

# 승모판막 치환술 후 뒤늦게 나타나는 기능성 삼첨판 폐쇄부전의 빈도 및 예측인자

1, 2, 3 가

## Incidence and Predictors of Late Secondary Tricuspid Regurgitation after Mitral Valve Replacement

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**Background** : Severe tricuspid regurgitation (TR) may develop later after mitral valve replacement (MVR) in the absence of prosthetic mitral valve (MV) dysfunction and other causes of left heart failure. The aim of this study was to investigate the incidence and predictors of severe TR late after MVR for rheumatic MV disease. **Methods** : From 309 patients who underwent MVR between 1995 and 1997 at Yonsei Cardiovascular Hospital, we selected 193 patients (M : F=52 : 141 ; mean age 48.5 ±11.3) who underwent MVR for rheumatic valvular disease [concomitant TAP (Tricuspid annuloplasty) group : 56, No TAP group : 137]. The mean follow up duration was 83.2 ±26.4 months. Primary end point was time to clinical events, such as death, reoperation for tricuspid valve, admission due to right heart failure and the development of severe TR without left side heart failure. Patients were classified into 3 groups based on the degree of TR at the time of MVR : Group I ; patients with coexisting mild TR (Grade 0, trivial), Group II; mild to moderate TR (Grade I-II), Group III ; severe TR (Grade III-IV). **Results** : Twenty-one patients (10.9%) developed clinical events [Group I : 2/78 (2.6%), Group II : 8/76 (10.5%), Group III : 11/39 (28.2%)]. Event free survival rate was different during the follow-up period between groups. By Cox regression analysis, initial severe TR (Hazard Ratio : 5.2, 95%CI 2.2 -12.3), old age (Hazard Ratio : 4.3, 95%CI 1.4 -12.8), and TAP (Hazard Ratio : 4.3, 95%CI 1.8 -10.5) were the risk factors for the development of late severe TR. **Conclusion** : The incidence of severe TR or right heart failure in the absence of prosthetic MV dysfunction was 10.9% in MVR patients. Despite of successful TAP, the severity of TR at the time of MVR was the most important factor for prediction of late severe TR. It can be suggested that initial TR grade and RV function rather than TAP, is the important factor for the recurrence of severe TR after MV surgery.

**KEY WORDS** : Tricuspid regurgitation · Right ventricle · Rheumatic valve disease · Mitral valve replacement · Echocardiography.

### 서 론

1)

80~90%

2-10)

2005 9 2  
2005 9 25  
120 - 752 134 8)9)

(02) 2228 - 8460 · (02) 393 - 2041  
E - mail : sycho@yumc.yonsei.ac.kr

가

<sup>11)</sup>

가

35%

<sup>8)12)13)</sup>

Group I (TR Grade 0, trivial),

가 Group II (TR

Grade I - II),

가

Group III (TR Grade III - IV)

<sup>14)</sup>

심초음파

(two - dimensional),

(pulsed - wave, continuous - wave)

(color Doppler imaging)

parasternal right ventricular inflow,

parasternal short - axis, apical 4 - chamber

가

Miyatake

가

<sup>15)</sup>

doming

가

### 대상 및 방법

가

연구대상 및 연구방법

1995 1997

가

309

가

3

193 ( : 52 : 141 ;

: 48.5 ± 임상경과

11.3 )

(

),

통계 분석

±  
SPSS(Statistical Package for Social Science, SPSS Inc, Chicago, IL, USA) for windows, version 11.0  
one - way ANOVA test

Cox proportional hazards multivariate model  
Kaplan - Meier  
Log rank test p 0.05  
가

결 과

**Table 1.** Baseline clinical characteristics of 193 patients

Age (years)	48.5 ± 11.3
Gender	
Male	52 (26.9%)
Female	141 (73.1%)
Predominant lesion	
Stenosis	131 (67.9%)
Regurgitation	34 (17.6%)
Combined	28 (14.5%)
NYHA classification	
I-II	57 ( 6.7%)
III	130 (67.4%)
IV	6 ( 3.1%)
PMV or OMC Hx	40 (20.7%)
PMV	30 (15.5%)
OMC	10 ( 5.2%)
Pre op TR grade	
0, trivial	78 (40.4%)
I	43 (22.3%)
II	33 (17.1%)
III	27 (14.0%)
IV	12 ( 6.2%)
LV ejection fraction (%)	59.4 ± 10.0
<50%	25 (13%)
≥50%	168 (87%)
RV pressure (mmHg)	48.5 ± 24.5
Underwent TAP	56 (29.0%)

PMV : percutaneous mitral valvotomy, OMC : open mitral commissurotomy, TAP : tricuspid annuloplasty

임상적 특징  
309  
11  
3.6% . 193  
26.4 (3~114 ).  
131 34  
28  
가  
40  
(Table 1).  
Group I 78 , Group II  
가 Group III  
가 (Table 2). Group  
III  
. NYHA  
임상 경과  
193  
21  
(10.8%), 21 20

**Table 2.** Clinical characteristics among groups

	Group I (n=78)	Group II (n=76)	Group III (n=39)	P-value
Age	46.2 ± 11.2	48.9 ± 11.3	52.3 ± 8.9	0.019
Sex (M : F)	23 : 55	21 : 55	8 : 31	NS
F/U duration (month)	84.9 ± 25.4	84.0 ± 25.7	79.7 ± 29.5	NS
Predominant lesion MS : MR : combined	54 : 14 : 10	53 : 13 : 10	24 : 7 : 8	NS
NYHA class III	46 (59.0%)	55 (72.4%)	29 (74.4%)	NS
NYHA class IV	0 ( 0%)	1 ( 1.3%)	5 (12.8%)	NS
LVEF (%)	61.0 ± 8.7	58.8 ± 11.2	57.4 ± 9.9	NS
RVSP (mmHg)	37.2 ± 19.0	56.1 ± 25.7	54.1 ± 24.4	0.004
Underwent TAP	1 ( 1.3%)	19 (25.0%)	36 (92.3%)	<0.001
PMV or OMC Hx	13 (16.7%)	13 (17.1%)	14 (35.9%)	NS

NS : no significance, MS : mitral stenosis, MR : mitral regurgitation, LVEF : LV ejection fraction, RVSP : RV systolic pressure, TAP : Tricuspid annuloplasty, PMV : percutaneous mitral valvotomy, OMC : open mitral commissurotomy

(61.7%)  
119  
72.1 ± 24.2

(Fig. 2, p=0.004)

Cox regression  
50 가  
I 2 (2.6%) III 11 (28.2%)  
8 , 3 , 2  
23 27

(Table 3).

(Fig. 1, p<0.001).

삼첨판 폐쇄 부전 및 우심실 기능부전의 발생의 빈도 및 예측인자

8 (Event free survival) 86.3%  
20 (10.3%)

11 (19.6%) 가

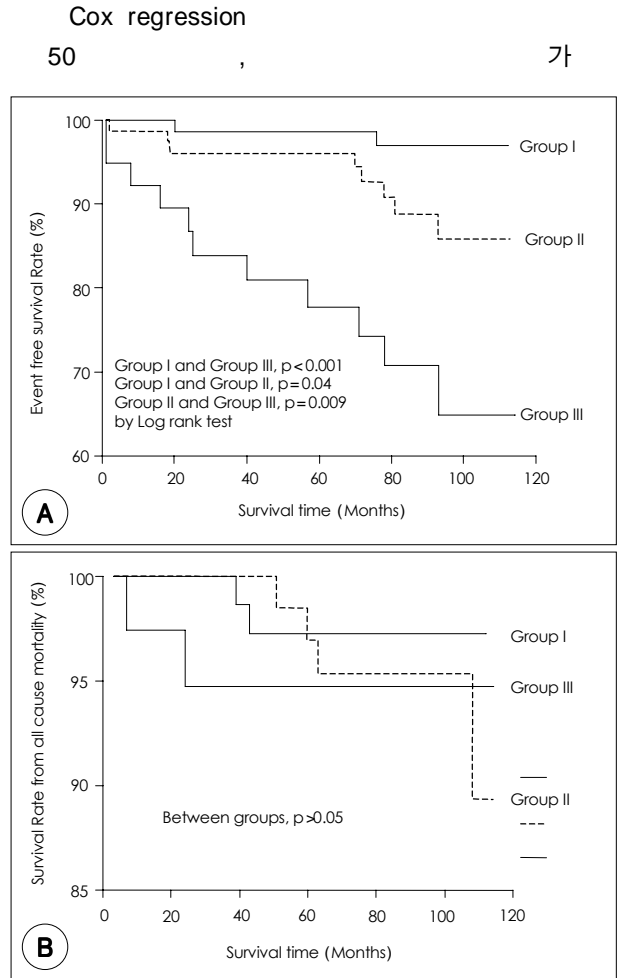
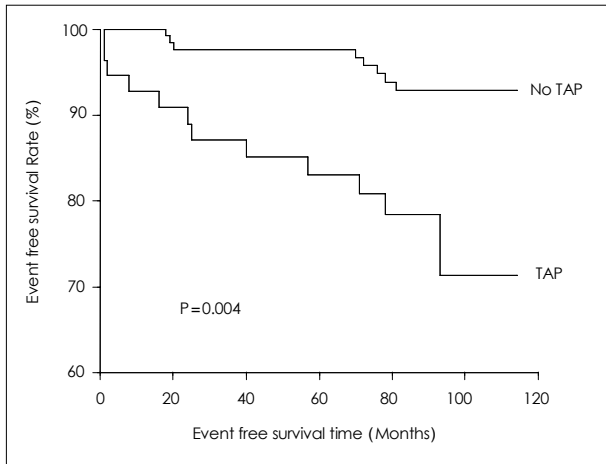


Fig. 1. Kaplan-Meier survival curves for clinical outcomes (A) and survival (B) among groups.

Table 3. Clinical events and late mortality between groups

	Group I (n=78)	Group II (n=76)	Group III (n=39)
Clinical event	2 (2.6%)	8 (10.5%)	11 (28.2%)
Severe TR (with Rt heart failure)	2 (1)	8 ( 1)	10 ( 2)
Tricuspid valve operation	0	0	1
Mortality	2 (2.6%)	4 ( 5.2%)	2 ( 5.2%)
Rt heart failure	0	1	1
Lt valve failure	0	1	0
Non-cardiac cause	2	2	1



**Fig. 2.** Event free survival curves between TAP and No TAP patients. TAP : tricuspid valve annuloplasty.

**Table 4.** Predictors of late severe TR or Rt heart failure in MVR patients

	Hazard Ratio	95.0% CI	p-value
Age (>50)	4.30	1.45 - 12.79	0.003
NYHA class (>III)	2.78	0.82 - 9.45	0.066
Decreased LVEF (<50%)	2.18	0.80 - 5.96	0.129
Initial RVSP (>40 mmHg)	2.36	0.82 - 6.81	0.098
Initial severe TR	5.22	2.22 - 12.31	<0.001
PMV history	0.94	0.32 - 2.80	0.913
Underwent TAP	4.34	1.80 - 10.47	0.001

LVEF : LV ejection fraction, RVSP : RV systolic pressure, PMV : percutaneous mitral valvotomy, TAP : tricuspid annuloplasty

중증의 삼첨판막 폐쇄 부전이 나타나는 빈도와 예측 인자

10.8%

9)

2.6%

16)

가 가

(Table 4).

가

가

고 찰

11)

기능성 삼첨판 폐쇄부전의 기전  
King

11)

8) ,  
 (chordae)  
 (leaflet)  
 가 18)19)  
 가 18-20)  
 가 (tenting) 가  
 가 가 21)  
 가 17) 가 가  
 (remodeling) 가  
 (chordae) 가 가

기능성 삼첨판막 폐쇄 부전증을 설명하는 다른 기전

가 , Henein 가  
 가 22)  
 가 가

우심실 기능부전과 동반된 기능성 삼첨판 폐쇄부전의 치료 11)  
 commissural fusion

요 약

연구 목적 :

가

가

가

대상 및 방법 :

1995 1997

193 ( : 52 :

141 ; : 48.5±11.3 )

임상 적용

가

결 과 :

193 21 [Mild TR group 2/78(2.6%), moderate TR group 8/76(10.5%), severe TR group 11/39(28.2%)].

가

연구의 제한점

. 8 (Event free survival)

86.3%

11 (19.6%) 가

9 (6.6%)

50

가

가

가 가

가

결 론 :

중심 단어 :

2002  
( : 6 -2002 -0063).

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