

경피적 승모판 교련술의 초기 및 장기 결과*

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= Abstract =

Immediate and Late Outcomes after Percutaneous Mitral Commissurotomy*

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Background : Percutaneous mitral commissurotomy (PMC) has been known as an effective therapeutic modality for moderate to severe mitral stenosis. However, long-term results and factors influencing late outcome after PMC remain to be elucidated.

Materials and Methods : Three hundred and forty-six patients received PMC at Seoul National University Hospital between August, 1988 and March, 1996. We evaluated long-term results of these patients and assessed demographic, clinical, echocardiographic and hemodynamic variables in order to identify predictors of immediate and late outcomes.

Results : PMC was completed without major complication or technical failure in 339 (98%) out of 346 cases. A good immediate result was obtained in 67% of cases. Multivariate study identified echocardiographic score ($P = 0.004$) and left atrial volume ($P = 0.009$) as independent predictors of immediate outcome. The estimated 3-year and 5-year event-free survival rates were $95.8 \pm 2.5\%$ and $90.6 \pm 4.3\%$, respectively. According to multivariate analysis, the independent predictors of late outcome were pre-PMC left atrial volume ($P = 0.03$), post-PMC mitral valve area ($P = 0.01$), and severity of mitral regurgitation after PMC ($P = 0.03$).

Conclusion : Percutaneous mitral commissurotomy as a treatment for patients with mitral stenosis is safe, and achieves good long-term results. Pre-procedural echocardiographic score, left atrial volume, post-procedural mitral valve area, and severity of mitral regurgitation affect the immediate and late outcomes after PMC.

KEY WORDS : Mitral stenosis · Percutaneous mitral commissurotomy.

서 론

missurotomy, PMC)

(Percutaneous Mitral Com -

PMC

1996

1-3), PMC, 가 . Doppler color flow map .

가 4-7), 6,7) 24

3) PMC 성적의 평가

(1) PMC 1.5cm² , PMC 25% 가 ,

major event - free survival rate

PMC , event - free survival rate

(2) PMC 3 , 50%

연구대상 및 방법

1. 환자군

1988 8 1996 3

PMC 3 346 , PMC ,

가 69 , 가 277

1 : 4 39 ± 11 (: 17 71) . 가 가 239 . 38 ± 26 (: (69%), 가 107 (31%) . 7 96) .

2. 방 법

4) 통계 분석

1) 경피적 승모판 교련술

± , PMC paired t - test . PMC , t - test

/ (EBDA/BSA) 3.5 4.0

가 PMC (3 Inoue Swan - Ganz

). PMC , Gorlin

가 .

2) 심초음파도 검사

PMC 1 , 1 3 , 3, 6, 12

12 , lo -

logistic event - free survival rate subgroup event - free survival rate Kaplan - Meier , log - rank test event가

gistic event / (EBDA/BSA) 가
(Table 2).
(P=0.009) (P=0.004)가 PMC

결 과

1. PMC의 초기 결과

346 339 (98%)
가 PMC . PMC
18.0±7.3mmHg 5.5±3.0mmHg
24.0±8.1mmHg 11.7
±5.1mmHg , 34.7±14.3mmHg
22.5±9.4mmHg .
0.9±0.2cm²
1.7±0.4cm² 가 (Table 1).

2. 성공적 PMC의 예견 인자

339 PMC
223 (67%) . PMC가
, , ,
, (4
)
PMC
,
, , ,
가 ,
PMC 가 .

Table 1. Echocardiographic mitral valve area and hemodynamic parameters before and after PMC

		Before	After
MV area(cm ²)	2-D	0.9± 0.2	1.7±0.4
	Gorlin	1.0± 0.3	2.3±0.9
MV gradient(mmHg)		18.0± 7.3	5.5±3.0
LAP(mmHg)		24.0± 8.1	11.7±5.1
PAP(mmHg)		34.7±14.3	22.5±9.4
C.O. (liter/min)		4.7± 1.3	5.0±1.2
LVEDP(mmHg)		7.4± 3.8	9.4±4.8

p<0.001 each

2-D denotes mitral valve area measured by 2-D echocardiography, Gorlin ; mitral valve area measured by Gorlin formula, LAP ; mean left atrial pressure, PAP ; mean pulmonary artery pressure, C.O ; cardiac output, LVEDP ; left ventricular end-diastolic pressure

3. 재협착의 예견인자

PMC 3
184 (83%) 30%(55)
(P=0.02) Gorlin
(P=0.04)
4. 임상적 경과 관찰
339 PMC 5
334 38±26
2 , 1 . 1
65

PMC , PMC
7 , 1 40
PMC PMC
48
PMC 가 5
3 PMC
20±14 (: 12 24)
2 12 48
PMC
17 . 7

PMC
50±24 (: 12 72)
1 PMC
가 5 가
2
38±23 (: 12 72)
5 PMC

Table 2. Predictive factors for the immediate outcome after PMC

Variables		Success(n=223)	Suboptimal(n=108)	P-value
Age(years)		38 ± 10	41 ± 11	0.01
Female(%)		79.8	78.3	NS
Af(%)		22.7	43.4	0.0002
LA volume(ml)		83.5 ± 39.0	114.3 ± 71.0	0.0001
Echo score	Mobility	1.55 ± 0.58	1.89 ± 0.59	0.02
	Thickening	1.81 ± 0.59	2.01 ± 0.57	NS
	Calcification	1.57 ± 0.74	1.91 ± 0.81	0.05
	Subvalvular thickening	1.89 ± 0.59	2.01 ± 0.82	NS
	Total	6.70 ± 1.91	7.79 ± 2.05	0.0002
MV area(cm ²)	2-D	0.94 ± 0.20	0.87 ± 0.28	0.02
	Gorlin	1.05 ± 0.32	0.94 ± 0.32	0.004
MV gradient(mmHg)		18.5 ± 7.4	17.6 ± 7.2	NS
LAP(mmHg)		24.2 ± 8.1	23.8 ± 8.0	NS
PAP(mmHg)		38.1 ± 20.1	37.7 ± 18.7	NS
C.O. (liter/min)		4.8 ± 1.4	4.4 ± 1.4	0.007
LVEDP(mmHg)		7.1 ± 3.7	7.4 ± 3.4	NS
EBDA/BSA		3.85 ± 0.34	3.84 ± 0.33	NS

Af denotes atrial fibrillation, LA volume : left atrial volume, Echo score : echocardiographic score, EBDA/BSA : effective balloon dilating area/body surface area

Table 3. Event-free survival rates(%±S.D) stratified by factors

Variables			No. of patients	No. of events	Predicted event-free survival		P-value*
					3YR	5YR	
Base-line variables	Age(years)	40	186	11	96.7 ± 3.3	92.6 ± 5.7	NS
		> 40	148	14	92.0 ± 4.9	87.8 ± 6.5	
	Sex	Male	68	8	94.8 ± 5.9	89.8 ± 8.6	NS
		Female	266	17	94.5 ± 3.4	90.6 ± 4.9	
	Rhythm	Sinus	230	11	96.2 ± 2.9	93.0 ± 4.7	0.001
		Af	104	14	90.9 ± 6.1	84.7 ± 8.8	
	Atrial volume(ml)	100	207	7	97.8 ± 2.5	92.8 ± 5.5	0.001
		> 100	93	14	89.2 ± 6.7	85.1 ± 8.4	
	Echo score	8	223	12	95.9 ± 2.9	92.5 ± 4.9	0.01
		> 8	56	9	88.0 ± 9.2	79.2 ± 12.5	
	MV area(cm ²)	0.75	245	12	97.2 ± 2.5	93.0 ± 4.7	0.01
		<0.75	80	11	88.3 ± 4.7	84.1 ± 9.2	
Postprocedure variables	Gorlin	0.75	260	16	94.8 ± 3.1	92.2 ± 4.3	NS
		<0.75	71	9	93.3 ± 6.3	84.7 ± 11.3	
	MV area(cm ²)	1.5	210	11	95.8 ± 3.1	92.8 ± 4.5	NS
		<1.5	97	9	96.0 ± 4.5	88.7 ± 9.2	
	Gorlin	2.0	1778	8	97.1 ± 2.9	95.3 ± 4.5	0.02
		<2.0	152	17	91.5 ± 5.1	84.5 ± 7.6	
	Mitral regurgitation	<Moderate	315	18	96.8 ± 2.2	93.0 ± 4.0	<0.0001
		moderate	19	7	63.4 ± 23.7	55.5 ± 25.4	

The numbers of patients do not total 334 for all variables because complete echocardiographic and hemodynamic data were not available for all patients

*For the predictive variable, according to the log-rank statistics

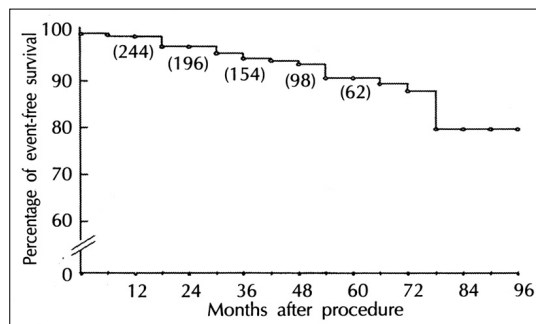


Fig. 1. Estimated event-free survival rates from life-table analysis. Numbers in parentheses represent patients alive and unsensored at the end of each of the 5 years.

PMC 33 ± 28 ()
 : 2 72)
 334 3-year event-free survival rate
 95.8 ± 2.5% 5-year event-free survival rate
 90.6 ± 4.3% (Fig. 1).

5. 예 후 인 자

event-free survival rate Table
 3 . Logistic PMC
 , , PMC
 , PMC
 , PMC
 , PMC
 EBDA/BSA (Table
 4, 5). PMC
 (P=0.03), Gorlin
 (P=0.01)
 PMC

고 안

1. PMC 성적의 평가

PMC
 Gorlin , Doppler

Table 4. Predictive factors for the late outcome after PMC (Base-line variables)

Variables	Event(-) (n=309)	Event(+) (n=25)	P-value
Age(years)	39 ± 11	42 ± 12	NS
Female(%)	80.6	69.0	NS
Af(%)	29.2	56.0	0.003
LA volume(ml)	90.9 ± 47.6	138.5 ± 93.8	0.0001
Echo score	6.9 ± 1.8	8.7 ± 3.0	0.0004
MV area(cm ²)			
2-D	0.92 ± 0.23	0.83 ± 0.31	NS
Gorlin	1.02 ± 0.33	0.84 ± 0.29	0.02
MV gradient(mmHg)	17.9 ± 7.3	18.2 ± 8.5	NS
LAP(mmHg)	23.9 ± 8.2	25.3 ± 7.4	NS
PAP(mmHg)	34.4 ± 14.3	40.1 ± 16.7	NS
C.O.(liter/min)	4.7 ± 1.3	4.1 ± 1.1	0.007
LVEDP(mmHg)	7.4 ± 3.6	7.9 ± 5.4	NS

Table 5. Predictive factors for the late outcome after PMC (postprocedural variables)

Variables	Event(-) (n=309)	Event(+) (n=25)	P-value
MV area(cm ²)			
2-D	1.71 ± 0.41	1.42 ± 0.52	0.001
Gorlin	2.30 ± 0.93	1.78 ± 0.50	0.002
MR(%)			
mod(Doppler)	3.9	28.0	0.0001
3+ (LVG)	1.9	24.0	0.001
MV gradient(mmHg)	5.4 ± 3.0	6.4 ± 3.1	NS
LAP(mmHg)	11.5 ± 5.0	13.6 ± 6.2	0.005
PAP(mmHg)	21.9 ± 9.0	29.7 ± 10.5	0.0001
C.O.(mmHg)	5.1 ± 1.2	4.7 ± 1.0	NS
LVEDP(mmHg)	9.3 ± 4.7	10.7 ± 5.7	NS

MR denotes patients who developed mitral regurgitation after PMC, LVG : left ventriculography

PMC

8,9)

가

10)

PMC

10,11)

PMC

가

2. PMC 초기 결과의 예견 인자

PMC, 18, 6, 5-
 PMC, 5-
 PMC, year event - free survival rate 51%, Palacios²²⁾ PMC 327
 3 - year event free survival rate 70%, Pan²³⁾ 350
 38, 5 - year event free survival rate 85%, 26
 , EBDA/BSA PMC, 2, PMC
 가¹⁹⁾ PMC, 3, 5 event - free survival rate 96%, 91% Cohen, Palacios
 , , , 가 146, (: 39),
 가 PMC 59, 가 (45%, : 31%),
²⁰⁾ 60mm, 가 (7.7 ± 3.0, : 7.1 ± 2.0), Pa-
 PMC, lacios 327, 3
 가, 36
 ,
 PMC, PMC
 가, 가
 , PMC
 PMC, PMC
 , Hung¹⁸⁾ PMC, 가
 50%, 55mm, 가 50%, 49m
 m, 가 PMC
 , PMC
 , PMC
 PMC

3. 임상적 경과 관찰

PMC, , ma - PMC, 가, Herrmann²⁵⁾ 21
 for event - free survival rate가 PMC 6, 71%
¹⁷⁾ , Post²⁶⁾ 72, PMC
 55, , PMC, 가 PMC
 7, , ,
 PMC, Cohen 17, 6
²¹⁾ PMC 146, 36, PMC

(P=0.01)

(P=0.03) event

PMc

Padial²⁷⁾ PMc

31

요 약

연구배경 :

(PMc)

방 법

1988 8 1996 3

PMc 346

PMc

결 과

PMc

339 (: 4 , 5case) PMc

67%(223)

(P=0.004) (P=0.009) PMc

PMc 3

184 (83%) 30%(55)

(P=0.02) (P=0.04)

334 3 5 event-free survival

rate 95.8±2.5% 90.6±4.3% .

(P=0.03),

결 론

PMc

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