

Incidence of Perioperative Cardiac Arrest in Pediatric Patients Undergoing Cardiac Surgery

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Introduction:

Little information exists regarding the incidence and survival rates of pediatric patients who suffered cardiac arrest (CA) during cardiac surgery. This study examined the incidence and mortality of perioperative CA in pediatric patients who underwent repair of complex cardiac anomalies in a single tertiary care institution with a large number of pediatric cardiac operations.

Methods:

Following IRB approval, the medical records of children less than 18 years old experiencing perioperative CA between November 1st 1988, and June 30th 2005, were reviewed. CA was defined as the need for chest compressions or inability to wean the patient from cardiopulmonary bypass (CPB). We included CAs which occurred intraoperatively and prior to the transfer of patient care to the PICU staff. We report the incidence of CA and survival rate of this high-risk surgical population.

Results:

During the study period, a total of 4,242 pediatric patients underwent cardiac surgery. In 3,033 patients (71.5%), surgery was performed with the use of CPB. CA was recorded in 54 patients (127.3 per 10,000 [95% CI 95.8 to 165.8], Table 1). Of those, only 5 patients (9.3%) were discharged from the hospital (mortality rate, 115.5 per 10,000). From the CPB group, 37 patients (68.5% overall) were unable to be weaned from CPB. Five (5) patients were initially supported by extracorporeal membrane oxygenation (ECMO); 4 died and 1 survived to hospital discharge.

Discussion:

In a study of age-related perioperative morbidity and mortality, Morita et al.¹ found an increased incidence of both CA and mortality in children younger than 1 month (incidence, 54 per 10,000; mortality, 43 per 10,000). In other age groups, the incidence was reported between 3 and 11 per 10,000 anesthetics, and the mortality was between 2 and 7 per 10,000 anesthetics. The incidence of pediatric CA for all surgical specialties, including cardiac surgery, as reported in the Perioperative Cardiac Arrest (POCA) registry, was 3 per 10,000 anesthetics.² The present study represents the largest report, to date, of the incidence of perioperative CA during pediatric cardiac procedures from a single institution. The increased incidence of perioperative CA in children undergoing cardiac procedures (127.3 per 10,000 anesthetics), suggests that definition of the ages and surgical specialties included in each study is necessary to accurately interpret epidemiologic studies of perioperative CA in children. Infants continue to be at the highest risk for perioperative CA and death during cardiac procedures requiring anesthesia services.

Table 1. Frequency of Perioperative Cardiac Arrest (CA) by Age

Age (years)	Cardiac surgery			
	Anesthetics (n)	CA (n)	CA per 10,000 Anesthetics	
			Estimate	95% C.I.
Less than 1	1,199	34 7 [†]	283.6 58.4 [†]	197.2 to 394.0 23.5 to 119.9 [†]
1 to 3	851	10 3 [†]	117.5 35.3 [†]	56.5 to 215.0 7.3 to 102.7 [†]
4 to 9	1,140	4 3 [†]	35.1 26.3 [†]	9.6 to 89.6 5.4 to 76.7 [†]
10 to <18	1,052	6 4 [†]	57.0 38.0 [†]	21.0 to 123.7 10.4 to 97.1 [†]
Overall	4,242	54 17 [†]	127.3 40.1 [†]	95.8 to 165.8 23.4 to 64.1 [†]

[†]Indicates estimates after “inability to wean from cardiopulmonary bypass” were excluded.
N, number; C.I., confidence interval

- References:** 1. Morita K, et al. Masui 2001; 50: 909-21
2. Morray JP, et al. Anesthesiology 2000; 93: 6-14