

Current Status of Cardiac Anesthesia In Indonesia

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Introduction

In Indonesia Anesthesiology was only recognized as a separate specialty in December 1964. Prior to this anesthesia were performed by surgeons or trained nurses. The first Head of the Department of Anesthesiology at the Medical Faculty University of Indonesia was the late Professor Kelan who was sent to the United States in 1951 while still a second year surgery resident to be trained as the first fully qualified anesthesiologist in Indonesia.

Hirtory of Cardiac Anesthesia In Indonesia

The first cardiac surgery performed by an Indonesian surgeon was in 1956. The procedure was a successful Beck's mitral commisurotomy done under ether anesthesia. In 1961 the late Professor Kelan administered ether anesthesia combined with hypothermia for ASD closure, which was the first intracardiac correction done in Indonesia. The patient having been anesthetized was lowered into a bathtub full of ice water until the patient's body temperature fell to 28°C. Then the patient was quickly removed to the operating table and prepared for surgery. After the surgeon ligated both the superior and inferior vena cava and clamped the aorta the closure of the ASD was performed as quickly as possible. Professor Kelan would stand at the head of the operating table with a stopwatch in his hand and counted each

minute loudly as it passed because the closure had to be done within seven minutes with beating heart.

Needless to say this was a very risky technic and after a few operations was abandoned. Due to the political situation in Indonesia at that time cardiac surgery remained at a stand still up to 1969 when one of our surgeons upon returning from Japan invited Dr. Sakakibara to visit Indonesia. Dr. Sakakibara and his team brought with them the second heart lung machine to Indonesia, the first which was made in the People's Republic of China was only used on animals. It was the good old Tonokura heat-lung machine which incidently is still in good condition after more than 20 years (Table 1).

The Department of Health of the Republic of Indonesia in a national survey realized that heart disease had jumped from tenth as a major health problem in the early 70's to number three in the 80's (Table 2). This finding prompted various authorities in Indonesia to tackle this problm. In August 1981 Dr. DeBakey and his team from the Baylor College of Medicine, Houston set foot in Jakarta, performed some cardiac surgery and proposed to establish the National Cardiac Center to the President of Indonesia.

The National Cardiac Center was finally inaugurated in November 1985 with 150 beds, modern equipments and three operating rooms. The architectural design of the center followed as closely possible the layout of the Methodist Hospital in Houston, Texas. In 1984 a whole team of doctors and nurses were sent to the Baylor Col-

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Table 1 Chronological order of historical events in the development of cardiac surgery in Indonesia

Year	Events
1953	Cardiac surgery by the WHO team
1956	Right heart catheterisation
1956	Close mitral commissurotomy
1961	Hypothermia technic
1969	Dr. Sakakibara's visit with the heart lung machine
1977	Coronary angiography
1981	Dr. DeBakkey's visit and Coronary artery surgery
1985	The National Cardiac Center
1987	Cold blood cardioplegia
1988	Warm blood cardioplegia
1989	Extracorporeal Membrane Oxygenation
1991	Cardiopulmonary Support System

Table 2 Illness related mortality in Indonesian population

No.	Diagnosis	1972 (%)	1980 (%)
1	Respiratory tract infection	12	19.9
2	Diarrheal disease	16.9	18.8
3	Cardiovascular disease	5.1	9.9
4	Tuberculosis	6	8.4
5	Others	40	6.8

lege of Medicine, Houston, Texas and the Royal Children's Hospital and St. Vincent's Hospital, Australia in preparation for the establishment of the center. During the first year only a little more than 100 cardiac surgery were performed. This was done intentionally so as to allow the various disciplines to gradually perform as a solid cardiac surgery team. At the present time this team consists of four cardiac surgeons, three cardiac anesthesiologists, two anesthesiologists that runs the cardiopulmonary bypass machine and three anesthesiologists that takes care of the patients in the intensive care unit. With this number our maximum operating capacity is around 1200 patients a year. Even though we have a fifteen bed.

ICU, at present we have to limit this number about 700 cases due to a shortage of ICU nurses. Since November 1992 a second building was completed bringing the total capacity of the National

Cardiac Center to 300 beds.

Patients and Technics

During the first five years the patient population that was presented for cardiac surgery consisted of an almost equal percentage of congenital and acquired heart disease (Table 3). Most of the congenital heart disease consisted of atrial and ventricular septal defects, Tetralogy of Fallot with the occasional more complex cases such as transposition of the great arteries, pulmonary artery atresia and univentricular hearts. The number of valve cases was slightly greater compared to the number of coronary artery disease, but in the last three years the number of coronary artery cases has steadily increased. This is a reflection of the changing life style and dietary habits of Indonesia. This is especially true in the big cities.

All right to left shunt patients are given a combination of ketamine 4-5mg/kg, midazolam 0.1-0.2mg/kg, and atropine 0.01mg/kg, intramuscular. Anesthesia is then maintained with sufentanil and midazolam and supplemented with an inhalational agent. For left to right shunts, valve lesions and coronary artery cases are premedicated with pethidine 1-1.5 mg/kg, and midazolam 0.1-0.2mg/kg, intramuscular. For induction of anesthesia and intubation sufentanil 1-2mg/kg, and midazolam as needed is given intravenously and anesthesia is maintained with sufentanil.

For vasodilators nitroprusside, nitroglycerine, ketanserin and phenoxybenzamine are used whereas phenylephrine and metaraminol are given as vasoconstrictors. Lidocaine, propranolol, esmolol, verapamil and digitalis are the standard antiarrhythmias. For inotropes dopamin, dobutamin

Table 3 Surgical cases at the National Cardiac Center November 1985-March 1990 : 1386 cases

OPEN HEART	1205(87%)	Congenital	673(49%)
		Valvular	359(26%)
CLOSE HEART	178(13%)	Coronary	289(21%)
		Others	65(4%)

and amrinone are used and if the need arises there are two intra aortic balloon pumps available. The decision to use what inotropes and the IABP is the responsibility of the attending anesthesiologists. A few patients have been given extracorporeal life support (ECMO) but rests have not been satisfactory perhaps due to not initiating the use of ECMO at an earlier stage. Hypothermic cardiopulmonary bypass is utilized in all cases of open heart surgery. From 1985 to 1986 cold cystaloid cardioplegia was used. In 1987 cold blood cardioplegia was introduced and in 1988 warm blood cardioplegia was first used for special cases such as patients with poor left ventricular function. For monitoring the patient an arterial line is routinely established as well as central venous pressure and pulmonary artery catheters are inserted if needed, which is also the case on whether to use one or two ECG leads.

Present Situation

Apart from the National Cardiac Center there are other hospitals that have a cardiac unit which performs cardiac surgery. The hospitals at the most do only one operation a week and majority of these are assisted by a full cardiac surgery team from the National Cardiac Center. All these hospitals in five different cities perform a total of less than 200 surgeries a year. With the population of Indonesia numbering over 180 million this situation is inadequate and far from ideal.

What is being done to rectify this situation? The major burden has been put on the National Cardiac Center. The Center at present has ongoing cooperations with four Medical Faculties in four different cities with two more on the drawing board. These institutions are spread out evenly

throughout the whole of Indonesia. Anesthesiologists from these institutions are sent to the National Cardiac Center for training in cardiothoracic anesthesia and postoperative care. The duration of this training is usually three to six months depending on whether or not they had been exposed to cardiac anesthesia during their residency. This is the first phase of their training because they are only expected to perform relatively simple operations such as corrective procedures for ASD, VSD and uncomplicated valve replacements when they return to their respective institutions. Depending on their performance a team from the National Cardiac Center will supervise and assist them if necessary for the first one or two years depending on their performance as judged by the visiting team.

Conclusion

With this situation as such cardiac anesthesia in Indonesia still has a long way to go. Cardiac anesthesia, and cardiac surgery for that matter was previously regarded as a difficult, time consuming and materially unrewarding profession. The presence of the National Cardiac Center has gradually changed this attitude in a most positive way as the increasing number of anesthesiologists interested in cardiac anesthesia.

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