

Minimally invasive procedure safe alternative for treating congenital heart defect

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A less invasive procedure for treating a congenital heart defect in children is a safe alternative to traditional surgery with no five-year difference in risk of death and is associated with a 62 percent reduced risk for neurological events (such as strokes or seizures), according to a study presented at the American Heart Association's Scientific Sessions 2010.

In a study of 580 children with secundum atrial septal defect (ASD), researchers evaluated the long-term safety and effectiveness of transcatheter closure versus [traditional surgery](#). Transcatheter closure is a minimally invasive treatment for patients with uncomplicated ASD.

"In our opinion, the main benefit of transcatheter closure versus surgical closure is that it avoids the need for open heart surgery and thus the need for cardiopulmonary bypass," said Colum Owens, M.D., study lead author and Adult [Congenital Heart Disease](#) Fellow at the MAUDE unit Royal Victoria Hospital, McGill University Health Centre in Montreal, Canada.

"This study addresses the question as to whether there could be a protective effect of transcatheter closure on neurocognitive outcomes by avoiding the need for cardiopulmonary bypass in a large population of children," Owens said. "One potential explanation for the reduction in new neurocognitive outcomes at three years with transcatheter closure is

the avoidance of the need for cardiopulmonary bypass."

Congenital heart defects occur in about 1 percent of live births, according to the American Heart Association. ASD is a common congenital defect in which there is an abnormal communication in the dividing wall (septum) between the upper filling chambers of the heart, the right and left atria. Normally, the left side of the heart pumps oxygenated "red" blood to the body and the right side of the heart pumps deoxygenated "blue" blood to the lungs. There is normally no communication between the left and right side of the heart. However, in children born with an ASD, this abnormal opening in the septum allows oxygenated blood from the left atrium to enter the right atrium, increasing the total amount of blood that flows to the lungs. As a consequence, the right side of the heart has to pump harder and can become weaker. To avoid this complication, if the ASD does not close by itself, the defect is closed either by [open heart surgery](#) (cardiopulmonary bypass) or by transcatheter closure.

Although cardiopulmonary bypass is a widely used, low-risk procedure for children undergoing cardiac surgery, increasingly it is recognized that it is associated with neurological complications such as strokes, seizures or neurodevelopmental disorders. This is a major concern, particularly for children whose brains are still developing. The exact mechanisms behind this are unclear, but cardiopulmonary bypass can have "deleterious neurological effects" on children, Owens said.

Using data from the Quebec congenital heart disease database, Owens and his team analyzed data on patients ages 1 to 18 years who in 1998-2005 underwent either conventional open-chest surgical closure (321) to treat their ASD or transcatheter closure (259). The median age for surgical patients was 4.6 years compared with 5.7 years for transcatheter patients. Researchers found:

- No difference in deaths between the two groups of children after five years of follow-up.
- During a three-year follow-up, children undergoing transcatheter closure experienced a 62 percent reduction in new neurocognitive events.
- Children undergoing minimally invasive transcatheter closure experienced shorter hospital stays compared with surgical closure patients (a median of six days shorter versus one day).
- Children undergoing transcatheter closure had an increased need for re-intervention and required more outpatient visits with a non-cardiologist. However, the patients also experienced fewer visits with a cardiologist compared with children undergoing surgical closure.

More research is needed and transcatheter closure may not be suitable for all children with ASD, particularly children whose defects are too large to be closed with the transcatheter device or those who have other congenital abnormalities or medical conditions, Owens said.

Provided by American Heart Association

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