

Citation

Murray J, Ramamoorthy C, Haberkern C, Bhanaker S, Posner K: Anesthesia-Related Cardiac Arrest in Children with Heart Disease: Data from the POCA Registry. *Anesthesiology* 109: A11, 2008.

Abstract

Background

The Pediatric Perioperative Cardiac Arrest (POCA) Registry was formed in 1994 to investigate factors involved in and outcomes from cardiac arrest (CA) in anesthetized children. To date the Registry has reported on 343 anesthesia-related CAs.^(1,2) A subset of these arrests occurred in children with congenital and acquired heart disease. We wished to identify factors associated with and outcome from anesthesia-related CA in this population.

Methods

North American institutions that provide anesthesia for children voluntarily enrolled in the POCA Registry. A representative from each institution submitted a standardized data collection form for cases of perioperative CA (defined as the need for chest compressions or as death) in children 18 years or younger. All data forms for arrests related to anesthesia submitted from 1994-2005 with the diagnosis of heart disease were reviewed by members of the POCA Steering Committee (JM, CR, CH, SB). Heart disease lesions were placed in one of the following categories: single ventricle, obstructive (aortic or pulmonary stenosis, coarctation), left-to-right shunt (ASD, VSD, PDA), Tetralogy of Fallot, cardiomyopathy, truncus arteriosus, or other (heart block, transposition, anomalous pulmonary veins, interrupted aortic arch). Patients with lesions of trivial or no hemodynamic significance and those without a specific diagnosis were excluded from the heart disease group. Comparison between patients with and without heart disease was performed with Fishers exact test.

Results

One hundred and seven cases of anesthesia-related CA in children with heart disease were identified and compared to 267 children without heart disease. In the heart disease group, 48% of CAs occurred in the general OR, 31% in the cardiac OR, and 20% in the cath lab. Most heart disease patients were ASA 3-5 (96% vs. 63% non-heart disease, $p < 0.01$). Cardiovascular-related arrests were the most common among the heart disease patients (51% vs. 40% non-heart disease, $p = 0.02$), although in 27/55 of these, the exact cause of CA could not be determined. The number and mortality of CAs by heart disease lesion are shown in the Table.

Table

| | Number and Mortality of Cardiac Arrests by Heart Disease Lesion | | | | | |
|-----------|---|--------------------|--------------|---------------------|----------------|--------------------|
| Lesion | Single Ventricle | Obstructive Lesion | L to R Shunt | Tetralogy of Fallot | Cardiomyopathy | Truncus Arteriosus |
| n | 24 | 20 | 17 | 14 | 13 | 6 |
| Mortality | 25% | 45% | 24% | 21% | 54% | 33% |

Overall mortality after CA in children with heart disease was 34%, not statistically different from mortality after arrest in the comparison group (24%, $p=0.52$). Mortality for the heart disease ASA 3-5 patients ($n=103$) was 35%, no different than mortality for non-heart disease ASA 3-5 patients (33%). Mortality for patients with aortic stenosis ($n=14$) was 64%.

Conclusions

Single ventricle and obstructive lesions (particularly aortic stenosis) were the most common type of heart disease in the POCA Registry. Without the necessary denominators, we cannot provide CA incidence for each heart disease lesion. It is noteworthy that CA in heart disease patients was reported more often in the general OR than in the cardiac OR or the cath lab. Such information may aid anesthesiologists in case assignments for infants and children with heart disease.

References

1. Anesthesiology 2000;93:6-14.
2. Anesth Analg 2007; 105:344-50.

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