

동율동 승모판협착증환자에서 경식도심초음파를 이용한 경피적 승모판성형술 전, 후 및 1년후 폐정맥혈류의 평가

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Transesophageal Echocardiographic Evaluation of Pulmonary Venous Flow before, after and One-year after Percutaneous Mitral Valvuloplasty in Patients with Mitral Stenosis in Sinus Rhythm

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ABSTRACT

Background : To evaluate the influence of changes in mitral valve area (MVA) and left atrial pressure on pulmonary vein flow (PVF) we analyzed PVF with transesophageal echocardiography (TEE) before, after and one-year after percutaneous mitral valvuloplasty (PMV) in patients with mitral stenosis (MS) in sinus rhythm. **Methods :** PMV was guided with TEE. Follow-up TEE was done about one year after PMV. MVA and transmitral mean gradient (TMG) were measured. Systolic velocity (S), diastolic velocity (D), atrial reversal velocity (AR), their time-velocity integral (S-TVI, D-TVI, AR-TVI) and their ratio (S/D ratio, S-TVI/D-TVI ratio) were evaluated. **Results :** The number of patients was twenty-two (F : 20). The age was 39 ± 9 years (range : 26 - 64). Follow-up duration was 16 ± 6 months (range : 7 - 28). MVA increased from 0.9 ± 0.2 cm² to 1.9 ± 0.3 cm² after PMV and decreased to 1.7 ± 0.3 cm² on follow-up TEE significantly. TMG decreased from 15.4 ± 4.3 mmHg to 5.5 ± 1.9 mmHg after PMV and was 6.2 ± 2.4 mmHg on follow-up. S increased significantly on follow-up at both pulmonary vein (PV). D increased on follow-up at left PV. S/D ratio increased on follow-up at both PV. AR increased on follow-up at both PV. S-TVI increased after PMV at left PV and increased on follow-up at both PV. D-TVI had no change. S-TVI/D-TVI ratio increased on follow-up at left PV. AR-TVI increased on follow-up at right PV. **Conclusions :** The main changes after PMV in patients with MS in sinus rhythm were increasing tendency in S, S-TVI, S/D ratio, S-TVI/D-TVI ratio and AR. And these changes were statistically significant on follow-up TEE rather than immediately after PMV. (Korean Circulation J 2000;30(2):134-140)

KEY WORDS : Pulmonary vein flow · Mitral stenosis · Percutaneous mitral valvuloplasty · Transesophageal echocardiography · Sinus rhythm.

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연구 배경

가, ¹⁾²⁾ (pressure - half time) ⁴⁾ tracing ⁵⁾ 가 1 cm sample volume , 가 (signal)가 (systolic flow, S), (diastolic flow, D) (atrial reversal flow, AR) time - velocity - integral(TVI) (S/D ratio) TVI (S - TVI/D - TVI ratio)가 , 1 가 , 3 0.5 VHS

방 법

1995 5 1997 2 Inoue ⁶⁾ 가 가 가 가 Omniplane TEE 5.0 MHz, Hewlett Packard Sonos 2500 Multiplane TEE 5.0 MHz, ATL Apogee CX 200 10% lido - 1 , 1 , 3 , 6 , 1 , 1 가 paired t - test p<0.05 가 가 220 22 가 2 , 가 20

39±9	26	64				43
16±6		7	28	± 16 cm/s	51± 15 cm/s	가
				(p=NS)	63± 17 cm/s	가
0.9±0.2 cm ²					(p=0.019).	36
1.9±0.3 cm ²	가	가(p=0.000)		± 10 cm/s,	37± 9 cm/s,	38± 11 cm/s
1.7±0.3 cm ²		(p=0.007).				S/D
15.4±4.3 mmHg		5.5	1.3 ± 0.6	1.4±0.4	가	
±1.9 mmHg	(p=0.000)	6.2±	1.8±0.6	가	(p=0.008).	
2.4 mmHg	가			22± 8 cm/s		20±
(Table 1).			6 cm/s	가	27± 7.8 cm/s	
Fig. 1	Fig. 2		가	(p=0.005).	S - TVI	7.5±3.5
			cm	8.9±3.6 cm	가	
				10.6±3.0 cm	가	

Table 1. Mitral valve area and transmitral pressure gradient

	Pre-PMV	Post-PMV		Follow-up	
MVA (cm ²)	0.9±0.2	1.9±0.3	*p=0.000	1.7±0.3	**p=0.007
TMVG (mmHg)	15.4±4.3	5.5±1.9	*p=0.000	6.2±2.4	

MVA : mitral valve area

TMVG : transmitral pressure gradient

*p<0.05 : Pre-PVM vs. Post-PMV

**p<0.05 : Post-PMV vs. Follow-up

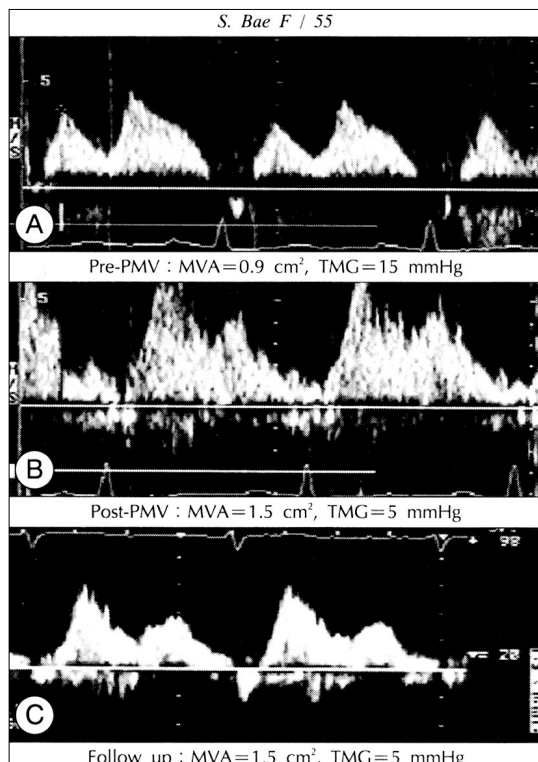


Fig. 1. Pulsed-wave Doppler flow measured at the right upper pulmonary vein.

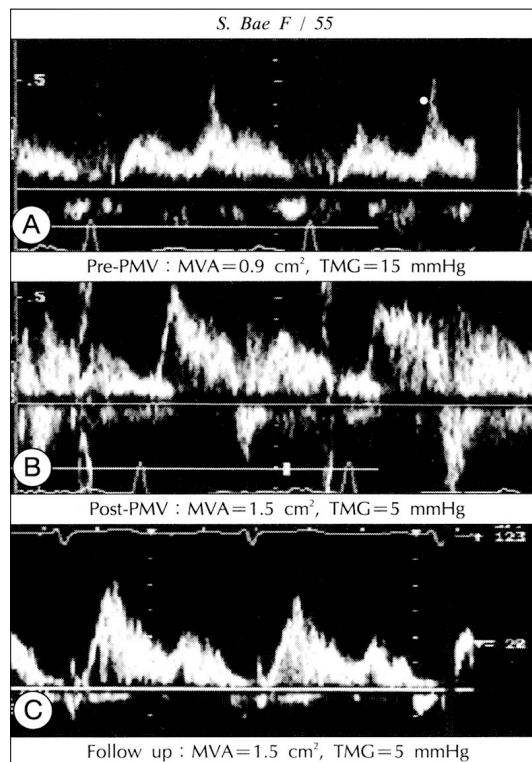


Fig. 2. Pulsed-wave Doppler flow measured at the left upper pulmonary vein.

(p=0.001) D - TVI (5.8 (p=0.004). D - TVI
 ± 1.8 cm, 6.4 ± 2.6 cm, 6.3 ± 2.6 cm ; p=NS). S - (5.8 ± 2.2 cm, 6.7 ± 3.2 cm, 6.6 ± 2.4 cm ; p=NS).
 TVI/D - TVI (1.6 ± 0.6 S - TVI/D - TVI 1.4 ± 0.7 1.6
 1.4 , 1.8 ± 1.5 , 1.9 ± 0.8 ; p=NS). AR - TVI 가 (p=0.017). AR - TVI
 1.4 ± 0.7 cm 1.4 ± 0.7 cm 가 가 (1.5 ± 0.9 cm, 1.3 ± 0.4 cm 1.6 ± 0.7
 가 1.9 ± 1.0 cm 가 (p= cm ; p=NS)(Table 3).
 0.033)(Table 2).
 42
 ± 20 cm/s 48 ± 12 cm/s 가 .
 (p=NS) 74 ± 21 cm/s 가
 (p=0.000). 33
 9 cm/s, 35 ± 11 cm/s
 42 ± 11 cm/s 가 (p=0.030).
 S/D 1.3 ± 0.5 1.5 ± 0.4 가 sample volume
 가 1.8 ± 0.7 가 0.5 1cm
 (p=0.006). 20 ± 6 cm/s .⁸⁾ (S),
 21 ± 8 cm/s 가 $25 \pm$ (D), (AR),
 8 cm/s 가 (p=0.006). S - TVI (S1) (S2) 47
 7.2 ± 4.5 cm 9.3 ± 3.1 cm 가
 (p=0.033) 12.4 ± 3.1 cm 가

Table 2. Echocardiographic parameters measured from right upper pulmonary vein

	Pre-PMV	Post-PMV	Follow-up	
S (cm/s)	43 ± 16	51 ± 15	63 ± 17	**p = 0.019
D (cm/s)	36 ± 10	37 ± 9	38 ± 11	
AR (cm/s)	22 ± 8	20 ± 6	27 ± 7.8	**p = 0.005
S-TVI (cm)	7.5 ± 3.5	8.9 ± 3.6	10.6 ± 3.0	**p = 0.001
D-TVI (cm)	5.8 ± 1.8	6.4 ± 2.6	6.3 ± 2.6	
AR-TVI (cm)	1.4 ± 0.7	1.4 ± 0.7	1.9 ± 1.0	**p = 0.033
S/D ratio	1.3 ± 0.6	1.4 ± 0.4	1.8 ± 0.6	**p = 0.008
S-TVI/D-TVI ratio	1.6 ± 1.4	1.8 ± 1.5	1.9 ± 0.8	

*p<0.05 : Pre-PVM vs. Post-PMV

**p<0.05 : Post-PMV vs. Follow-up

Table 3. Echocardiographic parameters measured from left upper pulmonary vein

	Pre-PMV	Post-PMV	Follow-up	
S (cm/s)	42 ± 20	48 ± 12	74 ± 21	**p = 0.000
D (cm/s)	33 ± 9	35 ± 11	42 ± 11	**p = 0.030
AR (cm/s)	20 ± 6	21 ± 8	25 ± 8	**p = 0.006
S-TVI (cm)	7.2 ± 4.5	9.3 ± 3.1	12.4 ± 3.1	**p = 0.004
D-TVI (cm)	5.8 ± 2.2	6.7 ± 3.2	6.6 ± 2.4	
AR-TVI (cm)	1.5 ± 0.9	1.3 ± 0.4	1.6 ± 0.7	p = 0.067
S/D ratio	1.3 ± 0.5	1.5 ± 0.4	1.8 ± 0.7	**p = 0.006
S-TVI/D-TVI ratio	1.4 ± 0.7	1.6 ± 0.6	2.2 ± 1.2	**p = 0.017

*p<0.05 : Pre-PVM vs. Post-PMV

**p<0.05 : Post-PMV vs. Follow-up

[illegible]

가 , 1

가 .

방 법 :

2) 1) Jolly TVI 가 1 가

3) Jolly 가 (S), (D),

conduit (AR) time - velocity - integral (S/D ratio) TVI (S - TVI/D - TVI)가

결 과 :

22 가 2 , 가 20

39 26 64 .

16 7 28

0.9±0.2 cm²

1.9±0.3 cm² 가

1.7±0.3 cm² 가

15.4±4.3 mmHg 5.5±1.9 mmHg

6.2±2.4 mmHg

S - TVI 가 ,

가 D - TVI

S - TVI/D - TVI

가 AR - TVI

가 .

가 S/D

가

■ 연구의 제한점

TVI S - TVI

가 ,

가 D - TVI

2)가 S - TVI/D - TVI

가 AR - TVI

가 .

결 론 :

가

(S), S - TVI, S/D , S - TVI/D - TVI

(AR) 가

1

요 약

연구배경 :

가

가

중심 단어 :

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