Pediatric Anesthesia Adverse Events: The Thai Anesthesia Incidents Study (THAI Study) Database of 25,098 Cases

Nutchanart Bunchungmongkol MD*, Wanna Somboonviboon MD**,
Suwannee Suraseranivongse MD***, Mayuree Vasinanukorn MD****,
Waraporn Chau-in MD*****, Thanoo Hintong MD*

** Department of Anesthesiology, Faculty of Medicine, Chiang Mai University, Chiang Mai*
*** Department of Anesthesiology, Faculty of Medicine, Chulalongkorn University, Bangkok*
**** Department of Anesthesiology, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok*
***** Department of Anesthesiology, Faculty of Medicine, Prince of Songkla University, Songkhla*
****** Department of Anesthesiology, Faculty of Medicine, Khon Kaen University, Khon Kaen*

Background: *The Thai Anesthesia Incidents Study (THAI Study) is the first national study of anesthesia outcomes during anesthesia practice in Thailand. The authors extracted data of 25,098 pediatric cases from THAI Study.*
Objective: *To report patient, surgical, and anesthetic profiles in order to determine the incidences of adverse events and their related factors.*
Material and Method: *A multi-centered prospective descriptive study was conducted among 20 hospitals across Thailand over a year from March 1, 2003 to February 28, 2004. Data in children aged 15 years and younger describing practices and adverse events were collected during anesthesia, in the recovery room and 24 hours postoperative period.*
Results: *Infants (0-1 year) had a significantly higher rate of adverse events compared with adults (4.6% versus 1.2%). Desaturation was the most common adverse event. The adverse events happened mostly during anesthesia (67%). Infants had significantly higher incidences of delayed detection of esophageal intubation, desaturation, reintubation, cardiac arrest, death, and drug error than older children and adults. Incidences of desaturation, reintubation, difficult intubation, coma/convulsion, cardiac arrest, and death were significantly higher in children with ASA physical status 3-5 than those with ASA physical status 1-2.*
Conclusion: *Infants are prone to higher adverse events compared with older children and adults. Main adverse events were respiratory-related and they occurred mostly during anesthesia.*

Keywords: *Adverse events, Children, Anesthesia, Perioperative period, Incidence*

J Med Assoc Thai 2007; 90 (10): 2072-9
Full text. e-Journal: *http://www.medassocthai.org/journal*

Pediatric patients, particularly neonates and infants, have different characteristics in terms of anatomy, physiology, pharmacology, and psychology from adults. Previous studies of anesthetic morbidity and mortality from different countries have reported a higher incidence for children especially infants (0-1 year) compared with adults[1-6]. It is, therefore, important that the authors should examine the quality of care in anesthesia with a particular emphasis on the outcome in this age group. However, there has been no large-scale study focusing on a pediatric population in Thailand. In 2003, the Royal College of Anesthesiologists of Thailand initiated the Thai Anesthesia Incidents study (THAI Study), a multi-centered research to find out adverse events during anesthesia practiced in 20 hospitals across Thailand. The results of this project in overall populations have been published recently[7,8]. The authors extracted data of 25,098 pediatric cases

Correspondence to : Bunchungmongkol N, Department of Anesthesiology, Faculty of Medicine, Chiang Mai University, Chiang Mai 50100, Thailand. Phone: 053-945-522, Fax: 053-945-526, E-mail: nuchamd@yahoo.com

from the THAI Study to report patient, surgical, and anesthetic profiles to determine the incidences and factors related to the adverse events.

Material and Method

Twenty hospitals, comprising seven university hospitals, five tertiary care hospitals, four secondary care hospitals and four primary care hospitals participated in the present study. After the protocol was approved by the Institutional Ethical Review Board, the data were collected prospectively over a year from March 1, 2003 to February 28, 2004. Details of pre-anesthetic conditions, anesthetic management, and adverse events of consecutive patients were recorded on a standardized form (Form 1).

The data of children aged 15 years and younger were included in the present study. The adverse events of interest were pulmonary aspiration, delayed detection of esophageal intubation (detected when cyanotic or $SpO_2 < 85\%$), desaturation ($SpO_2 \leq 85\%$ or $< 90\%$ for at least 3 minutes), reintubation, difficult intubation (more than 3 attempts or duration of intubation longer than 10 minutes), failed intubation, coma/cerebrovascular accident/convulsion, nerve injuries, cardiac arrest, death, anaphylaxis/anaphylactoid reaction, drug error, anesthesia equipment malfunction or failure. The time of adverse events was divided into three periods: intraoperative period, in the recovery room, and 24 hours postoperative period.

Attending anesthesia personnel or site managers were asked to fill in the preplanned structure data entry form (Form 1) in addition to the usual anesthetic record. Whenever the adverse events of interest occurred, the details of events were recorded in events specific data entry form (Form 2).

The data from each hospital were keyed in at the data management center with double entry technique to ensure the reliability of data entry.

Characteristics of patients, surgical profiles, anesthesia profiles, and adverse events were analyzed by descriptive statistics. The incidences of adverse events among age groups were compared using Chi-square test p-value < 0.05 was considered statistically significant.

Results

In the database of 172,700 patients from the THAI Study, there were 147,602 (85.4%) adults and 25,098 (14.5%) children. Children's characteristics and details regarding surgery are shown in Table 1. Details on the anesthetic drugs used, monitors, airway equip-

Table 1. Children's characteristics and details of surgery (n = 25,098)

Characteristic	N (%)
Age (year)	
0-1	5,406 (21.5)
> 1-8	10,657 (42.5)
> 8-15	9,035 (36)
ASA physical status	
1	14,733 (58.7)
2	7,775 (30.9)
3	2,160 (8.6)
4	321 (1.3)
5	41 (0.2)
Unknown	68 (0.3)
Weight (kg)	
≤ 10	5,398 (21.5)
10-20	8,140 (32.4)
> 20-40	7,081 (28.2)
> 40	4,286 (17.1)
Unknown	193 (0.8)
Elective/ emergency status	
Elective	18,214 (72.6)
Emergency	6,884 (27.4)
Admission status	
Inpatients	22,534 (89.8)
Outpatients	2,441 (9.7)
Unknown	123 (0.5)
Level of hospital	
University hospital	15,186 (60.5)
Tertiary care hospital	7,212 (28.7)
Secondary care hospital	2,466 (9.8)
Primary hospital	234 (0.9)
Site of operation	
Cardiac	1,178 (6.3)
Intrathoracic	321 (1.7)
Intracranial	987 (5.3)
Intraoral	1,272 (6.8)
Upper abdomen	1,167 (4.6)
Lower abdomen	2,841 (11.3)
Maxillofacial	839 (4.5)
Extremity	6,008 (32.3)
Eye	1,793 (9.6)
Ear	402 (2.1)
Perineum-anus	1,543 (8.3)
Neck	206 (1.1)
Coexisting medical conditions	
None	16,549 (65.9)
Respiratory	1,607 (6.4)
Cardiovascular	2,407 (9.5)
Renal	166 (0.6)
Hepatic	232 (0.9)
Hematology	1,782 (7.1)
Endocrine / metabolic	394 (1.5)
Neuro-muscular	1,411 (5.6)
Sepsis	132 (0.5)

ment, and duration of anesthesia are shown in Table 2. Age groups and ASA physical status stratified by type of hospitals are shown in Table 3.

Most children were judged to be healthy (89% as ASA score 1 or 2) and scheduled for elective surgery (72%). Only 9.7% were outpatient surgery. Three most common sites for operations were the extremities (32.3%), lower abdomen (11.3%), and perineumanus (8.3%). Pulse oximetry (98%), noninvasive blood pressure (95%), and electrocardiogram (82%) were the basic monitoring tools used during anesthesia in most operations. Tracheal intubation was performed in 60% of children whereas facemask and laryngeal mask airway were used for 16.6% and 5.5%, respectively. General anesthesia was the main technique (94.5%). Regional anesthesia was combined in 6.7% of cases: 3.1% caudal block, 0.5% lumbar or thoracic epidural block,0.3% brachial block and 2.8%other nerve blocks. Infants or those with poor conditions (ASA score 3-5) were admitted at higher proportions in university and tertiary care hospitals.

Incidences of adverse events stratified by age groups are shown in Table 4. Adverse events stratified by timing of their occurrences are shown in Table 5. Adverse events stratified by ASA physical status are shown in Table 6. Incidences of adverse events stratified by types of hospital are shown in Table 7.

Infants had significantly higher incidences of delayed detection of esophageal intubation, desaturation, reintubation, cardiac arrest, death, and drug error than older children and adults. Children between 1-8 years also had the incidences of desaturation higher than those older than 8 years and the adults. The adverse events happened mostly during anesthesia (67%). Oxygen desaturation was the most common adverse event in all age groups. Incidences of desaturation, reintubation, difficult intubation, coma/convulsion, cardiac arrest, and death were significantly higher in children with ASA physical status 3-5 than those with ASA physical status 1-2.

Table 2. Anesthetic agents, monitors, airway equipment and duration of anesthesia (n = 25,098)

	N (%)
Anesthetic agents	
Pentothal	2,638 (10.5)
Propofol	11,189 (44.6)
Ketamine	2,282 (9.1)
Midazolam	3,069 (12.2)
Diazepam	824 (3.3)
Succinylcholine	6,998 (27.9)
Pancuronium	2,506 (10)
Atracurium	4,795 (19.1)
Cisatracurium	1,963 (7.8)
Vecuronium	1,953 (7.8)
Mivacurium	98 (0.4)
Rocuronium	608 (2.4)
Nitrous oxide	18,556 (73.9)
Halothane	9,198 (36.6)
Isoflurane	7,028 (28)
Sevoflurane	8,735 (34.5)
Desflurane	10 (0.03)
Anesthetic agents	
Morphine	3,143 (12.5)
Fentanyl	13,529 (53.9)
Pethidine	1,803 (7.2)
Nalbuphine	15 (0.1)
Lidocaine	1,480 (5.9)
Bupivacaine	2,539 (10.1)
Ropivacaine	9 (0.03)
Monitors	
NIBP	23,868 (95.1)
IBP	1,466 (5.8)
EKG	20,455 (81.5)
Pulse oximeter	24,667 (98.3)
ET CO2	5,473 (21.8)
ET gas	962 (3.8)
Temperature	2,594 (10.3)
Urine output	3,311 (13.2)
Esophageal stethoscope	775 (3.1)
Precordial stethoscope	5,372 (21.4)
Central venous pressure	1,067 (4.3)
Nerve stimulator	4 (.01)
Airway pressure	6,396 (25.5)
Cardiac output	6 (0.02)
Pulmonary artery pressure	32 (0.1)
Airway equipment	
Oro-tracheal	15,026 (59.9)
Naso- tracheal	259 (1)
Tracheostomy	489 (1.9)
LMA	1,376 (5.5)
Under mask	4,154 (16.6)
Double lumen	15 (0.1)
Bronchoscope	401 (1.6)
Jet	177 (0.7)
Oral airway	3,997 (15.9)
Nasal airway	16 (0.1)
Duration of anesthesia	
< 1 hour	13,919 (55.5)
1-2 hours	6,743 (26.9)
> 2 hours	4,436 (17.6)

Discussion

From the present survey, the authors could present a relevant picture of anesthesia practice for children in Thailand. Propofol was administered more frequently than pentothal because of a shortage of pentothal in Thailand during the present study. Despite its undesirable effects such as bradycardia in children, succinylcholine was the most commonly used muscle relaxant for intubation because most anesthesia providers felt confident in using it for pediatric airway

Table 3. Age groups and ASA physical status stratified by types of hospitals

Type of hospital	Age			ASA physical status		
	0-1 y	> 1-8 y	> 8-15 y	1-2	3-5	Not stated
University hospital n = 15,186	3,775 (24.9%)	6,956 (45.8%)	4,455 (29.3%)	13,234 (87.1%)	1,900 (12.5%)	52
Tertiary care hospital n = 7,212	1,408 (19.6%)	2,680 (37.1%)	3,124 (43.3%)	6,657 (92.3%)	545 (7.6%)	10
Secondary care hospital n =2,466	220 (9%)	938 (38%)	1,308 (53%)	2,383 (96.6%)	77 (3.1%)	6
Primary care hospital n = 234	3 (1.3%)	83 (35.5%)	148 (63.2%)	234 (100%)	-	-

Table 4. Incidences of adverse events stratified by age groups, (rate per 10,000 cases)

Adverse events	0-1 y (n = 5,406)		> 1-8 y (n = 10,657)		> 8-15 y (n = 9,035)		Children (0-15 y) (n = 25,098)		Adult (> 15 y) (n = 147,602)	
	n	rate	n	rate	n	rate	n	rate	n	rate
Pulmonary aspiration	2	3.6	2	1.8	2	2.2	6	2.3	24	1.6
Esophageal intubation	9	16.6*	2	1.8	3	3.3	14	5.4	33	2.2
Desaturation	121	223.8*	71	66.6*	25	27.6	217	84.6	362	24.5
Reintubation	23	42.5*	16	15	6	6.6	45	17.6	172	11.6
Difficult intubation	11	20.3	6	5.6	9	9.9	26	10.1	231	15.6
Failed intubation	1	1.8	0	0	1	1.1	2	0.8	33	2.2
Coma/convulsion	2	3.6	7	6.5	3	3.3	12	4.7	68	4.6
Nerve injuries	1	1.8	1	0.9	0	0	2	0.8	30	2.0
Cardiac arrest	35	64.7*	16	15	13	14.3	64	24.9	374	25.3
Death within 24 hr	36	66.5*	13	12.1	9	9.9	58	22.6	403	27.3
Anaphylaxis/ anaphylactoid reaction	0	0	0	0	5	5.5	5	2.0	31	2.1
Drug error	4	7.4*	4	3.7	1	1.1	9	3.5	14	0.8
Equipment malfunction	2	3.6	7	6.5	2	2.2	11	4.3	49	3.3
Total	247	457.0*	145	136.0	79	87.4	471	187.6	1,824	123.6

* Indicate significantly higher rate than adult ($p < 0.05$)

management. Halothane was used as frequently as sevoflurane. This is different from some institutes[1] that halothane is no longer used because of the concern about its cardiovascular effects such as arrhythmias and cardiac arrest. Regional anesthesia was performed only in 6.7% of cases. This may be due to no official training in pediatric anesthesia. Because of inadequate anesthesiologists in primary and secondary hospitals, infants or those with ASA score 3-5 were admitted at higher proportions in university and tertiary care hospitals.

With prospective design and preplanned data collection in all patients, the authors could determine the incidences and factors related to adverse events of interest. The present study confirms a previous report by Tiret et al[2] that infants had a higher rate of adverse events compared with adults. Moreover, in the pediatric group, the authors found that infants had the highest rate of adverse events. The findings are in agreement with previous surveys in pediatric hospitals in Singapore[3], France[1], and Canada[4].

Main adverse events of children in the present study were related to the respiratory system, which was similar to previous studies[1-4]. Tay et al[3] reported that 77% of all incidents were respiratory related. The

Table 5. Adverse events stratified by timing of their occurrence

	Intraoperative			Recovery room			24 h postoperative		
	0-1 y	>1-8 y	>8-15 y	0-1 y	>1-8 y	>8-15 y	0-1 y	>1-8 y	>8-15 y
Pulmonary aspiration	2	2	2	0	0	0	0	0	0
Esophageal intubation	9	2	2	0	0	1	0	0	0
Desaturation	106	56	21	6	12	3	13	7	2
Reintubation	9	6	0	5	6	4	9	4	2
Difficult intubation	11	6	8	0	0	1	0	0	0
Failed intubation	1	0	0	0	0	1	0	0	0
Coma/convulsion	0	1	2	0	1	0	2	5	1
Nerve injuries	0	0	0	0	0	0	1	1	0
Cardiac arrest	20	10	3	0	0	1	16	6	10
Death within 24 hr	8	2	1	0	1	0	28	10	8
Anaphylaxis/ anaphylactoid reaction	0	0	5	0	0	0	0	0	0
Drug error	4	4	1	0	0	0	0	0	0
Equipment malfunction	2	7	2	0	0	0	0	0	0
Total events	172	96	47	11	20	11	69	33	23
Incidence (%)	3.2	0.9	0.5	2	0.2	0.1	1.3	0.3	0.2

Table 6. Adverse events stratified by ASA physical status

	ASA 1-2 (n = 22,508)	ASA 3-5 (n = 2,522)	Not stated
Pulmonary aspiration	4	2	-
Esophageal intubation	11	3	-
Desaturation*	147	68	2
Reintubation*	26	18	1
Difficult intubation*	18	8	-
Failed intubation	1	1	-
Coma/convulsion*	5	7	-
Nerve injuries	1	1	-
Cardiac arrest*	8	56	-
Death within 24 hr*	6	52	-
Anaphylaxis/anaphylactoid reaction	5	0	-
Drug error	9	0	-
Equipment malfunction	10	1	-
Total *	251	217	
Incidence (%)	1.1	8.6	

* Indicate statistical difference ($p < 0.05$)

United States pediatric closed claims study[5] and Australian incident monitoring study[6] also reported that respiratory events were more prevalent in the pediatric group.

Desaturation was the most common adverse event that occurred most frequently during anesthesia with an incidence rate of 86.4:10,000 cases. The presented rate was lower than the report from KK Women's and Children's Hospital in Singapore[3] (101:10,000). Similar to previous studies[1-4,9], the incidence of desaturation in the present study was greatly higher in infants compared with older children and adults. The authors found that children between 1-8 years also had a higher incidence of desaturation than adults. These data support the necessity of pulse oximeter for early detection of desaturation in children especially

Table 7. Incidences of adverse events stratified by types of hospitals (rate: 10,000 cases)

	University hospital n = 15,186		Tertiary care hospital n = 7,212		Secondary care hospital n = 2,466		Primary care hospital n = 234	
	n	rate	n	rate	n	rate	n	rate
Pulmonary aspiration	5	3.3	1	1.4	0	0	0	0
Esophageal intubation	4	2.6	10	13.8	0	0	0	0
Desaturation	122	80.3	82	113.6	13	52.7	0	0
Reintubation	37	24.3	7	9.7	1	4	0	0
Difficult intubation	19	12.5	6	8.3	1	4	0	0
Failed intubation	1	0.6	1	1.4	0	0	0	0
Coma/convulsion	10	6.6	2	2.8	0	0	0	0
Nerve injuries	2	1.3	0	0	0	0	0	0
Cardiac arrest	44	28.9	18	24.9	2	8	0	0
Death within 24 hr	37	24.3	20	27.7	1	4	0	0
Anaphylaxis/ anaphylactoid reaction	1	0.6	2	2.8	1	4	1	42.7
Drug error	7	4.6	2	2.8	0	0	0	0
Equipment malfunction	4	2.6	6	8.3	1	4	0	0
Total	293	193	157	217.7	20	81.1	1	42.7

the young ones. Further study is needed to identify causes and contributory factors.

Incidence of delayed detection of esophageal intubation and reintubation were related with age group. They were significantly higher in infants than in the other groups. These findings could reflect the inadequate experience of anesthesia providers in handling of small children. Recently, results of the study by Mamie et al[10] showed that not only the age of children but also the experience and skills of anesthesiologist were risk factors of perioperative adverse respiratory events. This finding suggests the need of additional training on pediatric anesthesia for anesthesia providers who are in charge of young children.

The Incidence of pulmonary aspiration in the present study was 2.4:10,000 while incidences from previous studies varied from 1:10,000 to 4:10,000[11-13]. The authors found no difference in the frequency of pulmonary aspiration across the different ages. These finding was similar to the results of a study by Warner et al[11]. In contrast, Olsson et al[12] reported that the incidence in the age group 0-9 years (8.6:10000) was approximately three times higher than the age group 20-49 years (2.9:10000). This great disparity in findings among studies is probably caused by differences in methodology and definition of pulmonary aspiration.

Incidences of cardiac arrest and death in the present study were from all causes. It is difficult to compare the presented incidences with previous studies[14,15], as methods and inclusion criteria differ substantially. Factors and mechanisms related to cardiac arrest need to be investigated in further studies in order to find out preventive strategies.

University and tertiary care hospitals showed higher incidences of adverse events compared with secondary and primary care hospitals. This may be due to the difference in patient populations among hospitals, not only by the age group but also by the type of surgery and the severity of illness of the patients undergoing anesthesia. University and tertiary care hospitals performed operations in patients with younger age and poorer conditions.

In summary, information obtained from the present study could represent national anesthesia outcomes in pediatric group. It showed that infants are prone to higher adverse events compared with older children and adults. The main adverse events were respiratory-related and they occurred mostly during anesthesia.

Vigilance during the maintenance of anesthesia by experienced and cautious anesthesiologists together with standard monitoring will help prevent such anesthetic disasters. In infants and seriously ill children, additional training in pediatric anesthesia is essential for the anesthesiologists in charge.

Acknowledgements

This research was accomplished by personal sacrifices and perpetual inspiration of attending anesthesiologists together with all personnel and by guidance of head of departments of all sites in this multicentered study. The Royal College of Anesthesiologists of Thailand and the THAI Study group wish to express deep gratitude to project advisors Professor Chitr Sitthi-Amorn and Associate Professor Joranit Kaewkungwal for their exceptionally wise, encourage criticism and advices. We also wish to thank Professor Pyatat Tatsanavivat head of Clinical Research Collaborative Network (CRCN) for this continued support, encouragement, and helpful suggestions.

The study was financially supported by Health Systems Research Institute (HSRI); Faculty of Medicine of Chiang Mai University, Chulalongkorn University, Khon Kaen University, Mahidol University (Ramathibodi Hospital and Siriraj Hospital), Prince of Songkla University and National Research Council of Thailand.

References

1. Murat I, Constant I, Maud'huy H. Perioperative anaesthetic morbidity in children: a database of 24,165 anaesthetics over a 30-month period. Paediatr Anaesth 2004; 14: 158-66.
2. Tiret L, Nivoche Y, Hatton F, Desmonts JM, Vourc'h G. Complications related to anaesthesia in infants and children. A prospective survey of 40240 anaesthetics. Br J Anaesth 1988; 61: 263-9.
3. Tay CL, Tan GM, Ng SB. Critical incidents in paediatric anaesthesia: an audit of 10 000 anaesthetics in Singapore. Paediatr Anaesth 2001; 11: 711-8.
4. Cohen MM, Cameron CB, Duncan PG. Pediatric anesthesia morbidity and mortality in the perioperative period. Anesth Analg 1990;70:160-7.
5. Morray JP, Geiduschek JM, Caplan RA, Posner KL, Gild WM, Cheney FW. A comparison of pediatric and adult anesthesia closed malpractice claims. Anesthesiology 1993; 78: 461-7.
6. Van der Walt JH, Sweeney DB, Runciman WB, Webb RK. The Australian Incident Monitoring Study. Paediatric incidents in anaesthesia: an analysis of 2000 incident reports. Anaesth Intensive Care 1993; 21: 655-8.
7. Charuluxananan S, Suraseranivongse S, Punjasawadwong Y, Somboonviboon W, Nipitsukarn T, Sothikarnmanee T, et al. The Thai Anesthesia Incidents Study (THAI Study) of anesthetic outcomes: I. Description of methods and populations. J Med Assoc Thai 2005; 88(Suppl 7): S1-13.
8. Charuluxananan S, Punjasawadwong Y, Suraseranivongse S, Srisawasdi S, Kyokong O, Chinachoti T, et al. The Thai Anesthesia Incidents Study (THAI Study) of anesthetic outcomes: II. Anesthetic profiles and adverse events. J Med Assoc Thai 2005; 88(Suppl 7): S14-29.
9. Moller JT, Johannessen NW, Berg H, Espersen K, Larsen LE. Hypoxaemia during anaesthesia - an observer study. Br J Anaesth 1991; 66: 437-44.
10. Mamie C, Habre W, Delhumeau C, Argiroffo CB, Morabia A. Incidence and risk factors of perioperative respiratory adverse events in children undergoing elective surgery. Paediatr Anaesth 2004; 14: 218-24.
11. Warner MA, Warner ME, Warner DO, Warner LO, Warner EJ. Perioperative pulmonary aspiration in infants and children. Anesthesiology 1999; 90: 66-71.
12. Olsson GL, Hallen B, Hambraeus-Jonzon K. Aspiration during anaesthesia: a computer-aided study of 185,358 anaesthetics. Acta Anaesthesiol Scand 1986; 30: 84-92.
13. Borland LM, Sereika SM, Woelfel SK, Saitz EW, Carrillo PA, Lupin JL, et al. Pulmonary aspiration in pediatric patients during general anesthesia: incidence and outcome. J Clin Anesth 1998; 10: 95-102.
14. Keenan RL, Boyan CP. Cardiac arrest due to anesthesia. A study of incidence and causes. JAMA 1985; 253: 2373-7.
15. Morray JP, Geiduschek JM, Ramamoorthy C, Haberkern CM, Hackel A, Caplan RA, et al. Anesthesia-related cardiac arrest in children: initial findings of the Pediatric Perioperative Cardiac Arrest (POCA) Registry. Anesthesiology 2000; 93: 6-14.

การศึกษาอุบัติการณ์การเกิดภาวะแทรกซ้อนทางวิสัญญีในเด็ก จากฐานข้อมูล Thai Anesthesia Incidents Study จำนวน 25,098 ราย

นุชนารถ บุญจีงมงคล, วรรณา สมบูรณ์วิบูลย์, สุวรรณี สุรเศรณีวงศ์, มยุรี วศินานุกร, วราภรณ์ เชื้ออินทร์, ธนู หินทอง

วัตถุประสงค์: *เพื่อนำเสนอข้อมูลเกี่ยวกับผู้ป่วย การผ่าตัด และการให้ยาระงับความรู้สึกในผู้ป่วยเด็กที่มารับบริการทางวิสัญญีในประเทศไทย และหาอุบัติการณ์การเกิดภาวะแทรกซ้อนทางวิสัญญีและปัจจัยที่เกี่ยวข้อง*

วัสดุและวิธีการ: *เป็นการศึกษาแบบพรรณนาไปข้างหน้าใน 20 โรงพยาบาลทั่วประเทศ วิเคราะห์ข้อมูลผู้ป่วยเด็กที่มีอายุน้อยกว่าและเท่ากับ 15 ปีจำนวน 25,098 ราย ที่ได้จากการลงทะเบียนภาวะแทรกซ้อนทางวิสัญญี จากฐานข้อมูล Thai Anesthesia Incidents Study ระหว่างวันที่ 1 มีนาคม พ.ศ. 2546 ถึงวันที่ 28 กุมภาพันธ์ พ.ศ. 2547 ซึ่งเกิดระหว่างการให้ยาระงับความรู้สึก ในห้องพักฟื้น จนถึง 24 ชั่วโมงหลังการผ่าตัด*

ผลการศึกษา: *เด็กแรกเกิดถึง 1 ปีมีอัตราการเกิดภาวะแทรกซ้อนรวมมากกว่าผู้ใหญ่อย่างมีนัยสำคัญทางสถิติ (4.6% ต่อ 1.2%) โดยจะเกิดในช่วงการให้ยาระงับความรู้สึกเป็นส่วนใหญ่ (67%) ความอิ่มตัวของออกซิเจนต่ำเป็นภาวะแทรกซ้อนที่พบมากที่สุด เด็กแรกเกิดถึง 1 ปี เป็นกลุ่มที่มีอัตราการเกิดภาวะแทรกซ้อนได้แก่ ความอิ่มตัวของออกซิเจนต่ำ การใส่ท่อช่วยหายใจซ้ำหลังการถอดท่อช่วยหายใจเมื่อสิ้นสุดการให้ยาระงับความรู้สึก การวินิจฉัยว่าใส่ท่อช่วยหายใจเข้าหลอดอาหารช้า หัวใจหยุดเต้น การเสียชีวิต ปัญหาความผิดพลาดจากการให้ยา มากกว่าเด็กโตและผู้ใหญ่อย่างมีนัยสำคัญทางสถิติ เด็กกลุ่มที่มีปัญหาในระบบต่าง ๆ ของร่างกายมากก่อนการผ่าตัด (ASA physical status 3-5) มีอัตราการเกิดภาวะแทรกซ้อนได้แก่ ความอิ่มตัวของออกซิเจนต่ำ การใส่ท่อช่วยหายใจซ้ำหลังการถอดท่อช่วยหายใจเมื่อสิ้นสุดการให้ยาระงับความรู้สึก การใส่ท่อช่วยหายใจยาก การชัก หัวใจหยุดเต้น การเสียชีวิตมากกว่าเด็กกลุ่มที่มี ASA physical status 1-2 อย่างมีนัยสำคัญทางสถิติ*

สรุป: *เด็กแรกเกิดถึง 1 ปีเป็นกลุ่มเสี่ยงต่อการเกิดภาวะแทรกซ้อนเมื่อเทียบกับเด็กโตและผู้ใหญ่ ภาวะแทรกซ้อนที่พบบ่อยเกี่ยวข้องกับระบบทางเดินหายใจ และเกิดส่วนใหญ่ในช่วงการให้ยาระงับความรู้สึก*