical cohort," the authors note. "Although we identified a greater burden of early decline in those undergoing aortic valve surgery, these individuals were older than those undergoing mitral valve surgery. It is unclear to what extent surgical valve or advanced age may lead to this observed early cognitive vulnerability."

Most studies on cognitive outcomes after heart surgery have focused on patients undergoing coronary artery bypass grafting (CABG) surgery. Much less attention has been paid to cognitive outcomes after VHD surgery. While CABG and VHD surgery are each associated with the general risks of open-heart surgery, they differ in many other important respects – i.e., identifiable risk factors for postcardiotomy cognitive dysfunction may be specific to the person or the procedure. For instance, individuals undergoing VHD surgery are at greater risk of embolic phenomena than those undergoing CABG.

This systematic review aimed to evaluate current evidence on cognitive outcomes after VHD surgery; the secondary aim was to examine whether aortic and mitral valve surgeries are associated with different cognitive outcomes. The review team searched MEDLINE, EMBASE, and PsycINFO from inception to July 2016 for peer-reviewed reports of individuals undergoing heart valve surgery who underwent pre- and postoperative cognitive assessment. Initial search returned 1,475 articles, of which 12 were included in the analysis. Postoperative cognitive results were divided into those from 1 week to 1 month (early outcomes, pooled  $n = 450$ ) and from 2 to 6 months (intermediate outcomes; pooled  $n = 722$ ). No studies with longer-term outcomes were identified.

Data analyses showed subjects had moderate early cognitive decline from baseline (Becker mean gain effect size (ES) =  $-0.39 \pm 0.27$ ) that improved slightly by 2 to 6 months (ES =  $-0.25 \pm 0.38$ ). Individuals undergoing aortic valve surgery, who were older on average than those undergoing mitral valve surgery (68 vs. 57), had greater early cognitive decline than those undergoing mitral valve surgery (ES =  $-0.68$  vs.  $-0.12$ ), but both cohorts had similar decline 2 to 6 months postoperatively (ES =  $-0.27$  vs.  $-0.20$ ).

"The determinants of cognitive decline after VHD surgery are multifactorial, although leading considerations include embolic phenomena, intraoperative cerebral hypoperfusion, cerebral autoregulation, temperature during surgery, and neuroinflammation," according to the review team, noting that the question of whether anaesthesia directly causes postoperative cognitive decline remains unanswered.

Future studies would do well to define cohorts not only according to surgical valve type or specific procedure, but also according to underlying VHD pathology while accounting for the effect of other known risk factors of cognitive decline such as age, the team adds.

Limitations of this meta-analysis reflect gaps in the literature. Studies of cognitive outcome after VHD surgery vary in design, population, surgical intervention type, hypothesis, cognitive assessment, and follow-up duration.

Source: [Journal of the American Geriatrics Society](#)  
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