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Review Article

Development of Coronary Artery Bypass Graft (CABG) in Thailand

Pradistchai Chaiseri, MD

Department of Surgery, Chest Disease Institute, Nonthaburi 11000, Thailand

In Thailand, the first close heart surgery was performed by Professor Smarn Muntarbhorn at Chulalongkorn Hospital in 1953. In 1959, he also performed the first open heart surgery. The first period of heart surgery in Thailand was mainly for congenital and valvular heart diseases. It was until 1974 when coronary artery bypass graft (CABG) was firstly commenced by Professor Prinya Sakiyalak at Siriraj Hospital on which the patient was referred by Dr. Tada Chakorn from Central Chest Hospital which was supposed to be the best cardiac catheterization laboratory in Thailand during that time. He performed two saphenous vein grafts anastomosed to LAD & RCA by beating heart technique¹.

In 1975, Dr. Chalit Cheanvechai who was practicing at Cleveland Clinic, came back temporarily to Thailand. He firstly operated CABG at Chulalongkorn Hospital. Later, he and his team - Dr. Suthi Surakiatchanukul, the surgeon and Dr. Punnee Satienchot, the cardiologist started cardiac surgery at

Vajira Metropolitan Hospital. In 1983, CABG was also started at Central Chest Hospital. However, during the first decade of CABG in Thailand (1974-1983), it was mainly confined to Vajira Metropolitan Hospital².

The number of cases of CABG during the first decade were not many. In 1983, it was only 40 cases per year which accounted for only 2% of the total number of cardiac surgery in Thailand (Fig. 1). During that period of time, there were limited number of well qualified cardiac catheterization laboratories and limited number of well trained cardiologists/cardiac surgeons and good quality coronary angiogram facilities. The technology of cardiac catheterization laboratory at that time was only 16-mm. film recorded without C-arm X-ray machine. The majority of cardiac surgery in heart disease over the first decade was rheumatic valvular heart disease and congenital heart disease³. CABG was performed mainly by reversed saphenous vein grafts using crystalloid cardioplegia. The incidence of ischemic heart disease was rather low

Correspondence address : Pradistchai Chaiseri, MD, Department of Surgery, Chest Disease Institute, Tiwanond Road, Nonthaburi 11000, Thailand. Tel: +66 2591 9999; Fax: +66 2591 8071; E-mail: pdchaiseri@yahoo.com

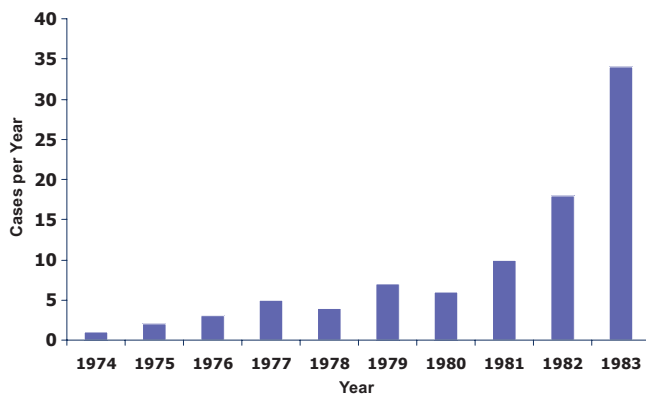


Figure 1 First Decade of CABG in Thailand

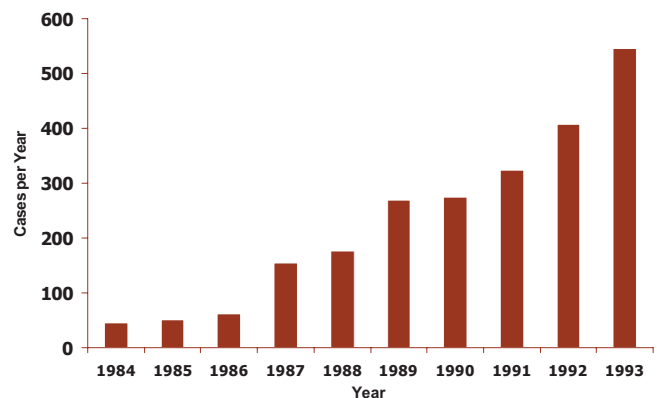


Figure 2 Second Decade of CABG in Thailand

and treatment was mainly medical and supportive therapy. Surgery for ischemic heart disease was not yet definitely indicated or accepted for its high morbidity and mortality.

Second decade of CABG was between 1984-1993 which mainly confined to three hospitals: Vajira Metropolitan, Siriraj and Central Chest hospital (Fig. 2). In 1987, percutaneous coronary intervention (PCI) was started in Thailand at Central Chest Hospital. Thereafter, there were an increasing number of cardiac catheterization laboratories, coronary angiograms and PCIs. The technology of cardiac catheterization laboratory was C-arm X-ray machine and 35-mm film recorder. The techniques of CABG using reversed saphenous vein grafts, left internal mammary artery, blood cardioplegia and intraaortic balloon pump (IABP) were used more frequently. The number of well trained cardiologists, cardiac interventionists and cardiac surgeons were also increasing. The famous interventionists and cardiac surgeons were invited to Thailand to collaborate on teaching program. However, the wealthy patients still went abroad to seek for best care. Trend of treatment for coronary artery disease was more aggressive, not only medical treatment but also revascularization of the stenotic coronary arteries either by PCI or CABG.

The Central Chest Hospital was once in 1992 considered as the unit that operated CABG more than other hospitals in Thailand. This might stimulate other cardiac units especially university hospitals to pay more attention to CABG program. Over that period of time, due to rapidly developing socio-economic status of the country, cardiovascular disease was counted as the leading cause of death for Thai population as in western countries (Fig. 3). In 1993, at

the end of second decade of CABG, the number of CABG in Thailand was 540 cases per year which accounted for 19% of the total number of open heart surgery⁴. There were 11 cardiac units of which private units performed CABG surgery.

Third decade of CABG was between 1994-2003 (Fig. 4). The rapidly developed advanced new technology of digitalized catheterization laboratory with newly invented good quality stent in association with multiple interventional equipment appeared, the number of PCI were increasing⁵. New technologies of cardiac surgery such as off-pump coronary artery bypass (OPCAB), all arterial grafts (radial artery and gastroepiploic artery CABG) were well established in many units. Transmyocardial revascularization (TMR) was used at Vajira Metropolitan Hospital. The total number of CABG at the end of third decade (2003) went up to 2,400 cases per year which accounted for 25% of the total number of cardiac surgery in Thailand⁶. There were total 24 cardiac units that could perform CABG, out of which 11 were private. In this era, CABG was well accepted and well established in Thailand and was much more accepted as standard treatment by Thai population. The OPCAB technique was done in 17% of the total CABG cases. The medical treatment was improved by ICU care and new drugs such as thrombolytic agents, angiotensin-converting enzyme inhibitor (ACEI), angiotensin II receptor blockers (ARB), beta-blocker, calcium antagonist and statin. Due to better modalities of coronary artery treatment both medical and interventional as well as cardiac surgery did improve the mortality of coronary artery heart disease. From the national registry point of view, the number of ischemic heart disease was increasing (Fig. 6) but the cardiovascular cause of death dropped

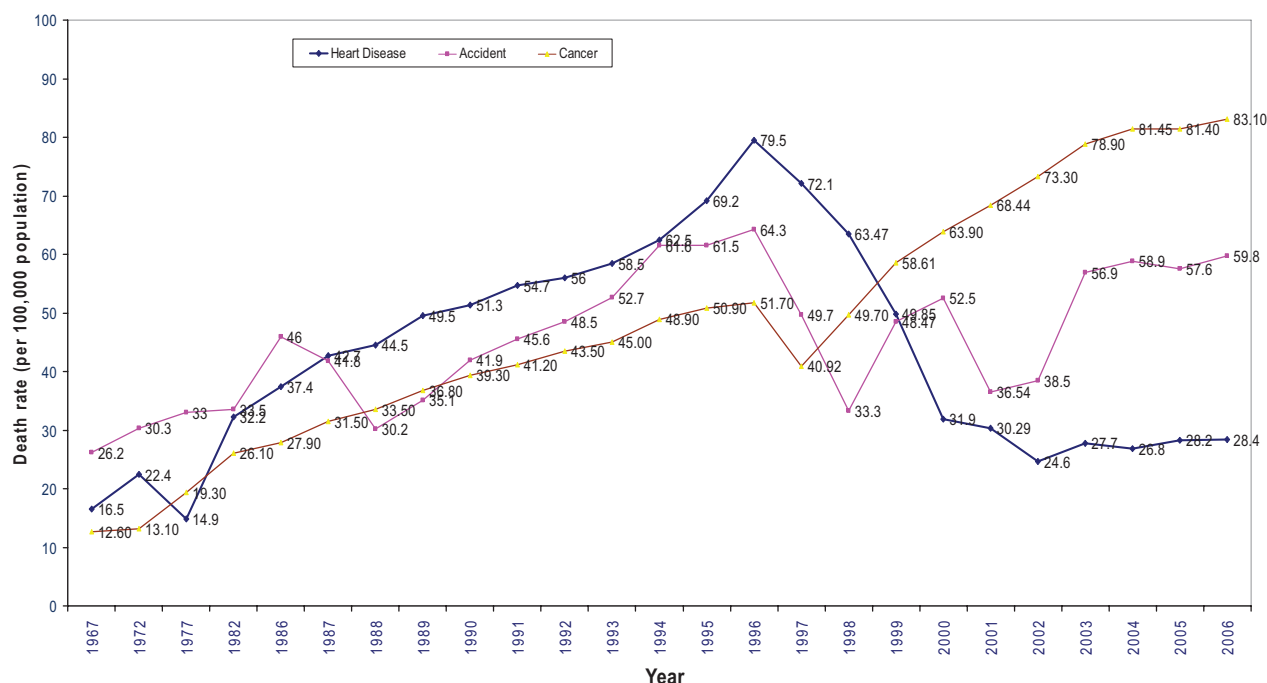


Figure 3 Death rate from major cause per 100,000 in Thailand : from CVD, CANCER and ACCIDENT; from Annual report 2007, Ministry of Public Health

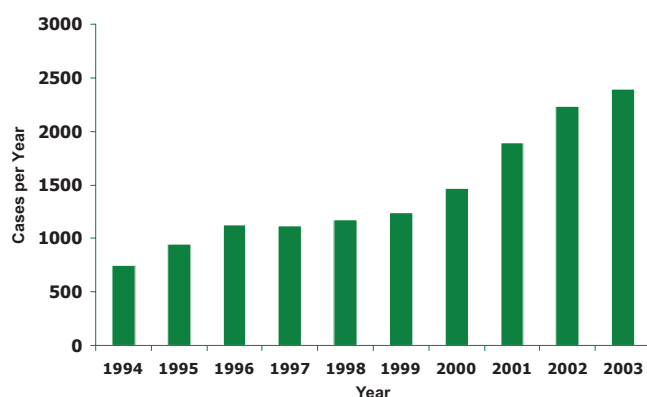


Figure 4 Third Decade of CABG in Thailand

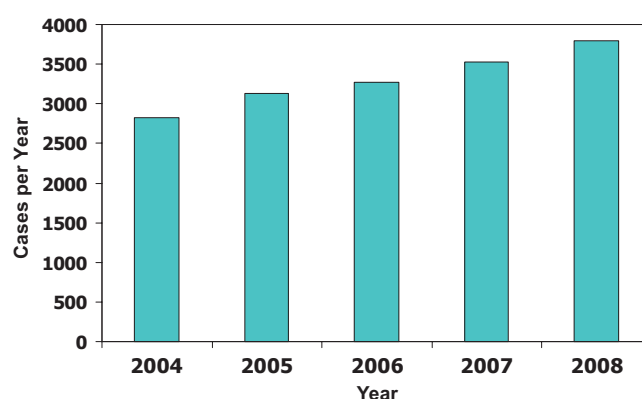


Figure 5 Fourth Decade of CABG in Thailand

its ranking from first leading cause of death to number third cause of death for Thai population (Fig. 3). Preventive measures emerged strongly over this era.

Fourth decade of CABG was between 2004-2009 (Fig. 5). CABG continued to be the major role of cardiac surgery in Thailand. In 2008, total number of CABG in Thailand was 3,790 cases per year which accounted for 31% of total cardiac surgery⁶. The number of surgery for valvular heart disease became less than CABG cases (Table 1). Number of interventional PCI increased enormously, however number of CABG did not decrease (Table 2). The patient learned much more about guideline of treatment for

coronary artery disease including acute coronary syndrome. Many private hospitals tried to establish cardiac unit (cardiac catheterization and open heart surgery) even though the number of case was still low. Nearly all cardiac units could perform CABG according to the database of open heart surgery in Thailand. The cardiac units were increased to 52 units in which 25 units were private. In some private hospitals, there were robotic surgery and stem cell therapy. Presently, PCI and CABG were well accepted over the country. Not only the wealthy patient but also the foreign patient come to Thailand for physical check up and had PCI or CABG done in Thailand as seen on CNN

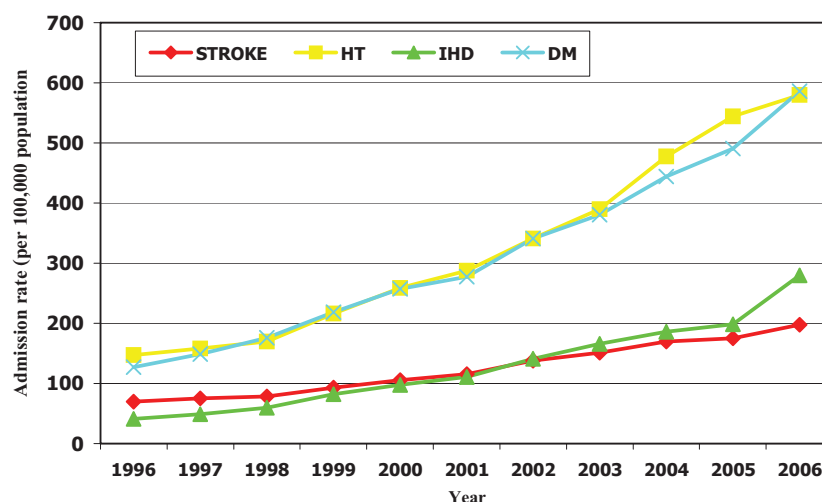


Figure 6 Inpatient rate from Non Communicable disease in Thai People: per 100,000 people; from Annual report 2007, Ministry of Public Health; except Bangkok province

Table 1 Statistic of Heart Surgery in Thailand 2006-2008

	Grand Total	Total Open	Total Close	Congenital	Acquired	Valvular	CABG
2004	10,727	8,675	2,052	3,805	6,922	3,283	2,877
2005	11,687	9,338	2,349	4,139	7,417	3,648	3,063
2006	11,395	9,109	2,286	3,764	7,655	3,320	3,280
2007	12,208	9,692	2,516	3,891	8,317	3,494	3,522
2008	12,144	9,827	2,317	3,742	8,402	3,464	3,790

Table 2 Statistic of Coronary Intervention in Thailand from the Heart Association of Thailand under Royal Patronage of H.M. the King

	PCI	CABG
1995	1,108	946
2006	>7,781	3,280
2008	>11,466	3,790

News and Times magazine. The standardization of leading hospitals is approved by the Joint Commission International Accreditation (JCIA).

In the future, according to the World Trade Organization (WTO), the medical service will be open for all including patients, medical personals, private hospitals and there will be no barriers between Asian countries. The technology of CABG and PCI was not different between asian and western countries. There will be shortage of cardiothoracic surgeons in the United States of America. Asian countries will be the medical hub of the world in the future and the government of Thailand has the medical industrial policy for the medical care in Thailand⁷.

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