

## 경피적 승모판막확장술도중 발생한 Inoue 풍선기형 1례

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# A Case Report of Inoue Balloon Deformity Recognized during Percutaneous Mitral Valvuloplasty

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## ABSTRACT

Since the Inoue balloon was first introduced for percutaneous mitral valvuloplasty (PMV) in 1984, this procedure has come into widespread use because of its effectiveness, simplicity, and reduced exposure to X-ray radiation. It's the procedure's complications include cardiac tamponade, atrial septal defect, thromboembolism, ventricular perforation, mitral regurgitation, and rarely balloon rupture. We report a case of Inoue balloon deformity during PMV in 62-year old woman with rheumatic mitral stenosis. Echocardiography revealed severe rheumatic mitral stenosis with a valvular area of 0.95 cm<sup>2</sup> (by pressure half-time method), and an Echo score of 10 points. The PMV with Inoue balloon 28mm was performed. We inflated the balloon to 28 mm in diameter first, and to 29 mm second. A bulging deformity with asymmetrical overinflation of one side of both proximal and distal balloon was recognized. A bulging deformity at the proximal part of Inoue balloon after second inflation. Balloon was not ruptured. Following completion of the procedure, the mitral valve area increased to 1.8 cm<sup>2</sup>. Moderate mitral regurgitation (grade II) was newly developed. This may be the first case of asymmetrical one side inflation and focal bulging deformity reported in Korea. (**Korean Circulation J 2001;31(8):830-833**)

**KEY WORDS** : Inoue balloon deformity · Percutaneous mitral valvuloplasty (PMV).

## 서 론

(Percutaneous Mitral Va-

lvuloplasty, PMV)

<sup>1)</sup>

1984

Inoue

: 2001 5 18

: 2001 6 27

: , 422 - 711

2

91 - 121

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Inoue

(bulging deformity)



4-6) 0.8 cm<sup>2</sup>

PMV Inoue 1 16.0 mmHg 10

증례 Inoue criteria 28 mmHg (PTMC-28, Toray Industries)

: 62

: , pigtail (fluoro -

: 66 scopy)

10 (NYHA functional class II) Inoue 28 mm

29 mm 2 29 mm (bulging de-

가 : formity)

: 110/70 mmHg, 가 16.0 mmHg 5.4 mmHg

82 , 20

165.0 cm, 64 kg 가 (Fig.

1). 30 (fluoro-

roscopic time) 8.9

PMV 24

1.8 cm<sup>2</sup>,

(opening snap) 1.5 cm<sup>2</sup>

(rumbling) 3.8 mmHg . Grade II

11.9 g/dl, rumb -

33.4%, 13,100/mm<sup>3</sup>, 376,000/m<sup>3</sup> ling NYHA

197 mg/dl, 200 mg/dl,

35 mg/dl, 122 mg/dl

고 찰

BUN 24 mg/dl, creatinine 1.1 mg/dl, 1984 Inoue 가 PMV

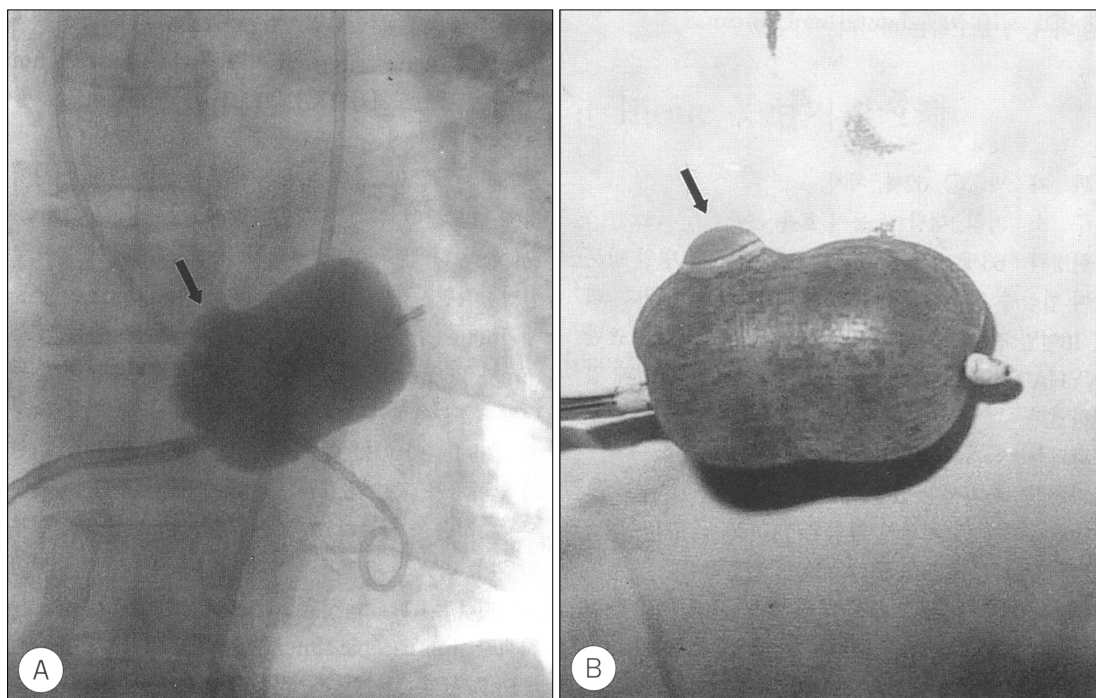
1) 3

X :

2)3)

0.9 cm<sup>2</sup>,





**Fig. 1.** Inoue balloon catheter deformity during percutaneous mitral valvuloplasty. A : shows a bulging deformity (arrow) of the proximal Inoue balloon following the second time of maximal inflation. B : shows the Inoue balloon catheter in vitro and asymmetrical one side overinflation with focal bulging deformity. The outer latex and nylon-rubber is lacerated and the inner latex layer is bulging out (arrow).

1.

0 1.5 cm<sup>2</sup>

1.5 1.7 cm<sup>2</sup>

60 mmHg Inoue

25 mmHg PMV (mesh)가 (elasticity) (co-

가 mpliance) 3 .

Wilkins 8) (mesh)

가 . , ,

4 3가 .

8 가 Schilling 4) (abrasive effect), 가

가 가 (avulsing effect), 가

가 5)6)

가 2 , 10

12)13)

( Gr III) PMV



(grade II)

Chow 5)

1.3%, Ho 6)

1990 Inoue balloon 15)

(deflation failure)

가

7 2001 3 426 Inoue 1989

PMV

1 (0.2%)

Inoue

1 2

중심 단어 : Inoue

## REFERENCES

- 1) Inoue K, Owaki T, Nakamura T, Ketamura F, Miyamoto N. *Clinical application of transvenous mitral commissurotomy by a new balloon catheter. J Thorac Cardiovasc Surg* 1984;87:394-402.
- 2) Bahl VK, Chandra S, Mishra S. *Concurrent balloon dilatation of mitral and tricuspid stenosis during pregnancy using an Inoue balloon. Int J Cardiol* 1997;59:199-202.
- 3) Bhargava B, Agarwal R, Yadav R, Bahl VK, Manchanda SC. *Percutaneous balloon aortic valvuloplasty during pregnancy: Use of the Inoue balloon and the physiologic antegrade approach. Cathet Cardiovasc Diagn* 1998;45:422-5.
- 4) Schilling RJ, Francis CM, Shaw TR, Norell MS. *Inoue balloon rupture during dilatation of calcified mitral valves. Br Heart J* 1995;73:390.
- 5) Chow WH, Chow TC, Cheung KL. *Angiographic recognition of a proximal balloon tear during Inoue balloon mitral valvotomy. Cathet Cardiovasc Diagn* 1993;28:235-7.
- 6) Ho YL, Chen WJ, Wu CC, Chao CL, Kao HL, Lee YT. *Inoue balloon deformity and rupture during percutaneous balloon valvuloplasty. Cathet Cardiovasc Diagn* 1996;38:345-50.
- 7) Bonow RO, Carabello B, de Leon AC Jr. *ACC/AHA Guidelines for the management of patients with valvular heart disease. J Am Coll Cardiol* 1998;32:1486-588.
- 8) Wilkins GT, Weyman AE, Abascal VM, Block PC, Palacios IF. *Percutaneous balloon dilation of the mitral valve: An analysis of echocardiographic variables related to outcome and the mechanism of dilatation. Br Heart J* 1988;60:299-308.
- 9) Padial LR, Abascal VM, Moreno PR, Weyman AE, Levine RA, Palacios IF. *Echocardiography can predict the development of severe mitral regurgitation after percutaneous mitral valvuloplasty by the Inoue technique. Am J Cardiol* 1999;83:1210-3.
- 10) Koh YY, Hyon MS, Kim JK. *Follow-up assessment after percutaneous mitral valvuloplasty (PMV) with Inoue balloon. Korean Circulation J* 1998;28:1841-51.
- 11) Palacios IF, Tuzcu ME, Weyman AE, Newell JB, Block PC. *Clinical follow-up of patients undergoing percutaneous mitral balloon valvotomy. Circulation* 1995;91:671-6.
- 12) Tuzcu EM, Block PC, Griffin B, Dinsmore R, Newell JB, Palacios IF. *Percutaneous mitral balloon valvotomy in patients with calcific mitral stenosis: Immediate and long-term outcome. J Am Coll Cardiol* 1994;23:1604-9.
- 13) Zhang HP, Yen GS, Allen JW, Lau FY, Ruiz CE. *Comparison of late results of balloon valvotomy in mitral stenosis with versus without mitral regurgitation. Am J Cardiol* 1998;81:51-5.
- 14) Bassand JP, Schiele F, Bernard Y, Anguenot T, Payet M, Ba SA, et al. *The double-balloon and Inoue techniques in percutaneous mitral valvuloplasty: Comparative results in a series of 232 cases. J Am Coll Cardiol* 1991;18:982-9.
- 15) Park SJ, Park SW, Kim JJ, Lim CM, Kim SW, Lee JK. *A case of deflation failure of Inoue balloon. Korean Circulation J* 1990;20:256-9.