

# Balloon valvuloplasty for severe and critical aortic stenosis in neonates and children - predictors of success

Surmacz R.<sup>1</sup>, Moszura T.<sup>1,2</sup>, Mroziński B.<sup>1</sup>, Bobkowska A.<sup>1</sup>, Łażniak A.<sup>1</sup>, Jaremba O.<sup>1</sup>, Walasek P.<sup>1</sup>, Baszko A.<sup>1</sup>, Siwińska A.<sup>1</sup>, Bobkowski W.<sup>1</sup>

<sup>1</sup>Department of Pediatric Cardiology, Poznan University of Medical Sciences, Poznań, Poland  
<sup>2</sup>Department of Pediatric Cardiology, Polish Mother's Memorial Hospital- Research Institute, Łódź, Poland

## Introduction/Aim

In most centers, balloon aortic valvuloplasty (BAV) is a first line treatment, especially for neonates and infants with a congenital aortic stenosis (AS)<sup>1</sup>.

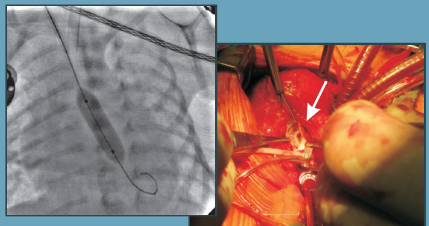
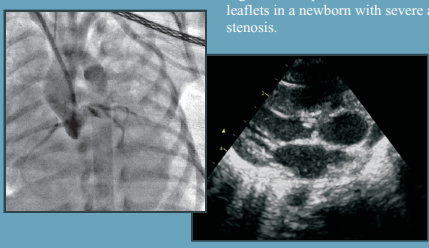


Fig. 1-2 BAV in newborn performed through carotid artery (left). Dysplastic, bicuspid aortic valve in a newborn with severe aortic stenosis and insufficiency - surgeon perspective view (right).

The aim of this study was to evaluate results of BAV and identify variables associated with good immediate and midterm results of BAV in newborns and neonates.

Fig. 3-4 Bicuspid aortic valve with thick leaflets in a newborn with severe aortic stenosis.



## Materials and methods

Data from 77 BAV procedures performed from 1999-2013 were reviewed.

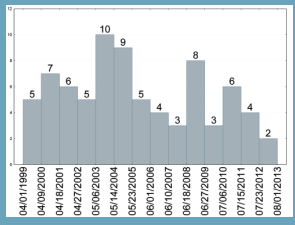


Fig. 5 The number of BAV procedures in different years.

Results of cardiac catheterization (including vascular access) and results of echocardiography before BAV, immediately after BAV and in follow-up were reviewed.

## Results

BAV was performed in 77 patients. The mean age at the time of the procedure was 27±42,9 days. There were 59 (77%) newborns. The mean body weight was 3,64±1,18 kg. 58 patients were followed, mean follow-up time was 980±882 (median 720, range 20-3600 days).

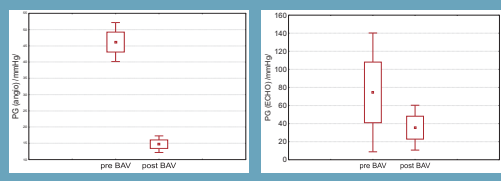


Fig. 6-7 Significant reduction of the pressure gradient across aortic valve (PG) after BAV both in cardiac catheterization (15±11mmHg after BAV vs. 46±26mmHg before BAV, p<0,01) and in echocardiography (before BAV 74,5±33,3mmHg vs. 35,5±12,7mmHg after BAV, p<0,01).

Success in catheterization: decrease of PG of 50% or more in 78% of patients.

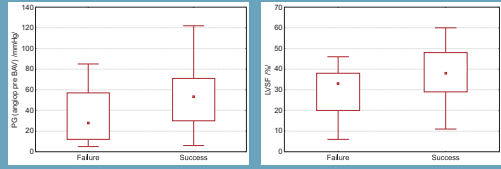


Fig. 8-9 Invasive pressure gradient (left) and LV systolic function (right) in patients with good (success) and poor result (failure) of BAV, p=0,01319 and p=0,015073 accordingly.

Success in ECHO: PG < 50mmHg in 85% of patients.

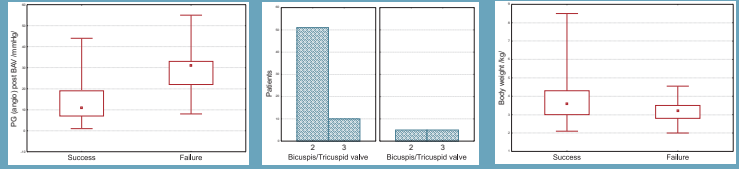


Fig. 10-13 Invasive pressure gradient after BAV, morphology of aortic valve, body weight and diameter of aortic valve in patients with successful BAV, immediately after procedure (10-11) and in follow-up (12-13), p=0,01184, p= 0,017216, p=0,0849, p=0,011241).

Moderate and severe aortic insufficiency (AI) was found in 24% of patients immediately after BAV. Significant AI in follow-up was present in 62% of patients and was associated with function and size of the left ventricle pre-BAV.

## Conclusions

BAV is a valuable method of treatment of severe and critical AS in neonates and infants. Immediate results of BAV depend on left ventricle function and morphology of the aortic valve. Results of BAV in follow-up are associated with a body weight of the patient, the diameter of the aortic valve and LV function.

## References

1. Ewert, P., et al., Balloon valvuloplasty in the treatment of congenital aortic valve stenosis - A retrospective multicenter survey of more than 1000 patients. International Journal of Cardiology, 2011. 149(2): p. 182-185.



POZNAŃ  
UNIVERSITY OF MEDICAL SCIENCES  
POLAND



Department of Pediatric Cardiology, Poznan University of Medical Sciences