

## PERCUTANEOUS TRANSLUMINAL BALLOON PULMONARY VALVULOPLASTY : IMMEDIATE AND MEDIUM-TERM RESULTS\*

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**Summary:** Özme Ş, Çeliker A, Özkutlu S, Özer S, Baysal K. (Pediatric Cardiology Unit, Department of Pediatrics, Hacettepe University Faculty of Medicine, Ankara, Turkey). Percutaneous transluminal balloon pulmonary valvuloplasty: immediate and medium-term results. Turk J Pediatr 32: 25-31, 1990.

Ten patients with pulmonary stenosis, (six males and four females) whose ages ranged between five and ten years (mean age 7 years) underwent cardiac catheterization and balloon valvuloplasty. Right ventricular systolic pressure before valvuloplasty ranged from 90 to 200 mm Hg (mean  $133.5 \pm 33.3$  mm Hg). It fell to 50-90 mm Hg (mean  $64.5 \pm 13.8$  mm Hg) immediately after the procedure. The peak systolic gradient across the pulmonary valve before valvuloplasty ranged from 70 to 180 mm Hg (mean  $114.5 \pm 35.4$  mm Hg) and decreased significantly to 30-70 mm Hg (mean  $43.0 \pm 13.8$  mm Hg) immediately after dilation. Doppler echo studies confirmed these results. At repeat cardiac catheterization in three patients, five to 15 months after valvuloplasty, restenosis was noted in one patient while there was no change in the others. All patients had been followed up by Doppler echocardiography. Patients with isolated valvular pulmonary stenosis can be adequately and safely treated with balloon valvuloplasty which results in excellent immediate and medium-term results. *Key words: balloon valvuloplasty, pulmonary valvular stenosis, children, immediate and medium-term results.*

Percutaneous transluminal balloon pulmonary valvuloplasty is widely used for the treatment of moderate to severe pulmonary valvular stenosis in children<sup>1-3</sup>. This invasive method, which was found to be effective by long-term follow-up studies,

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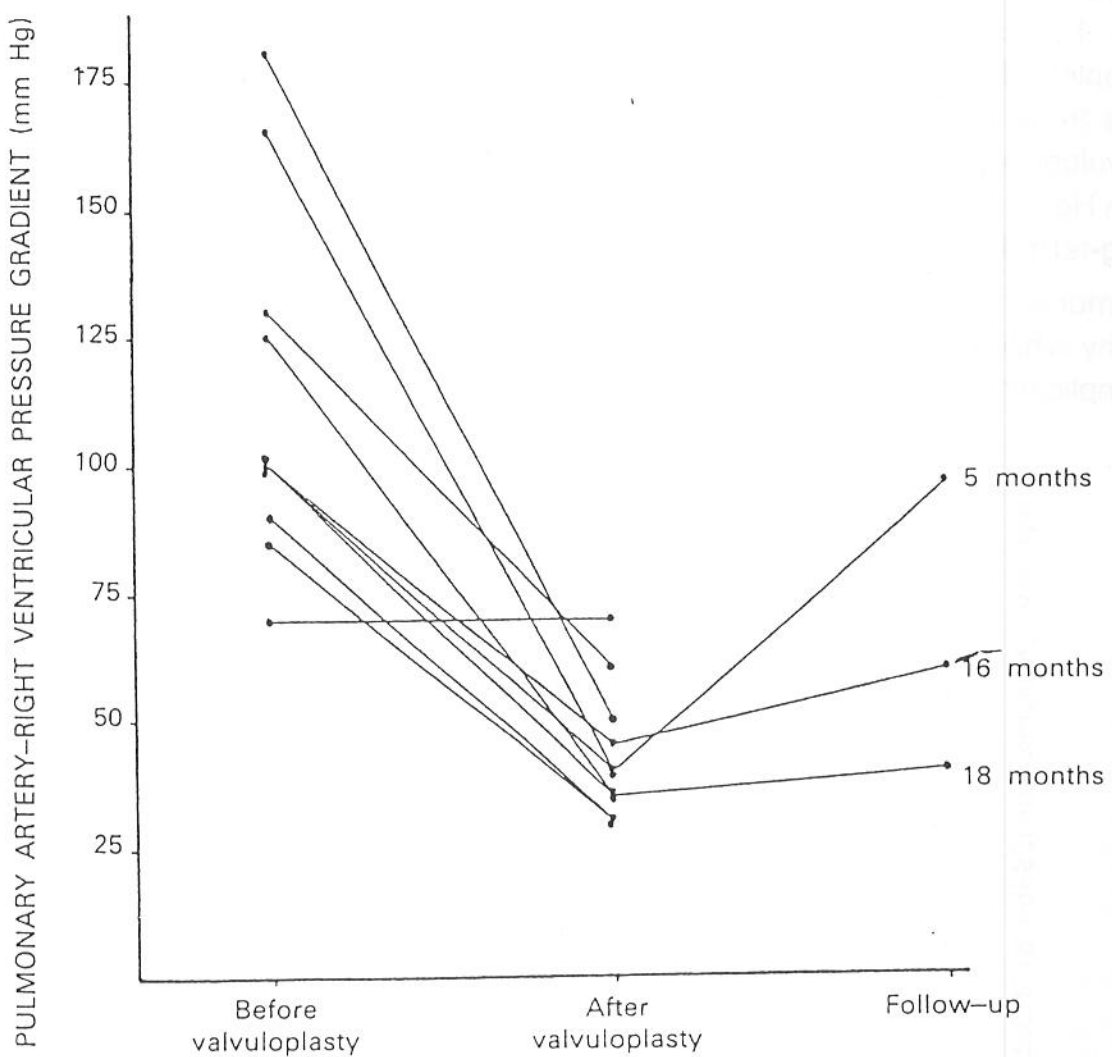


Fig. 1: Pulmonary valve peak systolic pressure gradients in ten patients with catheterization data. Note the fall in the gradient immediately after dilation. In one patient, the gradient remained unchanged. In the repeat study, the gradient increased and restenosis developed in one patient.

TABLE I: Balloon Pulmonary Valvuloplasty-Hemodynamic Data

		Before Valvuloplasty	After Valvuloplasty	
Right ventricular peak systolic pressure (mm Hg)	Range	90 – 200	55 – 90	p < 0.001
	mean ± SD	133.5 ± 33.3	64.5 ± 13.8	
Pulmonary artery right ventricular pressure gradient (mm Hg)	Range	70 – 180	30 – 70	p < 0.001
	mean ± SD	114.5 ± 35.4	43.0 ± 13.8	

TABLE II: Balloon Pulmonary Valvuloplasty: Doppler Echo Data

		<u>Before Valvuloplasty</u>	<u>After Valvuloplasty</u>	
Pulmonary artery	Range	55 – 160	30 – 81	
right ventricular pressure gradient (mm Hg)	mean $\pm$ SD	97.3 $\pm$ 37.21	50.6 $\pm$ 17.84	p < 0.001

## Discussion

The degree of obstruction and right ventricular dysfunction represent the indications for surgical therapy in pulmonary valvular stenosis<sup>1</sup>. Since the mortality rate of 3 percent and the non-fatal complications rate of 12 percent are not low<sup>1</sup>, less complicated techniques have been investigated. Kan et al<sup>5</sup> performed balloon valvuloplasty for the treatment of pulmonary valvular stenosis in 1985. This effective and safe technique has been employed in the Pediatric Cardiology Unit of Hacettepe University Children's Hospital since April 1987.

Ten patients with moderate to severe pulmonary valvular stenosis underwent balloon valvuloplasty in which immediate success was achieved in all but one patient who had infundibular stenosis. Balloon dilation with appropriate size balloons was attempted in this patient, but failed.

After balloon valvuloplasty, the patients were followed up by Doppler echocardiography and cardiac catheterization. In various studies restenosis has been detected in some patients<sup>2,3,6,7</sup>. These patients underwent repeat balloon dilation with a larger balloon, and successful results were obtained<sup>2,3</sup>. Infundibular stenosis can also be reduced to a lower degree by a repeated dilation<sup>2</sup>. Our three patients were followed up by cardiac catheterization; one of them had restenosis. This patient will undergo a repeat valvuloplasty.

Doppler echocardiography has been reported to be a simple and accurate non-invasive technique for quantitating the pressure gradient<sup>8-11</sup>, and two-dimensional echocardiography has been used to evaluate the anatomical and functional status of the pulmonary valve after balloon dilation<sup>7-9</sup>. Kveselis et al<sup>8</sup> confirmed that after balloon valvuloplasty, Doppler echocardiographic studies produced results similar to cardiac catheterization.

Six patients were followed up with Doppler echocardiography at long-term intervals; the late results were consistent with the immediate results. We suggest that Doppler echocardiography be employed to follow-up patients who undergo balloon valvuloplasty.

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