

Citation

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Full Text

The Pediatric Perioperative Cardiac Arrest (POCA) Registry has completed its second year of data collection. Formed in 1994 under the combined auspices of the ASA Committee on Professional Liability and the American Academy of Pediatrics Section on Anesthesiology, the registry was designed to provide an in-depth examination of cardiac arrests in anesthetized children and provide an estimate of incidence.

All cardiac arrests that are defined as the need for cardiopulmonary resuscitation in children 18 years of age or younger during induction or maintenance of anesthesia or in the postanesthesia care unit are eligible for inclusion. For each case that qualifies, participating institutions are asked to complete and submit a standardized data form to the data bank maintained by the University of Washington School of Medicine Department of Anesthesiology as a component of the ASA Closed Claims Project. Anonymity is maintained so that the patient, physician and submitting institution cannot be identified.

As of March 1, 1996, 52 institutions are participating in the registry. They include 43 university-affiliated hospitals (87 percent) and/or 24 pediatric hospitals (46 percent). In 1995, these 52 institutions administered approximately 272,777 anesthetics to children and reported 63 cases of cardiac arrest.

A total of 132 cases have been submitted since the registry's inception. In contrast to the pediatric component of the ASA Closed Claims Project, in which 43 percent of cardiac arrests and adverse outcomes in children were attributed to respiratory events,¹ only 10 percent of cases submitted to the POCA Registry had respiratory causes of cardiac arrest, while 56 percent had cardiovascular causes.

The predominance of cardiovascular events compared to respiratory events in the POCA registry may have some relationship to the frequent use of pulse oximetry (98 percent) and capnography (86 percent). This relationship has been noted recently in the overall database of the ASA Closed Claims Project. Specifically, the relative frequency of respiratory events was higher and that of cardiovascular events was lower in claims in which neither pulse oximetry nor capnography were used, compared with claims in which pulse oximetry and capnography were used alone or in combination (see the [accompanying NEWSLETTER article](#) by Frederick W. Cheney, M.D.).

One explanation for this relationship is the possibility that pulse oximetry and capnography are more effective in preventing respiratory events than preventing cardiovascular events. However, it is also possible that some events previously categorized as respiratory, in the absence of pulse oximetry and capnography, were actually cardiovascular in origin.

Age was correlated with ASA physical status and outcome of cardiac arrest [Table 1]. Children under 1 month of age accounted for 24 percent of all cardiac arrests and had a mortality rate of 72 percent, which is much higher than for any other age group. In this

youngest group, both incidence and outcome of cardiac arrest were probably influenced by underlying patient condition; 97 percent were classified as ASA physical status P3-P5, significantly more than expected by chance alone.

POCA Registry Cases by Age and Physical Status								
	< 1 month		1-5 months		6-12 months		> 12 months	
n	32		25		20		55	
ASA P1-P2	1	(3%)	3	(12%)	7	(35%) §	15	(27%) §§
ASA P3-P5	31	(97%) §	22	(88%) §	13	(65%)	40	(73%)
Mortality	23	(72%) §	9	(36%)	5	(25%) §§	19	(35%) §§
§ more than expected by chance alone (p<0.01 by Chi square)								
§§ fewer than expected by chance alone (p<0.01 by Chi square)								

Children from 1 to 5 months of age accounted for an additional 19 percent of arrests and also included significantly more ASA physical status P3-P5 patients than expected by chance alone. Interestingly, the mortality rate (36 percent) in this group was less than the mortality rate for children under 1 month of age. Collectively, children under 6 months of age and 1 year of age accounted for 43 percent and 58 percent of all arrests, respectively.

Several previous studies have suggested that children under 1 year of age have the highest risk during anesthesia.^{2,3} The POCA Registry data further define this; even within the group under 1 year of age, mortality is inversely proportional to age, with the highest risk in the group of children less than 1 month old. This finding is consistent with data from Cohen.⁴

ASA physical status P1 and P2 patients accounted for 26 (20 percent) of all cases. Although cardiac arrest in this group was frequently ascribed also to cardiovascular causes (50 percent), problems with drug administration (i.e., relative anesthetic overdose, wrong dose, or wrong drug and allergic reaction) were seen in 27 percent of cases compared to 8 percent in ASA physical status P3-P5 patients. The impact of anesthesia was described by the institutional reviewers as a major or total cause of cardiac arrest in 81 percent of ASA physical status P1 and P2 patients, compared to only 29 percent of ASA physical status P3-P5 patients. Outcome was excellent, with no mortality, compared with a 53-percent mortality in ASA physical status P3-P5 patients.

The POCA Registry Director is Jeffrey P. Morray, M.D. Other members of the Registry Steering Committee include Robert A. Caplan, M.D., Frederick W. Cheney, M.D., Karen B. Domino, M.D., Jeremy M. Geiduschek, M.D., Alvin Hackel, M.D., Chandra Ramamoorthy, M.D., and Karen S. Posner, Ph.D.

The Steering Committee would like to increase the size of the registry as well as the participation of community-based hospitals. All university-affiliated and community-based anesthesia departments that care for children and would like to participate in the registry are encouraged to do so.

All necessary information can be obtained by contacting Karen S. Posner, Ph.D., POCA Registry, Department of Anesthesiology, University of Washington School of Medicine, Box 356540, Seattle, WA 98195-6540; telephone: (206) 616-2673; e-mail: posner@uw.edu.

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