

## 경피적 승모판풍선성형술 후 심방세동의 전기적 심율동전환

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## Electrical Cardioversion of Atrial Fibrillation after Successful Percutaneous Balloon Mitral Valvuloplasty

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## ABSTRACT

**Objectives** : There was no previous report about the electrical cardioversion for the patients with atrial fibrillation after successful percutaneous balloon mitral valvuloplasty (PBMV). We performed electrical cardioversion after PBMV to evaluate the effectiveness of this procedure in the view of conversion to and maintenance of the sinus rhythm. **Methods** : 28 patients who had persistent atrial fibrillation after successful PBMV were included in this study. All patients were anticoagulated with warfarin. Amiodarone was loaded and maintained before cardioversion. The PBMV procedures were guided by transesophageal echocardiography in all patients. Transthoracic echocardiography was done before and after PBMV and cardioversion, and was followed. **Results** : The number of patients were 28 (male 9 and female 19) within the mean age of  $50.3 \pm 12.0$  years (24 - 66). Initially 24 patients (86%) succeeded in electrical cardioversion. The energy required for successful conversion was  $230 \pm 75$ J, on average. There were no complications except for the transient sinus bradycardia in 2 cases. The mean follow-up duration was  $357 \pm 144$  days and when followed-up, the sinus rhythm was maintained in 15 patients out of 24 with initial success (63%). No factor was significantly related to the success of cardioversion, but left atrial dimension after 1 month of PBMV was significantly related to the maintenance of the sinus rhythm. **Conclusions** : This study suggests that electrical cardioversion of atrial fibrillation after successful PBMV is favorable and recommendable treatment modality of chronic valvular atrial fibrillation with high conversion rate (88%) and good maintenance rate (63%). (**Korean Circulation J 1998;28(8):1293-1298**)

**KEY WORDS** : Electrical cardioversion · Atrial fibrillation · Percutaneous balloon mitral valvuloplasty.

서 론

가 , 3 (Pr - othrombin time, PT) INR(International Normal - ized Ratio) 2.0 3.0

가 , 3) amiodarone 200 mg 1 3 1

가 200 mg 1 1 . Amio - darone

79% 1)

가 2) . 10% lidocaine spray

가 , Maze midazolam 2 10 mg

가 , corridor 12 cm

가 R 100J shock 가 200J, 300J, 360J

가

대상 및 방법

amiodarone 1 , 1 , 3 , 6 , 1

1995 5 1996 7

(Percutaneous Mitral Baloon Valvuloplasty, PBMV) 220 M

amiodarone 가

가 , ± , unpaired

t - test

American College of Chest Physician t -

2. , p<0.05

결 과

28 가 9 , 가 19  
50.3 ± 12.0 24 66

0.9 ± 0.2 cm<sup>2</sup> (0.6~1.3),  
1.8 ± 0.3 cm<sup>2</sup> (1.3~2.5) . 19

, amiodarone 9

28 24 86%

100J 3 , 200J 12 , 300J 7 , 360J 2  
230 ± 75J  
2 45 50

357 ± 144  
24 15  
63%

9 68 ± 67 (14~222)  
Amiodarone  
240 ± 96 mg (100~400) am -  
iodarone 4 (16.7%)

**Table 1.** Comparison between successful and failed group in cardioversion

	Success	Failure	p value
Patients	24	4	
Age (years)	49.5 ± 12.8	55.3 ± 4.5	0.3869
MVA (Pre-PBMV) (cm <sup>2</sup> )	0.9 ± 0.2	0.9 ± 0.2	1.0000
MVA (Post-PBMV) (cm <sup>2</sup> )	1.8 ± 0.3	1.8 ± 0.5	0.5938
LAD (Pre-PBMV) (mm)	55.3 ± 7.3	59.5 ± 5.4	0.2808

MVA : Mitral Valve Area

PBMV : Percutaneous Balloon Mitral Valvuloplasty,

LAD : Left Atrial Dimension

**Table 2.** Comparison between maintained and recurred group in converted sinus rhythm

	Maintenance	Recurrence	p value
Patients	15	9	
Age (years)	49.5 ± 12.8	49.4 ± 13.5	0.9873
Male/Female	5/10	3/6	0.4843
Concomitant trial*	12	5	0.2115
MVA (Pre-PBMV) (cm <sup>2</sup> )	1.0 ± 0.2	0.8 ± 0.2	0.0753
MVA (Pre-PBMV) (cm <sup>2</sup> )	1.8 ± 0.2	1.8 ± 0.4	0.9699
MVA (1 Month) (cm <sup>2</sup> )	1.9 ± 0.3	2.0 ± 0.3	0.7437
MVA (Last FU) (cm <sup>2</sup> )	2.0 ± 0.5	1.9 ± 0.8	0.7154
LAD (Pre-PBMV) (mm)	53.2 ± 4.2	58.7 ± 10.1	0.0765
LAD (1 Month) (mm)	49.6 ± 5.1	57.7 ± 8.5	0.0079
LAD (1 year) (mm)	51.3 ± 5.5	51.3 ± 11.2	0.9942

MVA : Mitral Valve Area

PBMV : Percutaneous Balloon Mitral Valvuloplasty

LAD : Left Atrial Dimension

Concomitant trial\* : Concomitant trial PBMV and Electrical Cardioversion

## 고 찰

2.2%, 1.7%  
가 55~64 가 3.8%,  
가 3.0% 2)  
± 5.4 mm) (55.3 ± 7.3 vs. 59.5 (Table 1).  
1 가  
1 가

(Table 2).

20 ( 4)  
10 , 5 , 5 )  
Maze 15  
4 , 1  
. Skoularigis<sup>12)</sup>  
3  
amiodarone 12  
18  
11 (61%)  
23  
17 (7~24) 16 (70%)  
. Washington University<sup>1)</sup>  
123 ( 91 , 32 ) Maze  
7%  
3  
Cho<sup>13)</sup>  
56 ( 22 ,  
Maze( )  
34 )  
96.4%가  
IA, IC, III  
digoxin,  
amiodarone  
14)15)  
. Scheinman<sup>6)</sup>  
Lown<sup>7)</sup>  
가  
Kalman<sup>9)</sup>  
85%  
corridor  
procedure  
5.3%  
0.8%  
가  
Graffigna<sup>10)</sup>  
( , , )  
80.7%  
2  
71%  
. Gregori<sup>11)</sup>

12~13 cm 8 cm 가

가

amiodarone

가

Lee<sup>19)</sup>

amiodarone 1~2 요 약

1 80% , 1

1 50% , 2 연구목적 :

30%

Chun<sup>14)</sup> 가

(4.5%), (3.6%),

(2.7%)

100~400 mg(240± 방 법 :

96)

4 (16.7%)

amiodarone

amiodarone

가 가

86% 1 결 과 :

63%

28 ( 9 , 19 )

50.3±12.0(24~66) . 24 (86%)

가 가

(24 ) (4 )

230±75J

2

357±

가 144 24 15 (63%)

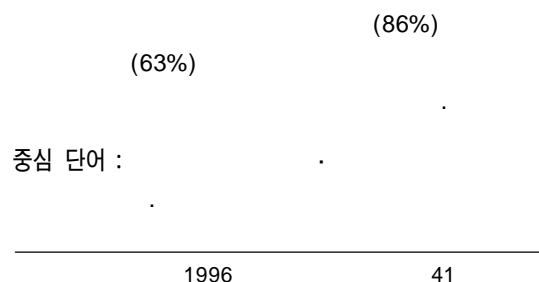
(15 )

(9 )

가

가 결 론 :

1



# REFERENCES

- 1) Baker BM, Smith JM, Cain ME. *Nonpharmacologic approaches to the treatment of atrial fibrillation and atrial flutter*. *J Cardiovasc Electrophysiol* 1995;6:972-8.
- 2) Wolf PA, Dawber TR, Thomas HE Jr, Kannel W. *Epidemiologic assessment of chronic atrial fibrillation and risk of stroke: The Framingham study*. *Neurology* 1978;28:973-7.
- 3) Laupacis A, Albers G, Dunn M, Feinberg W. *Antithrombotic therapy in atrial fibrillation*. *Chest* 1992;102:426S-33S.
- 4) Sopher SM, Camm AJ. *Atrial fibrillation: Maintenance of sinus rhythm versus rate control*. *Am J Cardiol* 1996;77:24A-37A.
- 5) Blackshear JL, Kopecky SL, Litin SC, Safford RE, Hammill SC. *Management of atrial fibrillation in adults: Prevention of thromboembolism and symptomatic treatment*. *Mayo Clin Proc* 1996;71:150-60.
- 6) Scheinman MM, Morady F, Hess DS, Gonzalez R. *Catheter-induced ablation of the atrioventricular junction to control refractory supraventricular arrhythmias*. *JAMA* 1982;248:851-5.
- 7) Lown B, Amarasingham R, Neumon J. *New method for terminating cardiac arrhythmias*. *JAMA* 1962;182:548-55.
- 8) Nattel S, Hadjis T, Talajic M. *The treatment of atrial fibrillation. An evaluation of drug therapy, electrical modalities and therapeutic considerations*. *Drugs* 1994;48:345-71.
- 9) Kalman JM, Jones EF, Doolan L, Oliver LE, Power JM, Tonkin AM. *Low energy endocardial cardioversion of atrial arrhythmias in humans*. *Pacing Clin Electrophysiol* 1995;18:1869-75.
- 10) Graffigna A, Pagani F, Minzioni G, Salerno J, Vigano M. *Left atrial isolation associated with mitral valve operations*. *Ann Thorac Surg* 1992;54:1093-8.
- 11) Gregori F Jr, Cordeiro CO, Couto WJ, da Silva SS, de Aquino WK, Nechar A Jr. *Cox maze operation without cryoablation for the treatment of chronic atrial fibrillation*. *Ann Thorac Surg* 1995;60:361-4.
- 12) Skoularigis J, Rothlisberger C, Skudicky D, Essop MR, Wisenbaugh T, Sareli P. *Effectiveness of amiodarone and electrical cardioversion for chronic rheumatic atrial fibrillation after mitral valve surgery*. *Am J Cardiol* 1993;72:423-7.
- 13) Cox Maze (III) 1997; 29 :59.
- 14) Chun SH, Sager PT, Stevenson WG, Nademanee K, Middlekauff HR, Singh BN. *Long-term efficacy of amiodarone for the maintenance of normal sinus rhythm in patients with refractory atrial fibrillation or flutter*. *Am J Cardiol* 1995;76:47-50.
- 15) Gosselink AT, Crijns HJ, Van Gelder IC, Hillige H, Wiesfeld AC, Lie KI. *Low-dose amiodarone for maintenance of sinus rhythm after cardioversion of atrial fibrillation or flutter*. *JAMA* 1992;267:3289-93.
- 16) Cohen JM, Glower DD, Harrison JK, Bashore TM, White WD, Smith LR, et al. *Comparison of balloon valvuloplasty with operative treatment for mitral stenosis*. *Ann Thorac Surg* 1993;56:1254-62.
- 17) Olson JD, Goldenberg IF, Pedersen W, Brandt D, Kane M, Daniel JA, et al. *Exclusion of atrial thrombus by transesophageal echocardiography*. *J Am Soc Echocardiogr* 1992;5:52-6.
- 18) Leung DY, Grimm RA, Klein AL. *Transesophageal echocardiography-guided approach to cardioversion of atrial fibrillation*. *Prog Cardiovasc Dis* 1996;39:21-32.
- 19) Lee WK. *Therapeutic drug monitoring of cardiac drugs*. *Jo-urnal of the Korean Medical Association* 1988;31:375-81.