

# THE CARDIOVASCULAR LABORATORY AT THE MOUNT ELIZABETH HOSPITAL: THE FIRST 600 CASES

W S Chin  
S S Rajendra Pillai

The Diagnostic X-ray Centre  
300 Orchard Road, #05-03  
The Promenade  
Singapore 0923

W S Chin, MD, DMRD (Lond), FRCR (Eng)

Department of Diagnostic Radiology  
Mount Elizabeth Hospital  
3 Mount Elizabeth  
Singapore 0922

S S Rajendra Pillai

## SYNOPSIS

This is to record the setting up of a complete cardiovascular Laboratory in a private hospital. It is the first of its kind in Singapore and Malaysia. The first 600 cases of cardiac catheterization were analysed.

## INTRODUCTION

Mount Elizabeth Hospital, a 500 bed hospital was officially opened on 8th December 1979 as a general service private hospital. Additional specialized services were added according to schedule and demand, one of which is the Cardiovascular Laboratory which began operations in January 1981. It is housed in and under the charge of the department of diagnostic radiology. The first case, an abdominal angiogram, was performed on 26 January 1981. The subject was a young Indonesian male suspected of a bleeding hepatic aneurysm. The first cardiac catheterization and cardioangiogram was on 24 April 1981 for a case of atrial septal defect. A regular programme followed thereafter.

Mount Elizabeth Hospital is unique in being the first private hospital in Singapore and Malaysia to have a full cardiovascular laboratory to study cardiac and vascular diseases. In Singapore, the only other hospital to have such a facility is the government's Singapore General Hospital. This was set up in 1964 and an initial description of it was given by Ghosh MB, et al in 1965 (1). A review from 1964 — 1981 was published by Johan A and Chow K W in 1982 (2).

#### Staff

The initial department staff for the professional and technical responsibilities consisted of a radiologist (author), radiographer, nursing sister, cardiac laboratory technician (co-author) and a photographic assistant. All had previous cardiovascular experience from the Singapore General Hospital and were brought together to run the laboratory. Additional staff were then trained as demand rose. Practising cardiologists are from the private sector and with the exception of one, are from the Mount Elizabeth Medical Centre. Cardiac surgery was performed in the Mount Elizabeth Hospital by two groups of surgeons in private practice.

#### Physical Facilities

The actual work space for the laboratory is 50 square meters, located in the X-ray department. The space is divided into a larger 38 sq m operative area and a 12 sq m control area.

The X-ray equipment is from Siemens. The generator is a Tridoros Optimatic 1000 (1000 mA — 70 kV). There is biplane fluoroscopy and biplane film recording using AOT-S (35 × 35), Sircam 100/6 100 mm camera and Arritechno 90 35 mm cine. The examination table is a general purpose Koordinat Angio. Contrast medium was delivered by a Simtrac DH injector with X-ray/injection delay and ECG release attachment. There is instant review of the angiogram by a medical video-tape recorder, Sirecord X. The cine film was processed by a Dupont Cronex T-15 processor and the finished product is viewed with a single lens Tagarno 35 XR cine projector.

Catheters, needles and other angiographic materials were largely of USC, Cordis and Kifa make. Some catheters were custom-shaped. Intravascular recording and monitoring of the patient was done using a Hewlett Packard Recorder 8890B.

An anaesthetic machine and full resuscitation equipment are on standby in the operative room. Additional staff to assist in emergency resuscitation could be called upon from the adjacent Accident & Emergency department and the operating theatres.

#### Cardiac Catheterization Cases

The first 600 cases were performed between April 1981 to October 1983. There were 352 males and 248 female patients. The majority of patients came from West Malaysia (311), followed by East Malaysia (108), Indonesia (96) and Singapore (73).

The types of cardiac catheterization were conveniently classified as: right heart 212 cases, left heart 192, and combined right and left heart 196 cases. The total number of cardioangiograms performed was 909 with the breakdown in Table 1.

Of the 600 cases, 568 patients had local anaesthesia and in 32, some form of general anaesthesia.

TABLE 1: TYPE OF ANGIOGRAM

Left ventriculogram	411
Aortogram	172
Coronary arteriogram	182
Right ventriculogram	109
Pulmonary arteriogram	24
Right atrial angiogram	6
Left atrial angiogram	5
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	909

Of the 600 cases, 294 had been operated in Mount Elizabeth Hospital by the end of the study (October 1983).

#### RESULTS

555 out of the 600 cases studied had definite significant abnormality or abnormalities (93%).

147 had acquired rheumatic disease.

265 had congenital heart disease.

144 had coronary artery disease.

Tables 2, 3 and 4 show the breakdown of the abnormalities.

TABLE 2: VALVULAR HEART DISEASE

Mital	64
Mital and aortic	41
Aortic	25
Mitral and tricuspid	14
Mitral, aortic and tricuspid	3
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	147

TABLE 3: CONGENITAL HEART DISEASE

Classified according to the major or only abnormality.

Ventricular septal defect	94
Fallot's Tetralogy	52
Atrial septal defect	51
Patent ductus arteriosus	18
Pulmonary valve stenosis	15
Pulmonary atresia	6
Tricuspid atresia	5
Double outlet right ventricle	5
Transposition of great vessels	3
Ebstein's anomaly	3
Others	13
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	265

**TABLE 4: CORONARY ARTERY DISEASE**

One vessel disease	27
Two vessel disease	31
Three vessel disease	75
Left ventricular aneurysm	7
Hypertrophic cardiomyopathy	2
Coronary fistula	1
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**Complications**

Complications were few and minor. There are only 4 cases considered as major. Two developed pulmonary oedema; one (with permanent pacemaker) had ventricular fibrillation following a right coronary arteriogram and required immediate DC shock; and in one patient, the distal tip of a guidewire broke off and lodged in a hepatic vein. This was left alone without any consequence and the patient died from her inoperable cardiac disease months later. There were no deaths as a result of cardiac catheterization or cardioangiogram.

In about the same period of time, over 500 non-cardiac angiograms were performed. About 35% were abdominal, 34% cerebral and 11% peripheral angiograms. The laboratory was also used for certain clean procedures e.g. needle lung biopsy.

**CONCLUSION**

The cardiovascular laboratory in the Mount Elizabeth Hospital can be considered successful in its initial stage to provide a service in the private sector. It should continue to grow in capacity and scope. Following present trends, the number of rheumatic heart cases will drop and coronary angiograms will rise. Percutaneous transluminal angioplasty will become a routine procedure.

**REFERENCES**

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The cardiovascular laboratory team:

WS Chin, KS Yeap, Sister PS Tan, Rajendra Pillai, Osman B Ahmad

Joined later by S/N MS Lee, CH Sim, S/N BL Teo.

Dr Michael KK Toh, Head, Department of Diagnostic Radiology, Mount Elizabeth Hospital.

Cardiologists:

Richard Ng	T.F. Loh
L.P. Low	S.P. Chiang
C.H. Lim	N.B. Tan
Charles Toh	

Cardiac Surgeons:

J. Sheares	H.S. Saw
D.C. Wu	N.K. Yong
K.T. Tan	

Sulaihar — Secretary