Infant Bypass Procedure Won't Impair Neurological Outcomes

Congenital heart defects are the most common birth defects, affecting eight per 1,000 live births with one-third of affected children requiring intervention in early infancy.

Increasing numbers of survivors, combined with developmental expectations for independence, behavioral self-regulation and academic achievement have led to a growing identification of neurobehavioral symptoms in some survivors. A study now suggests that a cooling technique often used in heart operations does not impair neurological outcomes.

Congenital heart disease and its treatment were originally thought to potentially increase neurologic injury in these patients. The technique of deep hypothermic circulatory arrest is used in order to repair these congenital cardiac defects by providing a bloodless surgical field, which may facilitate completion of the best physiologic repair, and decrease the duration of blood exposure to the bypass circuit. However, it involves a period of reduced blood flow in the brain.

Cooling is a protective mechanism to reduce metabolism of the brain and other organs during periods of low blood flow. Stephanie Fuller, M.D., a cardiothoracic surgeon at The Children's Hospital of Philadelphia, presented these research findings at the J. Maxwell Chamberlain Lecture during the annual meeting of the Society of Thoracic Surgeons in Fort Lauderdale. According to the study, DHCA does not impair language skills, attention, and other neurocognitive abilities in school-age children.

Dr. Fuller and colleagues assessed the use of DHCA as a predictor of neuron-developmental outcomes in children who had cardiac surgery as infants. The infants were enrolled in a prospective study of apolipoprotein-E (APOE) polymorphisms and neuron-developmental outcome after cardiac surgery and underwent formal neuron-developmental testing at four years of age.

Surgeons used DHCA in 92 of those infants. Use of DHCA was not predictive of worse performance for any neuron-developmental outcome. Significant predictors of worse outcome included lower socioeconomic status, preoperative mechanical ventilation and babies that were younger and smaller at the time of the first operation.

Neuro-developmental assessment included cognition, language skills, attention, impulsivity, executive function, social competence, and visual-motor and fine-motor skills. “Despite added risk factors, the selective use of DHCA during infancy for repair of congenital heart disease without an obstruction in the aorta was not

predictive of worse performance at four years of age," offered Dr. Fuller.

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