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Abstract

One hundred patients who underwent heart valve replacement during the years 1977 to 1985 were reviewed an average of 57 months after surgery. The overall rate of reemployment after the operation was 78%. The most important factors influencing the return to work were the employment status before surgery, age at the time of surgery, the number and site of the diseased valve, the preoperative New York Heart Association (NYHA) functional class and the number of times cardiac surgery was performed. These factors were closely related to the optimal timing of heart valve replacement. It was suggested that the rate of return to work and the quality of life would be improved if the heart valve replacement had been performed at an earlier stage of the disease.

KEYWORDS: return to work, heart valve replacement, quality of life

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Return to Work after Heart Valve Replacement

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One hundred patients who underwent heart valve replacement during the years 1977 to 1985 were reviewed an average of 57 months after surgery. The overall rate of reemployment after the operation was 78%. The most important factors influencing the return to work were the employment status before surgery, age at the time of surgery, the number and site of the diseased valve, the preoperative New York Heart Association (NYHA) functional class and the number of times cardiac surgery was performed. These factors were closely related to the optimal timing of heart valve replacement. It was suggested that the rate of return to work and the quality of life would be improved if the heart valve replacement had been performed at an earlier stage of the disease.

Key words : return to work, heart valve replacement, quality of life

Valvular surgery has evolved considerably during the past 25 years, making the operation safer and valve dysfunction less frequent. Now the emphasis has passed from the development phase to one of consolidation and wide acceptance, and there is a need to evaluate the quality of life of patients who have undergone valve replacement and learn more of the value of this type of surgery in terms of return to work, use of leisure time and dependence upon other people. Although a number of clinical and hemodynamic studies of various prosthetic valves have been undertaken, comparatively few reports have focused on the employment status of patients with prosthetic valves.

This study was designed to investigate the long-term results of heart valve replacement with special emphasis on changes in

the patients' activities, working status and way of life before and after the operation.

Materials and Methods

One hundred patients randomly selected from 367 patients who underwent heart valve replacement (261 mitral valve replacement, 84 aortic valve replacement, 22 combined valve replacement) at Okayama University Hospital between January 1977 and December 1985 participated in this study. There were 50 men and 50 women in this series and the age distribution varied from 15 to 65 years (mean, 43 years) as indicated in Table 1. There were 53 patients having undergone mitral valve replacement (MVR), 40 patients having undergone aortic valve replacement (AVR) and 7 patients having undergone combined mitral and aortic valve replacement (MVR+AVR). No patients had coronary artery disease. The patients were followed up at the hospital outpatient department.

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The patients were questioned with regard to symptoms, need for rehabilitation, use of medication, functional capacity (according to the New York Heart Association classification) and employ-

Table 1 Clinical characteristics of 100 patients

	MVR (n=53)	AVR (n=40)	MVR+AVR (n=7)
Age (mean)	21-59 (42.9±5.2)	15-62 (43.3±6.4)	30-65 (45.3±6.2)
Sex			
Male	21	26	3
Female	32	14	4
Rhythm			
Sinus rhythm	12	34	0
Af	41	6	7
Number of times of cardiac surgery			
One	37	40	4
Two	14	0	3
Three	2	0	0
Associated lesion			
TR	13	0	4
MS	0	11	0
Kind of valve prosthesis			
Björk-Shiley	45	3	8
St. Jude Medical	4	0	1
Hancock	2	0	0
Ionescu-Shiley	1	0	0
Carpentier- Edwards	1	0	0
Starr-Edwards	0	2	0
Lillehei-Kaster	0	10	2
Omniscience	0	25	3
Mean follow-up period (months)	56	59	56

Abbreviations: MVR, mitral valve replacement; AVR, aortic valve replacement; Af, atrial fibrillation; TR, tricuspid regurgitation; MS, mitral stenosis.

Table 2 Employment status before and after heart valve replacement

Occupation	MVR (n=53)		AVR (n=40)		MVR+AVR (n=7)	
	Preop	Postop	Preop	Postop	Preop	Postop
Light job	20	22	17	14	1	2
Heavy job	16	5	11	10	2	0
Skilled work	8	5	6	6	1	1
Housework	9	18	3	4	3	3
Study	0	0	3	1	0	0
Unemployed	0	3	0	5	0	1

Abbreviations: Preop, preoperative; Postop, postoperative; for others, see footnotes to Table 1.

ment status before and after the operation. Most of the questions elicited a simple yes-no response, which could be answered easily by the respondents. Clinical findings were used to assess the patients' employability in their ordinary work. Because multiple occupations were involved, six occupational categories were used in this evaluation: heavy physical laborer, light physical laborer, trained or skilled worker, housewife, student and unemployed person (Table 2).

Results

MVR group. The average age at the time of surgery was 43 years (range, 21-59 years). The average follow-up period was 56 months (range, 36-42 months). The kinds of valve lesion were mitral stenosis (MS) in 20 patients, mitral stenoin insufficiency (MSR) in 15 patients and mitral insufficiency (MR) in eight patients. Thirteen of the 53 patients had tricuspid insufficiency and mitral valve disease. The prosthetic valves implanted were Björk-Shiley valve in 45 patients, St. Jude Medical valve in four patients, Hancock valve in two patients, Ionescu-Shiley valve in one patient (Table 1). The preoperative functional status was NYHA class II in 27 patients, class III in 13 patients and class IV in 13 patients. The postoperative functional status was NYHA class I in 46 patients and class II in 7 patients (Table 3). Atrial fibrillation was present in 41 patients, and 12 patients were in sinus rhythm. The

number of operations was one in 37 patients, two in 14 patients and three in two patients (Table 1).

Concerning the employment status before the operation, 20 patients worked at light physical labor, 16 patients at heavy physical labor and eight at skilled employment as shown in Table 2. Nine patients were housewives. After the operation, 22 patients worked at light physical work and five at heavy physical work. Five patients were in skilled work. Eighteen patients were housewives and three retired from their preoperative jobs. Twenty-one patients resumed their previous jobs after surgery, and six changed their jobs from a heavy one to a light one. Three patients were transferred to a lighter job at the same working place. Twelve patients retired from work. Two gained new employment after the operation. Thus, 32 patients (60%) returned to work after MVR. Of the seven patients who did not work more than one year before the operation, only two patients resumed work 2 years following MVR. In contrast, all 30 patients who were working until admission to the hospital, return to work within two months of their discharge from the hospital. According to the NYHA classification, out of 27 patients who were in class I or II before the operation, 25 patients (92%) resumed the same work and two patients (8%) remained unemployed, while among 26 patients who were in class III or IV, 16 patients (61%) returned to work, and 10

Table 3 Functional class before and after heart valve replacement

NYHA classification	MVR (n=53)		AVR (n=40)		MVR+AVR (n=7)	
	Preop	Postop	Preop	Postop	Preop	Postop
I	0	46	0	40	0	4
II	27	7	28	0	1	3
III	13	0	9	0	3	0
IV	13	0	3	0	3	0

Abbreviations: NYHA, New York Heart Association classification; for others, see footnotes to Tables 1 and 2.

(39%) retired.

AVR group. The average age was 43 years (range, 15-62 years). The average follow-up period was 59 months (range, 30-110 months). The kinds of valve lesion were aortic insufficiency (AR) in 21 patients, aortic steno-insufficiency (ASR) in 13 patients and aortic stenosis (AS) in six patients. The cardiac valve prostheses implanted were Omniscience valve in 25 patients, Lillehei-Kaster valve in 10 patients, Björk-Shiley valve in three patients and Starr-Edwards valve in two patients.

Preoperatively, 28 patients were in NYHA class II, nine were in class III and three were in class IV. After the operation, all patients improved to class I (Table 3). Thirty-four patients (90%) showed sinus rhythm, and only six patients had atrial fibrillation. All AVR patients in this series underwent only one operation (Table 1).

Regarding the preoperative employment status, 17 patients had a light job, 11 a heavy job, six a skilled job, and three were housewives and three were students. After the operation, 27 patients returned to the same jobs, three patients changed the previous jobs to light work and nine patients retired. One patient was newly employed (Table 2). Out of 28 patients whose functional class was I or II, 24 patients (85%) returned to work and four retired. In contrast, seven of 12 patients whose functional class was III or IV, returned to work, but five patients retired. Three of five patients who were unemployed for a period exceeding one year before surgery did not return to work after the operation.

Combined mitral and aortic valve replacement. The average age was 45 years (range, 30-65 years). The average follow-up period was 56 months (range, 32-96 months). The valve lesions were MS+ASR in five patients and MR+AR in two patients. Four out of seven patients had tricuspid regur-

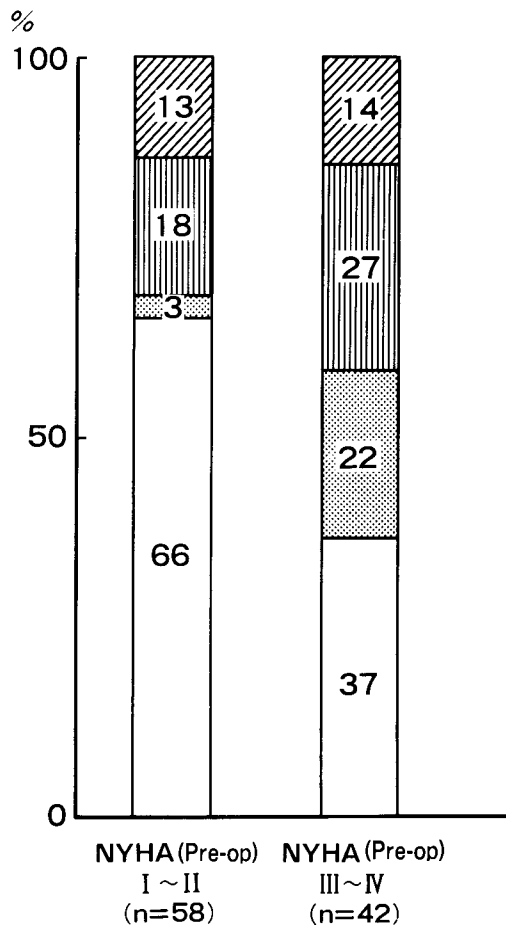


Fig. 1 Relation between preoperative NYHA classification and postoperative working status. Sixty-six percent of the patients who were in class I or II resumed full-time jobs, compared to 37% of those who were in class III or IV. □, Full-time employment; ▨, part-time employment; ▨, retired; ▨, housewife.

Table 4 Working status after heart valve replacement

Resumed work at previous job	61
Transferred to light job	5
Resumed work at different job	9
Newly employed	3
Retired	22
Total	100

gitation as well. The prostheses used for MVR were Björk-Shiley valve in six patients and St. Jude Medical valve in one

patient. The prostheses used for AVR were Omniscience valve in three patients, Lillehei-Kaster valve in two patients and Björk-Shiley valve in two patients. Before the operation, three patients were in functional class IV, three in class III and one in class II. After the operation, four patients recovered to class I and three patients recovered to class II. All patients showed atrial fibrillation. The number of times cardiac surgery was performed was one in four patients and two in three patients. Preoperatively, two patients were working at a heavy job, one patient at a light job and one at skilled work. After the operation, among the two patients who were in a heavy job before the operation, one changed his job to a light job and the other retired.

Working status of all patients. Among

the 100 patients, 61 patients resumed their previous jobs, five were transferred to light jobs in the same working place, nine resumed different full-time employment, three were newly employed and 22 retired after heart valve replacement (Table 4).

Among 58 patients who were in NYHA class I or II before the operation, 38 patients (68%) resumed a full-time job, two (3%) returned to a part-time job, and 11 (18%) retired after the operation. In contrast, among 42 patients who were in class III or IV before the operation, 16 patients (37%) resumed a full-time job, nine (22%) worked at a part-time job, and 11 (27%) retired after the operation (Fig. 1). Regarding the female employment, preoperatively, 16 patients (32%) were housewives, 25 (50%) had a full-time job and nine (18%) had a part-time job. After the operation, 25 patients (50%) were housewives, 19 (38%) resumed full-time work and six (12%) resumed part-time work (Table 5).

Concerning the age at the time of the operation, 22 patients who retired after the operation were all beyond 40 years of age. On the contrary, 28 patients who were younger than 41 years of age, resumed a full-time job or undertook houseworking well (Fig. 2).

Table 5 Female employment before and after heart valve replacement

	Preop ^a (n=50)	Postop ^a (n=50)
Housewife	16 (32%)	25 (50%)
Full-time worker	25 (50%)	19 (38%)
Part-time worker	9 (18%)	6 (12%)

a: See footnotes to Table 2.

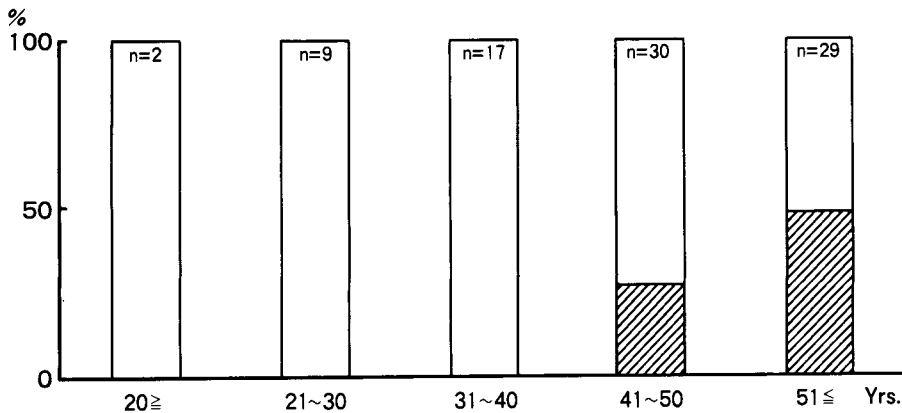


Fig. 2 Relation between age at the time of the operation and rate of employment. Advancing age is a major reason why an individual does not return to work following heart valve replacement. □, Employment rate; ▨, unemployment rate.

Discussion

Despite the rapid advances in valvular surgery during the past decades that have been accompanied with increased therapeutic effectiveness and reduced mortality, only a few studies in the medical and rehabilitation literature document the employment status after heart valve replacement. This study aimed to obtain information on a relatively neglected aspect of heart valve replacement, namely, the postoperative quality of life of the patients with valve prostheses. The main emphasis of the present survey was therefore on studying clinical findings and aspects of returning to work after heart valve replacement.

Compared to the patients having undergone MVR or double valve replacement (DVR), the AVR patients showed a more favorable outcome in terms of both the rate of re-employment and their daily activities. The AVR patients were generally more capable of vigorous exercise than those having undergone MVR or DVR.

There were several reasons for the difference in the employment status between the AVR patients and the MVR and DVR patients. Firstly, there was a higher percentage of symptomatically disabled patients (NYHA III or IV) in the MVR and DVR group than in the AVR group. Secondly, 34 patients (85%) of the AVR group showed sinus rhythm, while only 23% of the MVR patients, and none of the DVR patients, showed sinus rhythm. Thirdly, 30% of the MVR patients and 43% of the DVR patients underwent cardiac surgery more than twice, while all of the AVR patients underwent only one operation. Landry (1) reported that patients with AVR who were in functional class I could adapt to a physical exercise program without significantly adverse effects. Landry (1) emphasized that an early physical readaptation program may favorably affect

the health, quality of life and morale of patients with prosthetic valves.

From our results, the kinds of the cardiac valve prostheses implanted did not influence the working status. There were six patients who had thromboembolic episodes, but they recovered completely without any residual symptoms. The overall postoperative rate of reemployment of the patients examined in this series was 78%. Previous studies of the rate of return to work following valve replacement surgery have given varying results. Starr's study (2) on the employment status of a large number of patients after mitral valve replacement revealed that 58% were employed full-time at their previous jobs. Nitter-Hauge (3) reported an overall reemployment rate of 44% after aortic or mitral valve replacement. In the present study, 61% of the patients resumed their usual occupation and 14% of the patients resumed different full-time employment. Three percent of the patients were newly employed after the operation, although they were unable to work before the operation because of their physical symptoms.

Our study indicated that the patient's opinion of the extent of his physical handicap is of some importance when vocational rehabilitation is discussed. Twenty-two percent of the patient who were working until the operation remained unemployed after the operation. The reasons why they were unemployed after the operation were not connected to the valve replacement itself, but to the personal situation. In some patients, fear of exercise and a self-imposed limitation became the major reason for limited activity after discharge from hospital. Therefore, cardiac rehabilitation should no longer be confined to exercise alone; equal emphasis should be placed on psychological aspects of patient recovery.

The most important factor for predicting the possibility of return to work was found

to be the duration of sick leave before the operation; that is, return to work after a long period of sick leave before the operation was quite unusual. This result corresponds well with the results of previous studies (3, 4). This finding may be interpreted as an indication that rather advanced cardiac disease necessitates sick leave, or that sick leave has untoward effects on the attitudes of the patient (5). As indicated by Blachly (4), there is an apparent tendency for patients who have worked until hospitalization to have a rapid return to work and to have a favorable functional status.

Criteria for the optimal timing of surgical intervention in patients with valvular disease are still controversial. There has been a general concept that surgery should not be performed until the patient becomes symptomatic and left ventricular function begins to deteriorate. However, from the point of view of return to work after heart valve replacement, it seems important to operate on patients at an early stage of the disease before sick leave becomes necessary. This idea is supported by the findings that the rate of reemployment is less frequent in patients belonging to NYHA class III or IV than in the patients in class I or II. A higher rate of return to work was found in patients in preoperative NYHA class I or II.

Concerning the female employment, preoperatively, 34 (68%) of the 50 women had full-time or part-time jobs. After the operation, 25 (50%) of the 50 women resumed the same jobs, and the number of housewives increased from 16 (32%) to 25 (50%) after heart valve replacement. Before the operation, 10 (20%) required help with housework, but postoperatively none needed assistance. The results of the present study show that the postoperative improvement in the ability of women to undertake their jobs as well as to run their homes is quite ap-

parent.

Age was significantly related to the return to work in both AVR and MVR patients. All of the unemployed patients after the operation were over 45 years of age. On the contrary, all of the patients younger than 40 years of age successfully returned to work.

Regarding the prosthetic valve sound, the number of the patients who were disturbed by the unfamiliar valve sound was unexpectedly low. The majority of the patients in this series answered that they became accustomed to the mechanical sound within six months of the operation. One of the most important problems encountered in rehabilitation of patients with heart valve prosthesis is the psychological reaction. Twenty-one patients showed much concern over the durability of the prosthetic valve implanted. This concern stemmed partly from the physicians' preoperative explanation of the rehabilitation status, employment status and the durability of the valve prosthesis.

Before the operation, there was an increase in more sedentary work as a result of physical disability as well as the psychological status. During the postoperative period, however, there was an improvement in daily activities, including more energetic pursuits such as playing golf and tennis. The present study indicates that heart valve replacement should be performed at an early stage of the disease, since the majority of the patients having heart valve replacement show overall improvement in the quality of life.

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