

CHAPTER 3

HEART AND LUNG TRANSPLANTATION

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3.0 INTRODUCTION

The first heart transplant in Malaysia was carried out at Institut Jantung Negara (IJN) Kuala Lumpur in December 1997. The main limitation to the performance of heart transplants has been the lack of donor organs. Since 2004, IJN in collaboration with Institut Perubatan Respiratori (IPR) of the Ministry of Health has been preparing to perform lung transplantation as well as heart lung transplant and the first lung transplant was carried out in December 2005.

The rest of the report that follows will review the results of heart and lung transplantation in Malaysia till end of 2005.

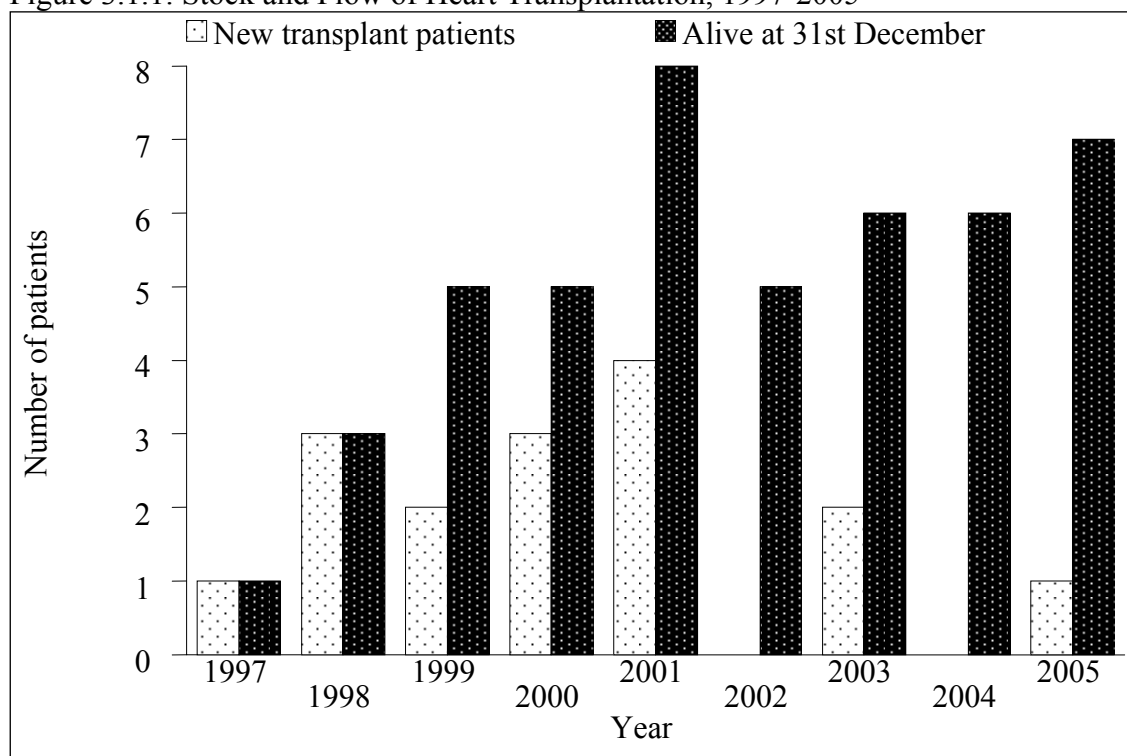
3.1 STOCK AND FLOW

Table 3.1.1: Stock and Flow of Heart Transplantation, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
New transplant patients	1	3	2	3	4	0	2	0	1
Deaths	0	1	0	3	1	3	1	0	0
Retransplanted	0	0	0	0	0	0	0	0	0
Lost to follow up	0	0	0	0	0	0	0	0	0
Alive at 31 st December	1	3	5	5	8	5	6	6	7

N.B. There was no heart transplants carried out in 2004

Figure 3.1.1: Stock and Flow of Heart Transplantation, 1997-2005



3.2 RECIPIENTS' CHARACTERISTICS

A total of 16 heart transplants have been carried out from 1997 to 2005. Two thirds of the recipients were males and over half were Indians. The mean age of recipients was 36 years (range 13-55 years) (Table 3.2.3).

The aetiology of heart failure is as listed in Table 3.2.4. Ischaemic cardiomyopathy was the most commonest aetiology followed by dilated cardiomyopathy.

Table 3.2.1: Gender distribution, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Gender	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Male	1	3	0	2	2	0	2	0	1	11
Female	0	0	2	1	2	0	0	0	0	5
TOTAL	1	3	2	3	4	0	2	0	1	16

Table 3.2.2: Ethnic group distribution, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Ethnic group	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Malay	0	0	1	1	2	0	0	0	1	5
Chinese	0	0	0	1	0	0	1	0	0	2
Indian	1	3	1	1	2	0	1	0	0	9
TOTAL	1	3	2	3	4	0	2	0	1	16

Table 3.2.3: Age distribution, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Age, years	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
0-19	0	0	2	1	1	0	0	0	1	5
20-39	0	2	0	0	0	0	0	0	0	2
40-59	1	1	0	2	3	0	2	0	0	9
>=60	0	0	0	0	0	0	0	0	0	0
TOTAL	1	3	2	3	4	0	2	0	1	16
Mean	51	40	16	37	38	-	46	-	15	36
SD	-	9	1	22	17	-	8	-	-	16
Median	51	37	16	44	43	-	46	-	15	40
Minimum	51	33	15	13	14	-	40	-	15	13
Maximum	51	50	16	55	54	-	52	-	15	55

Age=date of transplant-date of birth

Table 3.2.4: Primary diagnosis, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Primary diagnosis	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Ischaemic Cardiomyopathy	1	3	0	1	1	0	2	0	0	8
Idiopathic Dilated Cardiomyopathy	0	0	2	1	2	0	0	0	1	6
Restrictive Cardiomyopathy	0	0	0	0	0	0	0	0	0	0
End Stage Valvular Heart Disease	0	0	0	0	1	0	0	0	0	1
Hypertrophic Cardiomyopathy	0	0	0	1	0	0	0	0	0	1
Others	0	0	0	0	0	0	0	0	0	0
TOTAL	1	3	2	3	4	0	2	0	1	16

3.3 TRANSPLANT PRACTICES

The majority of patients received orthotopic biatrial and only 2 had orthotopic bicaval procedure (Table 3.3.1).

At the time of transplant all patients received methylprednisolone followed by prednisolone. All also received cyclosporine and azathioprine, but in 3 patients, azathioprine was later replaced by mycophenolate mofetil (Table 3.3.2).

All patients surviving to discharge were sent home on Neoral[®]. During follow up, 56% of patients were still on prednisolone. Nearly half the patients were switched from azathioprine to mycophenolate mofetil (Table 3.3.3).

Four of the recipients were transplanted when they presented with severe heart failure, before they were formally listed on the waiting list. The other 11 recipients were transplanted from the waiting list and their average waiting time was 9 months (Table 3.3.4). The patient who had heart transplant in 2005 was a boy who had a Thoratec implantable Ventricular Assist Device (VAD) placed as a bridge to transplant. He was on the VAD for 4.5 months before finally receiving his heart transplant.

Table 3.3.1: Heart Procedure, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Heart Procedure	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Orthotopic Bicaval	1	1	0	0	0	0	0	0	0	2
Orthotopic Traditional	0	2	2	3	4	0	2	0	1	14
Heterotopic	0	0	0	0	0	0	0	0	0	0
TOTAL	1	3	2	3	4	0	2	0	1	16

Table 3.3.2: Immunosuppressive used, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total
Type of immunosuppressive	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
<i>Steroids</i>										
Prednisolone	1	3	2	3	4	0	1	0	1	15
Methylprednisolone	1	3	2	3	4	0	2	0	1	16
<i>Calcineurin Inhibitors</i>										
Neoral [®]	1	3	2	3	4	0	1	0	1	15
<i>Antimetabolites</i>										
Azathioprine (AZA)	1	3	2	3	4	0	2	0	0	15
Mycophenolate Mofetil	0	0	0	0	1	0	1	0	1	3
TOTAL patients at notification	1	3	2	3	4	0	2	0	1	16

Table 3.3.3: Immunosuppressive used at time of last follow-up up to 2005

Year of transplant*	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Type of immunosuppressive	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
<i>Steroids</i>										
Prednisolone	1	4	1	0	3	0	0	0	0	9
Methylprednisolone	1	1	0	0	1	0	0	0	0	3
<i>Calcineurin Inhibitors</i>										
Neoral®	1	4	3	1	4	0	2	0	0	15
<i>Antimetabolites</i>										
Azathioprine (AZA)	1	2	1	1	3	0	0	0	0	8
Mycophenolate Mofetil (MMF)	0	2	2	0	1	0	2	0	0	7
TOTAL patients at follow-up	1	2	2	1	3	0	1	0	0	10

*Data according to year of transplant of patient

Table 3.3.4: Duration of waiting time on waiting list, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Duration (months)	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
<5	0	2	1	0	1	0	1	0	0	5
5-<10	1	0	1	0	1	0	0	0	1	4
10-<15	0	0	0	1	0	0	0	0	0	1
15-<20	0	0	0	1	0	0	0	0	0	1
20-<25	0	0	0	0	0	0	0	0	0	0
25-<30	0	0	0	0	0	0	0	0	0	0
30-<35	0	0	0	0	0	0	0	0	0	0
35-<40	0	0	0	0	0	0	1	0	0	1
TOTAL	1	2	2	2	2	0	2	0	1	12
Mean	6	2	4	15	5	-	20	-	9	9
SD	-	0	1	6	5	-	25	-	-	10
Median	6	2	4	15	5	-	20	-	9	6
Minimum	6	2	3	10	1	-	2	-	9	1
Maximum	6	2	5	19	8	-	37	-	9	37

*Duration=date of transplant-date added to wait list

3.4 TRANSPLANT OUTCOMES

Hypertension and hyperlipidaemia requiring drug treatment was common post transplant with high incidence in recipients (Table 3.4.1). Two patients were treated for rejection out of the 10 patients who were discharged from hospital (Table 3.4.4).

Five (33%) of the heart transplant recipients died in hospital following transplant (Table 3.4.5). One died of hyperacute graft rejection. The other 4 died of multiorgan failure with septicaemia (Table 3.4.7). The 1 year Kaplan Meier patient survival rate was 60% (Fig 3.4.6).

Four patients had succumbed to late deaths after their heart transplant. One of the deaths occurred within a year (sudden death, cause unclear), while the other 3 deaths occurred more than a year post transplant. One patient died of small cell lung cancer (he was a smoker, but stopped before his transplant). Another patient died suddenly but autopsy showed cardiac allograft rejection which was due to non-compliance to immunosuppression. One other death in a peripheral hospital was classified as severe bleeding but the actual cause of death was unclear (Table 3.4.8).

Table 3.4.1: Post Transplant Events at last follow-up up to 2005

Year of transplant*	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Type of post transplant events	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Drug Treated Hypertension	1	2	2	1	3	0	1	0	0	10
Bone Disease (Symptomatic)	1	0	0	0	1	0	0	0	0	2
Chronic Liver Disease	0	0	0	0	0	0	0	0	0	0
Cataracts	0	0	0	0	0	0	0	0	0	0
Diabetes	1	2	0	0	0	0	1	0	0	4
Renal Dysfunction	1	0	0	0	1	0	0	0	0	2
Stroke	0	0	0	0	0	0	0	0	0	0
Drug Treated Hyperlipidaemia	1	2	2	1	3	0	1	0	0	10
TOTAL patients at follow-up	1	2	2	1	3	0	1	0	0	10

*Data according to year of transplant of patient

Table 3.4.2: Post Transplant Malignancies at follow-up up to 2005

Year of transplant*	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Type of post transplant malignancies	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Recurrence of pre-transplant tumor	0	0	0	0	0	0	0	0	0	0
De Novo solid tumor	1	0	0	0	0	0	0	0	0	1
De Novo lymphoproliferative disorder	0	0	0	0	0	0	0	0	0	0
Skin	0	0	0	0	0	0	0	0	0	0
TOTAL patients at follow-up	1	2	2	1	3	0	1	0	0	10

*Data according to year of transplant of patient

Table 3.4.3: Non-compliance at follow-up up to 2005

Year of transplant*	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Non-compliance during follow-up	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
• Yes	0	0	2	0	0	0	1	0	0	3
• No	1	2	0	1	3	0	0	0	0	7
TOTAL patients at follow-up	1	2	2	1	3	0	1	0	0	10
<i>Areas of non-compliance:</i>										
• Immunosuppression medication	0	0	1	0	0	0	1	0	0	2
• Patient unable to afford immunosuppression medications	0	0	0	0	0	0	0	0	0	0
• Other medication	0	0	0	0	0	0	0	0	0	0
• Other therapeutic regimen	0	0	1	0	0	0	0	0	0	1
TOTAL patients with noncompliance	0	0	2	0	0	0	1	0	0	3

*Data according to year of transplant of patient

Table 3.4.4: Patient treated for rejection at follow-up up to 2005

Year of transplant*	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Patient treated for rejection	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
• Yes	0	1	1	0	0	0	0	0	0	2
• No	1	1	1	1	2	0	1	0	0	7
TOTAL patients with follow-up	1	2	2	1	3	0	1	0	0	10
<i>Number of rejection events</i>										
• 1	0	1	0	0	0	0	0	0	0	1
• 2	0	0	0	0	0	0	0	0	0	0
• 3	0	0	1	0	0	0	0	0	0	1
TOTAL patients with rejection	0	1	1	0	0	0	0	0	0	2

*Data according to year of transplant of patient

Table 3.4.5: Time of deaths, 1997-2005

Year of discharge	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Time of deaths	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
<3 months (at discharge)	0	1	0	2	0	1	1	0	0	5
3-<6 months	0	0	0	0	0	0	0	0	0	0
6 months-1 year	0	0	0	0	0	1	0	0	0	1
> 1 year	0	0	0	1	1	1	0	0	0	3
TOTAL patients who died	0	1	0	3	1	3	1	0	0	9

*Time=Date of death–date of transplant

Table 3.4.6: Patient survival, year of transplant 1997-2005

Year of Transplant	1997-2005	
Interval	% Survival	SE
6 months	67	1
1 year	60	1
2 year	47	1
3 year	40	1

SE=standard error

*Duration=date follow up-date transplant, if alive at discharge
=date of discharge-date of transplant, if dead at discharge

Figure 3.4.6: Patient survival, year of transplant 1997-2005

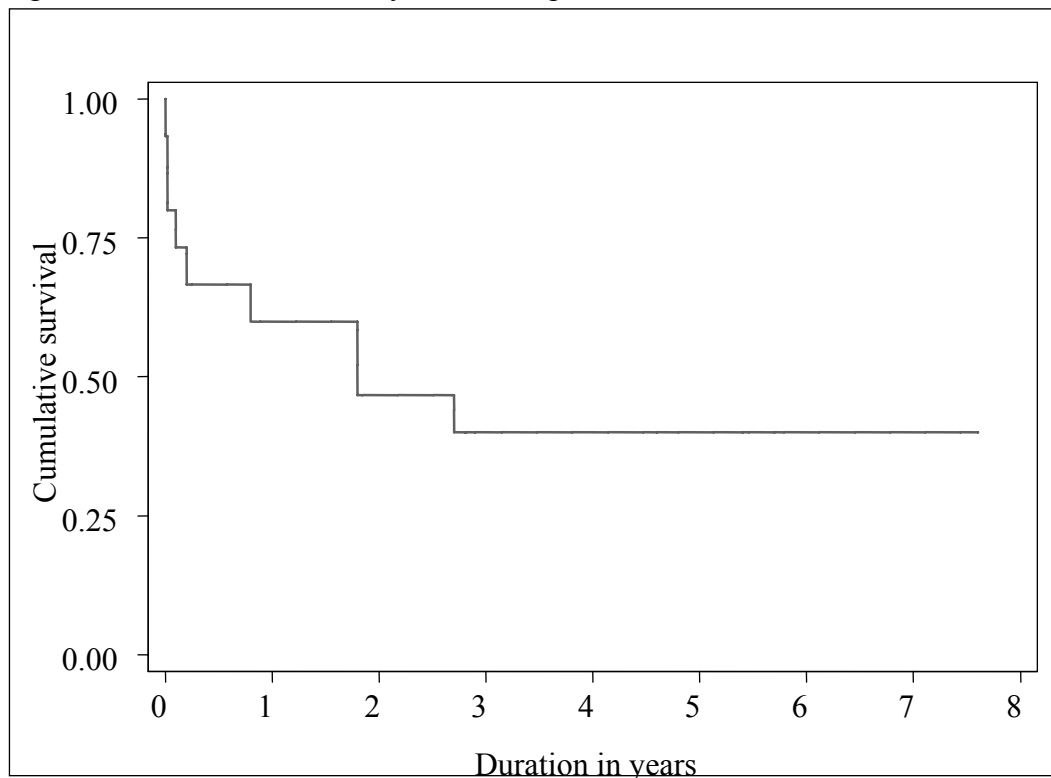


Table 3.4.7: Cause of death at discharge, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Cause of death	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Hyperacute rejection	0	0	0	0	0	0	1	0	0	1
Multi organ failure	0	0	0	1	0	0	0	0	0	1
Respiratory failure secondary to septicaemia	0	0	0	0	0	1	0	0	0	1
Respiratory failure, renal function and liver failure, ARDS, septicaemia	0	0	0	1	0	0	0	0	0	1
Septicaemia, multiorgan failure	0	1	0	0	0	0	0	0	0	1
TOTAL patients who died at discharge	0	1	0	2	0	1	1	0	0	5

Table 3.4.8: Cause of death at follow-up, 1997-2005

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	TOTAL
Cause of death	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Severe bleeding	0	0	0	0	0	1	0	0	0	1
Lung cancer, small cell type, septicaemia, bronchopneumonia	0	0	0	1	0	0	0	0	0	1
Rejection due to non-compliance	0	0	0	0	1	0	0	0	0	1
Unknown	0	0	0	0	0	1	0	0	0	1
TOTAL patients who died at follow-up	0	0	0	1	1	2	0	0	0	4