

# AORTA-CORONARY BYPASS GRAFT ASEAN EXPERIENCE

J H H Sheares

## SYNOPSIS

Over the last 2 decades, ischaemic heart disease has become increasingly common in the ASEAN countries and is now one of the most common causes of death. Aorto-coronary bypass graft (CABG) has become firmly established in the ASEAN countries over the last 5 years.

The most common indication for CABG was chronic stable angina pectoris and the next most common was unstable angina pectoris refractory to medical therapy. More males than females had CABG and the most common age group was between 40 to 50 years. Most of the patients had severe atherosclerosis and the average number of arteries grafted was 3 with an average artery diameter of 1.5 mm. Saphenous veins were used although an occasional case had internal mammary artery graft. The operative mortality varied from 1% to 9% but was 1% to 3% in the more recent years. Associated conditions treated at the time of CABG were aneurysmectomy, valve replacement or commissurotomy and closure of septal defects. Long-term follow-up showed functional improvement and relief of symptoms in over 90% of survivors after 1 year, and also after 4 years in Thailand where data was available. ASEAN patients tended to have CABG surgery at a younger age than patients in Western countries, and they also tended to have smaller coronary arteries with severe atherosclerosis so that three grafts were the average number performed per patient.

Cardiothoracic Surgical Centre  
Mt Elizabeth Medical Centre  
Singapore 0922

J H H Sheares, MA, FRCS, AM, FACC  
Surgeon

## INTRODUCTION

The incidence of ischaemic heart disease is increasing in the ASEAN countries (2, 3, 5) and the number of patients undergoing coronary artery bypass graft (CABG) surgery is also increasing. I am very grateful to all my colleagues (Table 1) who so generously provided me with information and data on their patients who had CABG operations. I am especially grateful to Dr Suthi Surakiatchanukul and colleagues so readily providing their data and help in compiling this survey of CABG in the ASEAN countries. This survey excludes data from other cardiac surgical units where information was not made available to me.

## INDICATIONS

In the ASEAN countries the most common indications for pre-operative coronary angiograms were stable and unstable angina pectoris. Other indications were myocardial infarction and its complications of left ventricular aneurysms and ventricular septal defects. A positive stress test, and patients over 45 years of age who required valve surgery were indications in some ASEAN countries.

Angina pectoris, whether stable or unstable, was also a common indication for CABG surgery. Another indication was left main stem obstruction which was deemed significant if it was 50% or more occluded by

TABLE 1  
AORTO-CORONARY BYPASS GRAFT, ASEAN EXPERIENCE

COUNTRY	CARDIAC SURGICAL UNIT	
INDONESIA	Rajawali Hopsital, Bandung	Shen et al
MALAYSIA	Hosp. Besar, Kuala Lumpur	Wathooth et al
PHILIPPINES	Heart Cent. for Asia, Manila	Aventura et al
SINGAPORE	Tan Tock Seng Hospital	Tan et al
	Singapore General Hopsital	Tan et al; & Chia et al
	Mount Elizabeth Hospital	Saw et al; & Sheares et al
THAILAND	Chest Hospital, Bangkok	Chaisere et al & Manothai et al
	Chulalongkorn Hopsital	Ongcharit et al
	Siriraj Hospital, Bangkok	Sakiyalak et al
	Vajira Hospital, Bangkok	Surakiatchanukul et al

It is commendable that 7 years after the first CABG operation was performed in the USA, it was started in the ASEAN countries in Thailand in 1974 and since then CABG has become firmly established in the ASEAN countries. The CABG operation began in the Philippines in 1975 and a year later in Singapore. Up to the present time (Table 2) the number of CABG operations performed has been 6 in Rajawali Hospital, Indonesia; 51 in Hospital Besar, Kuala Lumpur, Malaysia; 308 in the Philippines Heart Centre for Asia; 184 in the Singapore General Hospital and Mount Elizabeth Hospital of Singapore; and 129 in the Chest, Chulalongkorn, Siriraj and Vajira Hospitals of Bangkok, Thailand.

TABLE 2  
NUMBER OF CABG OPERATIONS

COUNTRY	YEARS	NO. CABG
INDONESIA	1984	6
MALAYSIA	1982 — May 1984	51
PHILIPPINES	1975 — May 1984	308
SINGAPORE	1976 — May 1984	184
THAILAND	1974 — Dec 1983	129

atheroma. Two or more coronary arteries occluded by 70% or more obstruction were common indications for CABG. Other indications were complications of myocardial infarction like a left ventricular aneurysm or ventricular septal defect or complications from percutaneous transluminal coronary angioplasty. There was an increasing trend to combine CABG with valvular surgery when there was significant disease in the left main stem or proximal left anterior descending or right coronary arteries.

Contraindications to CABG surgery were poor left ventricular ejection fraction of 20 to 30%, inadequate distal run-off of the coronary arteries, congestive cardiomyopathy, and terminal illnesses. Old age did not seem to be a significant contraindication to CABG.

## AGE &amp; SEX

Most of the patients fell under the 40-49 age group but the ages ranged from 23 to 75 years (Table 3). The median age in Thailand was 47.3 years.

There were many more men undergoing CABG than women and the male to female ratio was 6:1, but it ranged from 6:0 to 9.6:1. Although there was a clinical impression that coronary arteries of female patients were smaller than in males, no surgeon commented upon this.

## TECHNIQUE

The favoured technique amongst ASEAN surgeons

TABLE 3  
CHARACTERISTICS OF CABG PATIENT

COUNTRY	PATIENTS	M:F	COMMON AGE GP. (YRS.)	AV. DIAM. COR. ART. (MM)	AV. GRAFT PER PATIENTS
INDONESIA	6	6:0	50-59	1.5	1.8
MALAYSIA	51	7.5:1	40-49	1.5	3.6
PHILIPPINES	308	9.6:1	50-59	1.5	3.0
SINGAPORE	160	5.5:1	40-49	1.5	2.9
THAILAND	129	5.5:1	47.3	1.5	2.1

was to graft saphenous veins to coronary arteries using continuous sutures. In the Philippines there was an increasing trend to use sequential vein grafts and internal mammary artery grafts and this latter procedure was also used infrequently in Singapore. Myocardial preservation was with electrolyte or blood cardioplegia and topical cooling.

#### SEVERITY OF DISEASE & ASSOCIATED LESIONS

Coronary artery disease in the ASEAN patients tended to involve several arteries which were small in diameter (Table 3). The average graft per patient was 3 but it ranged from 1.8 to 3.6 per patient. The average coronary artery diameter was 1.5 mm and it was unusual to find an artery with a diameter greater than 2.0 mm. A few patients had 1 vessel CABG and this ranged from 6.8% to 10.0% (Table 4). The majority of patients required CABG to 3 vessels or more. Left main stem or equivalent disease accounted for a

significant number of patients and this ranged from 13.3 to 33.0% of the total number of CABG operations (Table 4). A large number of patients undergoing CABG had a previous myocardial infarction.

There was a significant number of associated lesions treated at the time of CABG (Table 5). Left ventricular aneurysmectomy and valve surgery were the most common associated lesions treated. Dr Aventura et al had the most experience with treating associated lesions and also had one case that required CABG after percutaneous transluminal coronary angioplasty.

#### MORTALITY

The operative mortality was relatively high in the early years of the surgeons' experience, and from data available in the Philippines and Thailand where CABG operations began earlier than in the other ASEAN countries, the operative mortality was 7.7% and 9.3%, (Table 6). However, in the later years in these 2 coun-

TABLE 4  
SEVERITY OF CORONARY DISEASE

COUNTRY	NOS	1-VESSEL	2-VESSEL	3-OR MORE-VESSEL	LMS	PREVIOUS M.I.
MALAYSIA	51	(5) 10.0%	(9) 18.0%	(20) 39.0%	17 (33.0%)	(21) 41.0%
SINGAPORE	118	(8) 6.8%	(18) 15.2%	(72) 61.0%	(20) 17.0%	(80) 67.0%
THAILAND	105	(14) 13.3%	(42) 40.0%	(35) 33.4%	(14) 13.3%	

TABLE 5  
CABG WITH ASSOCIATED LESIONS

COUNTRY	NOS	LMS	L.V. ANEURYSM	VALVE SURGERY	ASD	POST-PTCA
INDONESIA	6					
MALAYSIA	51	(17) 33.0%		(3) 5.9%		
PHILIPPINES	129	(29) 22.0%	(10) 7.8%	(18) 14.0%		(1) 0.8%
SINGAPORE	160	(23) 14.4%	(7) 4.4%	(1) 0.6%		
THAILAND	129	(14) 13.3%	(6) 4.7%	(5) 3.9%	(1) 0.8%	

TABLE 6  
CABG OPERATIVE AND LATE MORTALITY

COUNTRY	YEARS	NOS	OPERATIVE MORTALITY	LATE MORTALITY
INDONESIA	1984	6	0	
MALAYSIA	1982-May 1984	51	0	
PHILIPPINES	1975-Dec 1983	129	7.7%	4.2%
SINGAPORE	1982-May 1984	160	3.8%	
THAILAND	1974-Dec 1983	129	9.3%	1.7%

tries and in the other countries where CABG began later in the 1980s the operative mortality varied from 0 to 3.8%. The lowered mortality reflected improvements in technique and myocardial preservation rather than more stringent selection of patients for surgery.

The operative mortality was higher where associated lesions were treated compared to cases where CABG only, excluding left main stem disease, was performed (Table 7).

**LONG-TERM FOLLOW-UP**

A follow-up of patients was possible in at least 75% (Table 8) of cases and this was usually conducted through outpatient clinic and sometimes correspondence. This low incidence of patients lost to follow-up

was presumably due to the interest cardiologists and surgeons have in this group of patients and because the total number of patients involved was relatively small. Late mortality (Table 6) was available in the Philippines and Thailand where it was 4.2% and 1.7% respectively.

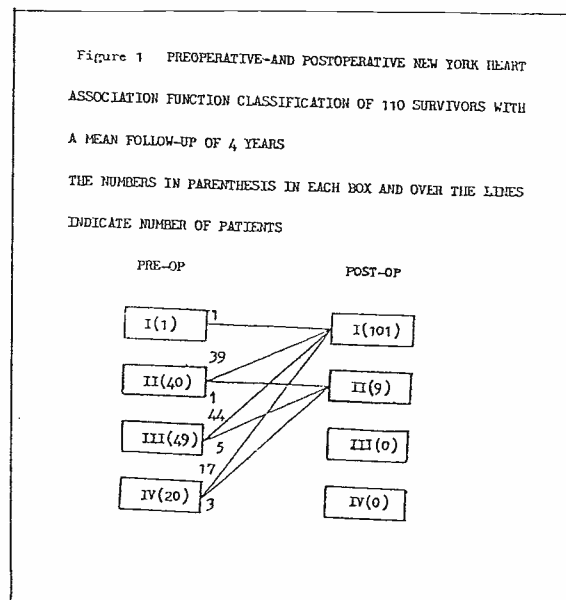
The majority of patients achieved symptomatic relief from angina pectoris, but post-operative coronary angiograms were rarely performed because of financial constraints. 110 patients in Thailand were followed-up for 2 months up to 10 years with a mean follow-up of 4 years (Figure 1) and reported by Dr S Surakiatchanukul. All these patients except for 2 showed functional improvement according to their NYHA classification. There was a general clinical impression that most of the other post-operative patients in the ASEAN countries would show a similar trend.

**TABLE 7  
OPERATIVE MORTALITY OF CABG WITH ASSOCIATED LESIONS**

COUNTRY	OPERATIVE MORTALITY					
	CABG	LMS	+ VALVE SURG	+ L.V. ANEUR	+ ASD	+ PTCA
INDONESIA	(0/6) 0%					
MALAYSIA	(0/31) 0%	(0/17) 0%				
PHILIPPINES	(1/71) 1.4%	(1/29) 3.4%	(4/18) 22.2%	(4/10) 40.0%		(0/1) 0%
SINGAPORE	(4/137) 2.9%	(2/23) 8.7%	(0/1) 0%			
THAILAND	(11/105) 9.4%		(1/4) 25.0%	(0/6) 0%	(0/1) 0%	

**TABLE 8  
FOLLOW-UP OF CABG PATIENTS**

COUNTRY	NOS	LOST TO FOLLOW-UP	FOLLOW-UP	
			BY CLINIC	BY CORRESPONDENCE
INDONESIA	6			
MALAYSIA	51	(4) 7.8%	+	
PHILIPPINES	308	25%	+	
SINGAPORE	160	25%	+	+
THAILAND	129	(5) 3.9%	+	



Coronary artery surgery in Thailand, result of a National survey by S Surakiatchanukul et al, 1984

## CONCLUSION

The CABG operation has now become firmly established in the ASEAN countries since the time it started in Thailand in 1974, and an increasing number of CABG is being performed each year. The patients tended to be younger than those in Western countries and their ages were in the 40-49 years age group. The coronary occlusions also were more extensive than Western patients, as evidenced by the fact that the majority required 3 or more grafts per patients. The coronary arteries were also smaller, on average 1.5 mm in internal diameter and seldom 2 mm in diameter; and there was a clinical impression that there was more calcified coronary disease than in the Western patients.

Operative mortality in the early years were similar to those early reports (7) in the USA, but in more recent years the operative mortality has fallen to an acceptable 1 to 3%. The clinical impression, with some supportive data from the Philippines and Thailand, is that the majority of patients achieve symptomatic relief and enhancement of survival.

## REFERENCES

1. Surakiatchanukul S. Results of a National Survey: Coronary artery in Thailand. Vajira Hospital Bangkok, 1984.
2. Aventura A. Personal communication. Philippines Heart Centre for Asia, Manila, 1984.
3. Tan N. C. Personal communication. Singapore General Hospital, 1984.
4. Saw H S. Personal communication, Mount Elizabeth Hospital, Singapore 1984.
5. Shen D. Personal communication, Rajawali Hospital, Bandung, Indonesia, 1984.
6. Tan N. C. Discussion: Coronary Artery Bypass Surgery at Singapore General Hospital: Singapore-Malaysia Academy of Medicine Congress, Singapore 1984.
7. Read R C, Murphy M.L, Hultgren H N, Takarao T. Survival of Men treated for chronic stable angina pectoris. J Thor Cardiovascular Surgery 1978; 75, 1-6.
8. Oh W: Coronary Artery Disease in Southeast Asia — Current Concepts Med. Prog. 1982; 9: 31-6.