

가



=Abstract=

Results of heart transplantation in Korea

Se-II Oh, M.D.¹, Byung-Hee Oh, M.D.¹, Joon-Ryang Rho, M.D.²,
 Ki-Bong Kim, M.D.², Jae-Joong Kim, M.D.³, Meung-Gun Song, M.D.⁴,
 Dong-Gyu Jin, M.D.⁵, Kook-Yang Park, M.D.⁶, Suk-Keun Hong, M.D.⁷,
 Yoon Seop Jeong, M.D.⁸, Sang-Hoon Lee, M.D.⁹, Pyo-Won Park, M.D.¹⁰,
 Jong-Won Ha, M.D.¹¹, Byung-Chul Chang, M.D.¹² and Bum-Koo Cho, M.D.¹²

*Department of Internal Medicine¹, Thoracic Surgery²,
 Seoul National University College of Medicine, Seoul, Korea*

*Department of Internal Medicine³, Thoracic Surgery⁴,
 Asan Medical Center, College of Medicine, University of Ulsan, Seoul, Korea*

*Department of Cardiology⁵, Thoracic Surgery⁶, Heart Center,
 Gil Medical Center, Gachon Medical School, Incheon, Korea*

Department of Internal Medicine⁷, Thoracic Surgery⁸, Sejong General Hospital, Puchon, Korea

*Department of Medicine⁹, Thoracic Surgery¹⁰, Sungkyunkwan University School of Medicine,
 Cardiac and Vascular Center, Samsung Medical Center, Seoul, Korea*

*Division of Cardiology¹¹, Cardiovascular Surgery¹²,
 Yonsei Cardiovascular Center, Yonsei University College of Medicine, Seoul, Korea*

Background : Heart transplantation is a definite treatment modality of the patients with end-stage heart failure. Heart transplantation has been performed in Korea since 1992, and currently it is an established procedure for the management of terminal heart failure. The purpose of this study is to clarify the Korean status of heart transplantation.

Methods : Six major heart transplantation centers' 137 cases during the period November 1992 through May 1999 are analyzed to evaluate the general demographics, underlying heart diseases, postoperative management, complications, and survival.

Results : The mean age of the patients is 37 years old, and the mean follow-up period is 25

• : 1999 4 19

• : 1999 8 20

• : , 28

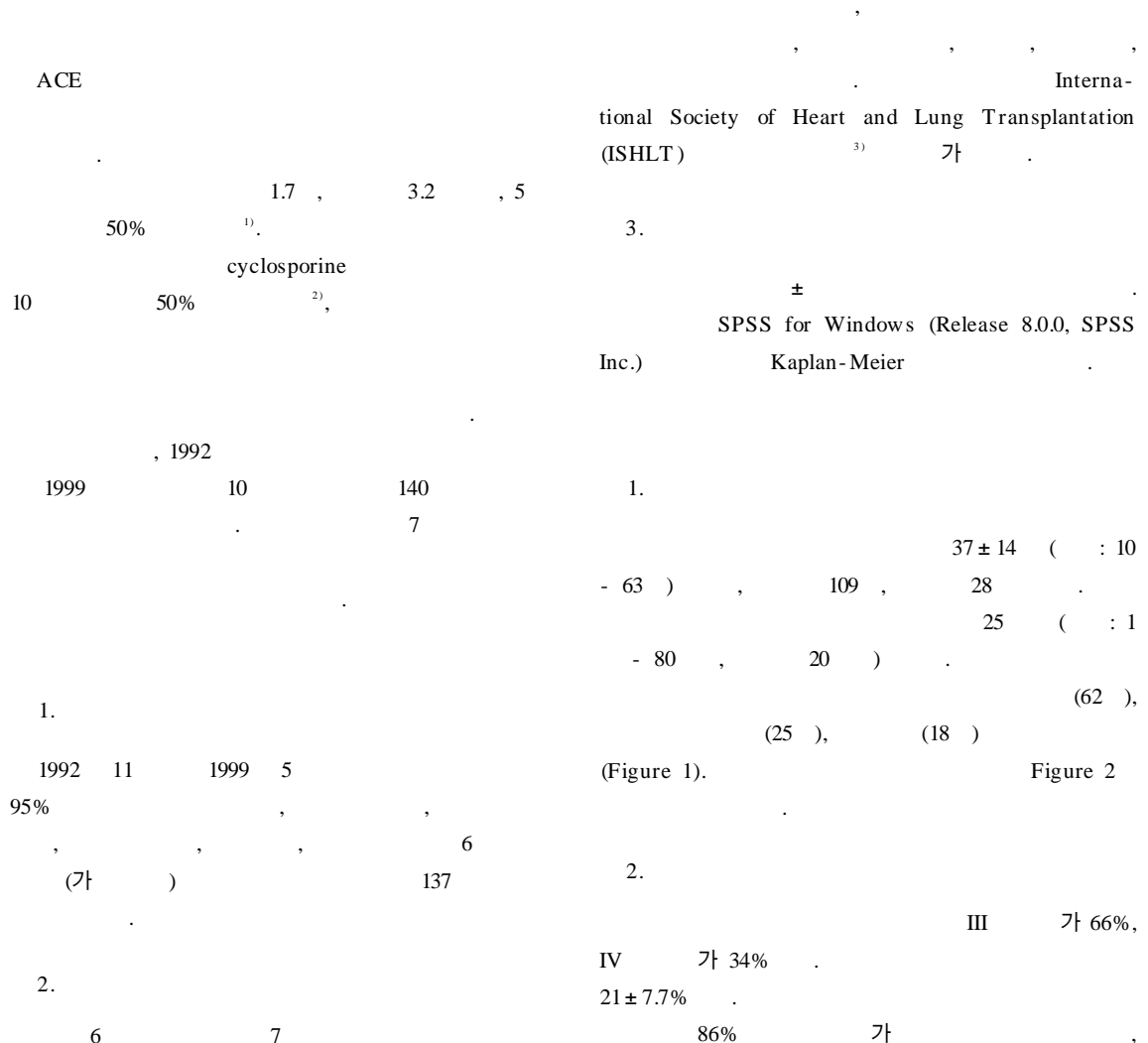
(110-744)

E-mail : ohbhmed@snu.ac.kr

months (1 day - 80 months, median 20 months). Most common underlying disease related to heart failure is cardiomyopathy (86%). Total 16% of patients underwent cellular rejection of ISHLT (International Society of Heart and Lung Transplantation) grade 3A or more within 1 year after transplantation. The most common type of clinical infection is bacterial (18%), and the most common organism is Herpes zoster virus (6.4%). Graft coronary artery disease examined by coronary angiography detected in 3.7% of recipients within 12 months after transplantation. One, 2, 3, and 5-year overall survival rates of recipients are 81%, 72%, 71%, and 62%, respectively.

Conclusion : Distribution of underlying heart diseases and the frequency of graft coronary artery disease of Korean heart transplantation recipients were different from those of the western patients. Although the history of heart transplantation in Korea is relatively short, the early and long-term results are comparable with well-established centers. (Korean J Med 60:228-233, 2001)

Key Words : Heart transplantation; Follow-up studies; Survival



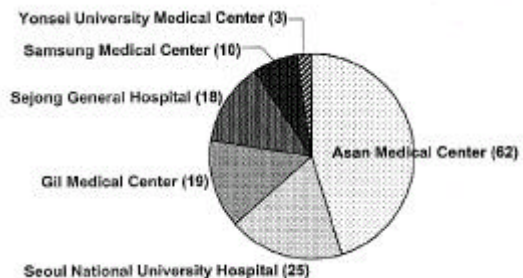


Figure 1. Heart transplantation cases of 6 major centers (November, 1992-May, 1999). Numbers in parentheses are case numbers of each hospital.

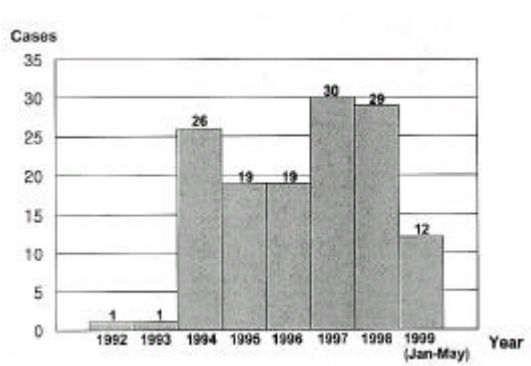


Figure 2. Annual heart transplantation cases in 6 major centers (November, 1992-May, 1999)

Table 1. Underlying diseases of heart transplantation recipients

Underlying disease	Proportion
Cardiomyopathy	86 %
Dilated cardiomyopathy	81 %
Hypertrophic cardiomyopathy	3 %
Restrictive cardiomyopathy	1 %
Arrhythmogenic RV dysplasia	1 %
Valvular heart disease	7 %
Coronary artery disease	3 %
Others	4 %

(7%), (3%) (Table 1). B (HBsAg) 1.5% HBeAg 가 , C 가 (cytomegalovirus, CMV) 가 94% .

3. cyclosporine, azathioprine, corticosteroid 가 3 cyclophosphamide 가 7.3%, mycophenolate mofetil, OKT3, methotrexate 가 1.5%, 0.7%, 0.7% .

4. 1 ISHLT grade 3A 가 16% . (18.0%), (11.0%), (4.4%) , Herpes zoster 가 6.4% 가 , CMV (cytomegalovirus) 2.8% (Table 2). 1 3.7% 0.9% lymphoid malignancy .

Table 2. Infectious agents proved in heart transplantation recipients

Infectious agents	Proportions
Bacterial infection	18.0%
Gram negative	3.8%
Staphylococcus	3.8%
Viral infection	11.0%
Herpes zoster	6.4%
CMV	2.8%
Fungal infection	4.4%
Aspergillus	2.9%

5. 1 , 2 , 3 5 81%, 72%, 71%, 62% (Figure 3). 1 가 (25%) , 1 가 (50%) . 가 (31%) (Table 3).

Table 3. Causes of death of heart transplantation recipients

Causes	Total	within 1 year	after 1 year
Rejection	31%	8%	50%
Infection	19%	25%	14%
Nonspecific graft failure	8%	8%	7%
Graft CAD	4%	8%	0%
Lymphoid malignancy	4%	0%	7%
Cerebrovascular disease	4%	8%	0%
Others	31%	42%	21%
	100%	100%	100%

CAD; coronary artery disease

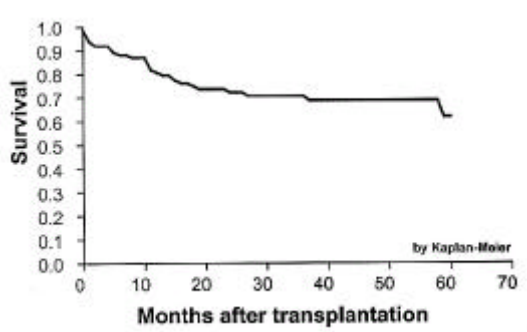


Figure 3. Survival analysis of heart transplantation recipients (by Kaplan-Meier method)

1 가
 , 1-4 CMV
 , 가
 CMV가 가
 CMV , CMV 가 가
 CMV
 94% ,
 CMV
 , 가
 CMV가 Herpes zoster 가 .

1.

UNOS (United Network for Organ Sharing) ⁴⁾
 1998 2345
 44.6%
 (6.6%), (2.2%)
 (42.1%),
 가
 , OECD 가 가 가
 1 가 .

11%, 22%, 45% ⁵⁾
 (intravascular ultrasound, IVUS) 1
 가 75% ⁶⁾
 , CD4 MHC
 class II ,
 1 3.7%
 (35
), HLA-A1 A2 , (280
 mg/dL), CMV ⁸⁾

2.

가 가

(age-matched control) 3 zoster (6.4%) 1
 , 가 , 3.7%
 , 9) , , 1 , 2 , 3 5 81%, 72%,
 , 10) 71%, 62% .
 가 :

(lymphoproliferative tumor) .
 Epstein-Barr
 , B 11) 가 .

3.

REFERENCES

1996- 1997
 (4283) 1 93.2%, 1 85.7%
 4) 1989- 1997 18747 3
 5 76.7%, 69.5% 4),
 가 .
 1
 가 8, 12, 13).
 :
 , 1992
 , 가 .
 : 6 1992
 11 1999 5 137
 , , ,
 가 .
 : 37 ,
 25 (: 1 -80 , : 20)
 , 가
 86% . 16% 가
 1 ISHLT grade 3A
 . 가 (18%)
 , 가 Herpes

1) Ho KKL, Pinsky JL, Kannel WB, Levy D. *The epidemiology of heart failure: the Framingham study. J Am Coll Cardiol* 22(Suppl A):6A-13A, 1993
 2) Costanzo MR. *Selection and treatment of candidates for heart transplantation. Semin Thorac Cardiovasc Surg* 8:113-125, 1996
 3) Billingham ME, Cary NR, Hammond ME, Kemnitz J, Marboe C, McCallister HA, Snovar DC, Winters GL, Zerbe A. *A working formulation for the standardization of nomenclature in the diagnosis of heart and lung rejection: Heart Rejection Study Group. The International Society for Heart Transplantation. J Heart Transplant* 9:587-593, 1990
 4) 1999 Annual Report of the U.S. *Scientific Registry for Transplant Recipients and the Organ Procurement and Transplantation Network: Transplant Data: 1989-1998. U.S. Department of Health and Human Services, Health Resources and Services Administration, Office of Special Programs, Division of Transplantation, Rockville, MD; UN OS, Richmond, VA.*
 5) Costanzo MR, Naftel DC, Pritzker MR, Heilman JK 3rd, Boehmer JP, Brozena SC, Dec GW, Ventura HO, Kirklin JK, Bourge RC, Miller LW. *Heart transplant coronary artery disease detected by angiography: a multiinstitutional study of preoperative donor and recipient risk factors. Cardiac Transplant Research Database. J Heart Lung Transplant* 17:744-753, 1998
 6) Yeung AC, Davis SF, Hauptmann PJ, Kobashigawa JA, Miller LW, Valentine HA, Ventura HO, Wiedermann J, Wilensky R. *Incidence and progression of transplant coronary artery disease over 1 year: results of a multicenter trial with use of intravascular ultrasound. J Heart Lung Transplant* 14:S215-S220, 1995
 7) Weis M, Scheidt WV. *Cardiac Allograft Vasculopathy. Circulation* 96:2069-2077, 1997

- 8) Bieber CP, Hunt SA, Schwinn DA, Jamieson SA, Reitz BA, Oyer PE, Shumway NE, Stinson EB. *Complications in long-term survivors of cardiac transplantation. Transplant Proc 13:207-211, 1981*
- 9) Penn I, Brunson ME. *Cancers after cyclosporine therapy. Transplant Proc 20:885-892, 1988*
- 10) Penn I. *Tumors after renal and cardiac transplantation. Hematol Oncol Clin North Am 7:431-445, 1993*
- 11) Hanto DW, Frizzera G, Gajl-Peczalska KJ, Simmons RL. *Epstein-Barr virus, immunodeficiency, and B cell lymphoproliferation. Transplantation 39:461-472, 1985*
- 12) Hosenpud JD, Shipley GD, Wagner CR. *Cardiac allograft vasculopathy: Current concepts, recent developments, and future directions. J Heart Lung Transplant 11:9-23, 1992*
- 13) Miller LW. *Transplant coronary artery disease (editorial). J Heart Lung Transplant 11:S1-S4, 1992*