

성공적 경피적 승모판 풍선확장 성형술의 예측인자에 대한 연구

김영학 · 강덕현 · 송재관 · 홍명기 · 김재중 · 박성욱 · 박승정 · 송 현*

= Abstract =

The Prediction of Successful Outcome after Percutaneous Mitral Valvuloplasty

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Background : Several predictors of successful outcome after percutaneous mitral valvuloplasty (PMV) have been identified but the results were controversial. We analyze the clinical and echocardiographic predictors of successful outcome after PMV.

Methods : We studied 214 patients (167 women and 47 men) undergoing PMV from October 1991 to December 1995. Echocardiographic evaluation was performed before and after PMV.

Results : The study population had mean age of 41 ± 11 years, and the total echocardiographic score was 7.5 ± 1.5 . PMV using Inoue balloon and double balloon technique were performed in 113 cases and 101 cases respectively. The successful outcome from PMV (defined as mitral valve area 1.5cm^2 and increase in valve area $\geq 25\%$ and less than grade 3 mitral regurgitation (MR)) was achieved in 178 cases (83.2%). The mean mitral valve area was increased from $0.90 \pm 0.21\text{cm}^2$ to $1.82 \pm 0.34\text{cm}^2$ ($p < 0.01$). The successful outcome group had good echocardiographic score (7.3 ± 1.4 vs. 8.8 ± 1.4 , $p < 0.01$) and larger valve area before procedure ($0.92 \pm 0.21\text{cm}^2$ vs. $0.75 \pm 0.17\text{cm}^2$, $p < 0.01$) than suboptimal result group. The patients with total echocardiographic score ≥ 8 had more increment in valve area after PMV ($0.97 \pm 0.21\text{cm}^2$) than those with total echocardiographic score < 8 ($0.83 \pm 0.22\text{cm}^2$, $p < 0.01$). Significant MR (grade 3 MR) after PMV was developed in 10 cases (4.7%). In patients with significant MR after PMV, echocardiographic calcification score were high (2.3 ± 0.8 vs. 1.7 ± 0.7 , $p < 0.01$) and mitral valve area before PMV were smaller ($0.82 \pm 0.10\text{cm}^2$ vs. $0.90 \pm 0.22\text{cm}^2$, $p < 0.05$) than in those without significant MR.

Conclusions : The predictors of successful outcome after PMV are large mitral valve area and good echocardiographic score. The predictors of significant MR is severe calcified mitral valve and small mitral valve area before PMV.

KEY WORDS : Percutaneous mitral valvuloplasty · Predictors of successful outcome.

System 2.5MHZ transducer			
서론			
(PMV)		Wilkins ¹⁾	(echo score)
가	가	1	4
가		(mitral valve area)	planimetry
		pressure half time	
PMV		planimetry	
		pulsed doppler color	
		flow map MR jet	grade 1 4
연구 대상 및 방법		2) PMV 시술	
1. 연구 대상		Inoue	
PMV		2).	
grade		3) 자료 분석	
3		PMV	
	1991 10 1995	25%	1.5cm ² gr -
12	PMV 214	ade 3	
가 47	가 167	PMV	
19	73	가	(el -
	127 (59.3%),	astic recoil)	
(40.7%)	grade 1 2	elastic recoil property	3).
	155		
	Inoue	Elastic recoil(%) =	
	Inoue 113	[(EBDA) - PMV]	
(52.8%)	101 (47.2%)	× 100	
	가 5	PMV	
	2	20 (10.7%)	±
		SPSS/PC+	paired and unpaired stud -
		ent - t - test	2 test
		가	
2. 방 법		multiple logistic regression	
1) 심초음파 검사		. p 0.05	
1 2	1		
2 Hewlett - Packard	Ultrasound Imaging	가	

결 과

1) 시술 결과

7.5 ± 1.5 (4 ~ 12)
 0.90 ± 0.21 cm²
 1.82 ± 0.34 cm² 가 (p < 0.01)
 178 (83.2%)
 1, 2 (0.9%)

2) 성공적 시술군의 특성 (success group)

Table 1. Comparisons of clinical and echocardiographic variables

	Successful result group	Suboptimal result group
Number	178	36
Age (year)	40.5 ± 11.3	41.8 ± 11.4
Male : Female	38 : 140	9 : 27
Sinus rhythm : Af	108 : 70	19 : 17
Balloon (Inoue : Double)	95 : 83	18 : 18
BSA (cm ²)	1.58 ± 0.14	1.55 ± 0.16
EBDA/BSA (cm ² /m ²)	3.88 ± 0.34	3.82 ± 0.40
MVA before PMV (cm ²)	0.92 ± 0.21	0.75 ± 0.17**
Total echo score	7.3 ± 1.4	8.8 ± 1.4**
Leaflet thickening	2.0 ± 0.5	2.3 ± 0.6**
Leaflet mobility	1.6 ± 0.5	1.9 ± 0.5**
Calcification	1.6 ± 0.7	2.3 ± 0.8**
Subvalvular thickening	2.1 ± 0.6	2.3 ± 0.6*
Af : Atrial fibrillation		
BSA : Body surface area		
EBDA : Effective balloon dilating area		
MVA : Mitral valve area		
*p < 0.05 **p < 0.01		

Table 2. Multivariate analysis of predictors of successful outcome

	p value	r value
Total echo score	<0.01	-0.29
Leaflet thickening	NS	
Leaflet mobility	NS	
Calcification	NS	
Subvalvular thickening	NS	
MVA before PMV	<0.01	0.24
MVA : Mitral valve area		

(suboptimal group)

(Table 1)

27%가

가

(Table 2)

(r = 0.24, p < 0.01)

(r = -0.29, p < 0.01)가

가

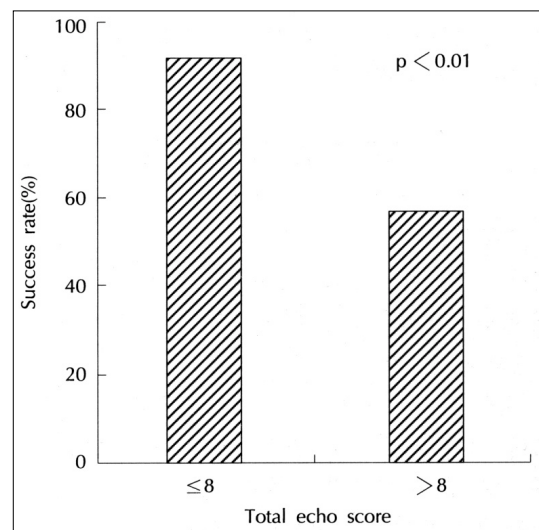


Fig. 1. Success rate of PMV according to echocardiographic score.

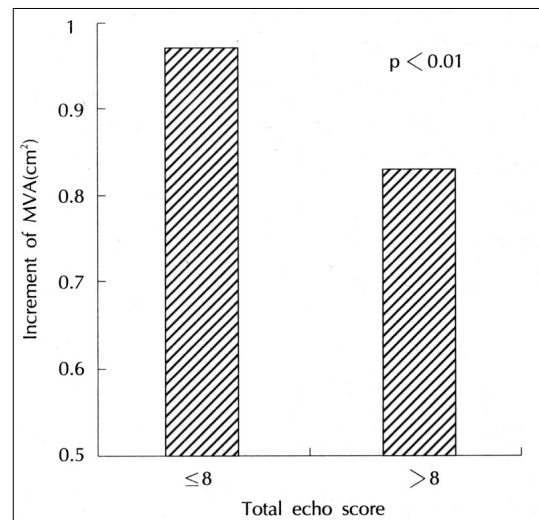


Fig. 2. Increment of MVA after PMV according to echocardiographic score MVA ; Mitral valve area.

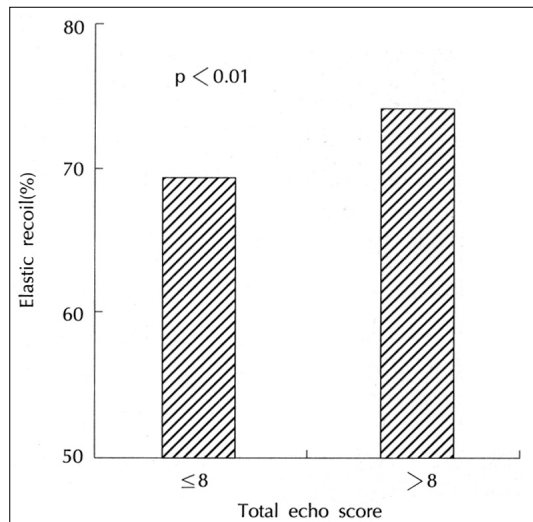


Fig. 3. The elastic recoil property according to echocardiographic score.

Table 3. Comparisons of clinical and echocardiographic variables according to significant MR after PMV

	MR grade 2	MR grade 3
Number	204	10
Age(year)	40.8±11.3	40.0±12.2
Male : Female	46 : 158	1 : 9
Sinus rhythm : Af	124 : 80	3 : 7
Balloon(Inoue : Double)	109 : 95	4 : 6
BSA(cm ²)	1.58±0.15	1.54±0.11
EBDA/BSA(cm ² /m ²)	3.87±0.36	3.80±0.27
MVA before PMV(cm ²)	0.90±0.22	0.82±0.10**
Total echo score	7.5±1.5	8.0±1.6
Leaflet thickening	2.1±0.5	2.2±0.8
Leaflet mobility	1.7±0.5	1.5±0.5
Calcification	1.7±0.7	2.3±0.8*
Subvalvular thickening	2.1±0.6	2.0±0.5

Af : Atrial fibrillation
BSA : Body surface area
EBDA : Effective balloon dilating area
MVA : Mitral valve area
*p<0.05, **p<0.01

3) 심초음파 점수에 따른 PMV결과

8 ≤8 >8 PMV
92%(149/162) 56%(29/52)
가 8
(p<0.01, Fig. 1).

8 >8
가 Fig. 2 0.97
±0.21cm² 0.83±0.22cm² 가
가 (p<0.01).

4) 심초음파 점수와 승모판 수축력(elastic recoil property)의 관계

가 8 >8 elastic recoil
Fig. 3 68.7±5.5% 73.7±5.0%
가 ela - stic recoil
(p<0.01).

5) 심한 승모판 폐쇄 부전의 발생

Grade 3 10 (21%)
grade 3 MR 7 grade 4
MR 3 . Grade 4 MR 3 2

(Table 3)

가 . ,

가 .

고 안

가 PMV
PMV 가
4)

Abascal¹⁾, Wilkins⁵⁾

, , , 4가

130 Abascal
6) 가 8 >8 PMV
(84% vs. 42%)

가 PMV
가

6,7,8,9,10). Bassand¹¹⁾ 3

가 PMV
가 가
가

22)
Inoue 23) Zaibag 24) Inoue

PMV 가

12,13) Palacios 14,15) 가 가
PMV Inoue
가 Abascal 6)
가 PMV 가
가 (r = - 3,4,15,25,26) Inoue
0.47 vs. - 0.40). Bahl 16) , , 4)
Reid 8) 가
PMV Tuzcu 27) 65 99
가 PMV 50% Sancho
28) PMV Tuzcu 27)
가 PMV (NYHA functional
class)

가 PMV
가 PMV 65
가 6
PMV
7,18,22) , 7,18) (eff -
17) Hung 7,8,29)
가 18,19,20) 가
가 PMV 가 27)
가 (co -
가 mmissural splitting), (valve leaflet)
PMV , 가
가 가 30) Reid 30)
Herrmann 21) <1.3cm² PMV 가
1.3cm² doppler
PMV 2

가 가 가

가 (leaflet tear)

가 (chordal rupture)

PMV 3 2 가 (inco -

regurgitant jet가

3) . Lattmann mplete coaptation)

elastic recoil property , Elastic Hernandez ³⁶⁾

recoil PMV ,

가 ,

가 8 >8 가

Effective balloon dilating area PMV

$6.07 \pm 0.42\text{cm}^2$ $6.03 \pm 0.46\text{cm}^2$

가 (p=0.56) Fig. 3 가 Palacios

elastic recoil 8 ³⁷⁾ PMV

가

PMV

PMV , , 4

가 1 4

가

4 10% 4

³¹⁾ grade 3

4.7% 가

가 3

PMV 28) , 28) ,

28) , 32) ,

33) , 9,33,35)

Palacios

가

요 약

(p<0.01).

PMV 가 연구배경 :

(fused commissure) 가 (PMV)

2 가

regurgitant jet 가 PMV

35,36)

방 법 :

PMV 214

결 과 :

- 1) 41 ± 11
 7.5 ± 1.5 Inoue
 113 101
- 2) 1.5cm^2
가가 25% 178 (83.2%)
 $0.90\text{cm}^2 \pm 0.21\text{cm}^2$
 $1.82\text{cm}^2 \pm 0.34\text{cm}^2$ 가
- 3) 가 (7.3 ± 1.4 vs. 8.8 ± 1.4 , $p < 0.01$)
($0.92 \pm 0.21\text{cm}^2$ vs. $0.75 \pm 0.17\text{cm}^2$).
- 4) 8 > 8 PMV
가가 ($0.97 \pm 0.21\text{cm}^2$ vs. $0.83 \pm 0.22\text{cm}^2$, $p < 0.01$).
- 5) grade 3
 10 (4.7%)
가 (2.3 ± 0.8 vs. 1.7 ± 0.7 , $p < 0.01$)
($0.82 \pm 0.10\text{cm}^2$ vs. $0.90 \pm 0.22\text{cm}^2$, $p < 0.05$).

결 론 :

PMV

가

가

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