

Case Report

Double-Balloon Valvuloplasty for Treatment of Severe Valvular Aortic Stenosis: A Case Report

Chaisit Sangtawesin MD*,
Siriporn Jongyorklang MD*

* Pediatric Cardiology Unit, Queen Sirikit National Institute of Child Health, Department of Medicine Services, College of Medicine, Rangsit University, Bangkok

The authors report the first case of successful double-balloon valvuloplasty for treatment of severe valvular aortic stenosis at Queen Sirikit National Institute of Child Health, Bangkok, Thailand. The patient was a 7-month-old, 6 Kg weighed infant with the pressure gradient across the aortic valve of 76 mmHg and aortic valve annulus of 10 mm diameter. The procedure was performed under general anaesthesia. The catheterization data revealed left ventricular and ascending aorta pressure of 156/1 and 52/30 mmHg, respectively. After the procedure the left ventricular pressure decreased to 114/0, left ventricular-aortic pressure gradient to 46 mmHg and no significant aortic regurgitation. He was well at 1-month follow-up with the left ventricular-aortic pressure gradient of 12 mmHg and no significant aortic regurgitation.

Keywords: Double Balloon, Aortic, Valvuloplasty, Bangkok, Thailand

J Med Assoc Thai 2008; 91 (Suppl 3): S169-72

Full text. e-Journal: <http://www.medassocthai.org/journal>

Aortic valve stenosis is the third common congenital obstructive lesion of the heart following pulmonic stenosis and co-arctation of aorta^(1,2). At Queen Sirikit National Institute of Child Health, there are 10-15 new cases annually with one severe case over several years. Without treatment, these severe cases have short life span with sudden death from ventricular arrhythmia. Balloon aortic valvuloplasty is the treatment of choice in moderate and severe aortic valve stenosis^(3,4). In order to reduce the risk of vascular complication, a double-balloon technique has been used with good short and long term results for more than 20 years⁽⁵⁻¹⁰⁾. There were no previous reports of double-balloon valvuloplasty for treatment of aortic valvular stenosis in Thailand.

Objectives

To present an experience of successful double-balloon valvuloplasty for treatment of severe valvular aortic stenosis.

Correspondence to: Sangtawesin C, Pediatric Cardiology Unit, Queen Sirikit National Institute of Child Health, Bangkok 10400, Thailand.

Case Report

A 7-month-old, 6-Kg boy was found to have heart murmur during well child care. Investigation at the local hospital revealed the diagnosis of severe valvular aortic stenosis. He was then transferred to our institute for treatment. Echocardiogram at Queen Sirikit National Institute of Child Health confirmed the diagnosis with the pressure gradient across the aortic valve of 76 mmHg and aortic valve annulus of 10 mm diameter (Fig. 1, 2). After informed consent, we performed balloon aortic valvuloplasty using percutaneous technique under general anaesthesia.

The procedure started with right heart catheterization via the right femoral vein. After complete evaluation of hemodynamic data, we performed left heart catheterization via the right femoral artery using 5F-arterial sheath and pigtailed catheter No. 4. Heparin 600 IU was perfused via the femoral artery. The left ventricular and ascending aortic pressure were 156/1 and 52/30 mmHg, respectively. The left ventricular angiogram confirmed the diagnosis of aortic valve stenosis with aortic valve annulus 10 mm (Fig. 3, 4).

The 0.035-inch exchange guide wire (Terumo®) was inserted and used to guide the 5 mm-

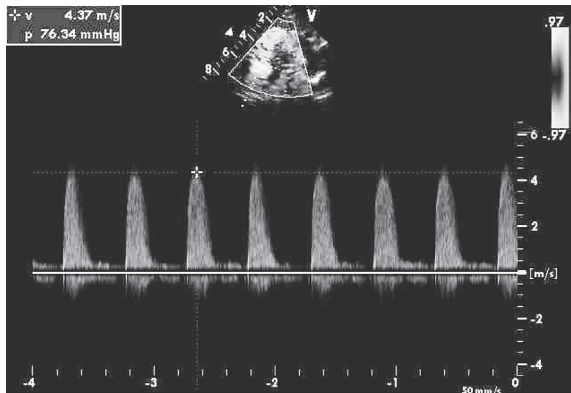


Fig. 1 Continuous wave Doppler at aortic valve in the suprasternal notch view

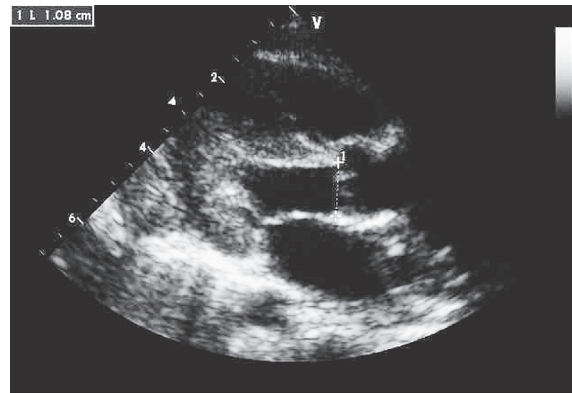


Fig. 2 2-D measurement of aortic valve annulus in the long-axis view

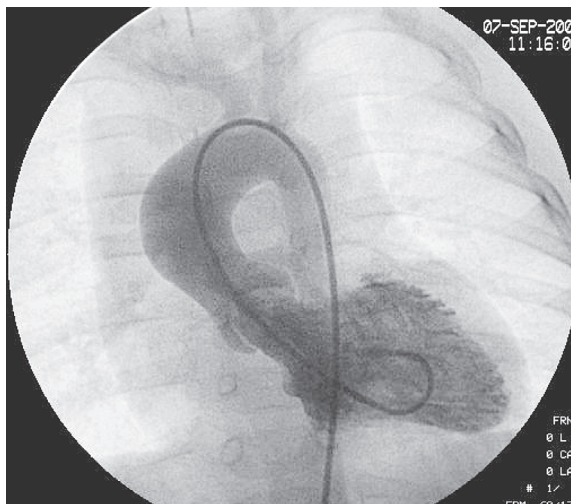


Fig. 3 Left ventricular angiogram showing aortic valve stenosis

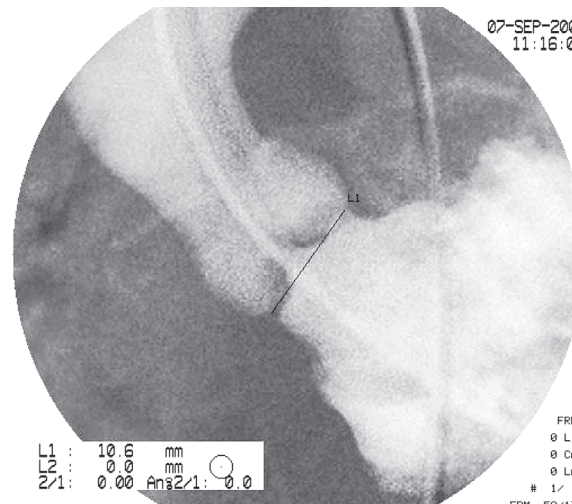


Fig. 4 Aortic valve annulus measurement

balloon catheter. After placing the balloon catheter, we inflated balloon several times until there was no waist (Fig. 5) before inserting the second 5 mm-balloon catheter via the left femoral artery in the same manner.

After both balloon catheters were in the good place determined by fluoroscope, they were inflated simultaneously. The balloons were inflated several times until there was no waist left in fluoroscope (Fig. 6).

The balloon catheters were then removed and replaced by the No.4 pigtailed catheter. The left ventricular pressure did decrease to 114/0 and left ventricular-aortic pressure gradient to 46 mmHg. The left ventricular angiogram revealed no significant aortic regurgitation. The patient was reversed to fully con-

scious with spontaneous respiration. Heparin was continued for the next 8 hours after the procedure because of the partial obstruction of femoral artery. The patient was discharged the day after with the left ventricular-aortic pressure gradient of 32 mmHg without significant aortic regurgitation. He was well at 1-month follow-up with the left ventricular-aortic pressure gradient of 12 mmHg without significant aortic regurgitation.

Conclusion

Double-balloon aortic valvuloplasty can be performed safely with very good efficacy in selected patients.

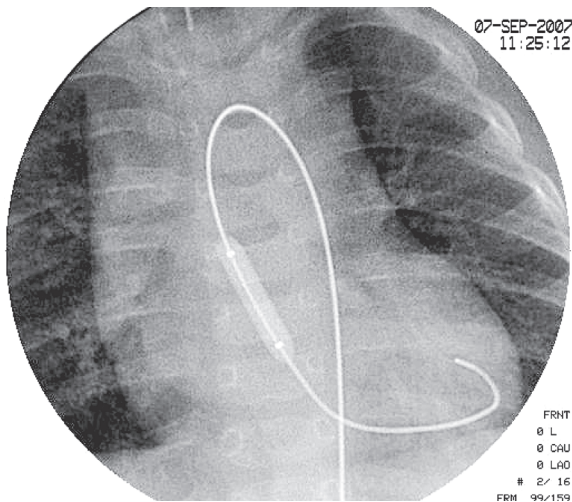


Fig. 5 The first 5-mm balloon catheter was inflated until there was no waist

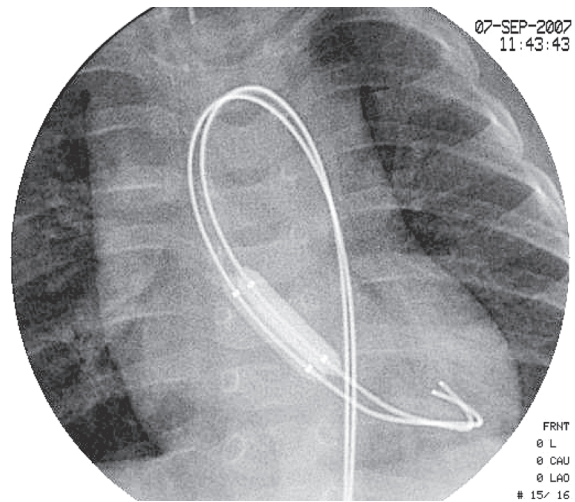


Fig. 6 The double 5-mm balloon were inflated simultaneously until there was no wedge

References

1. Samanek M, Slavik Z, Zborilova B, Hrobonova V, Voriskova M, Skovranek J. Prevalence, treatment, and outcome of heart disease in live-born children: a prospective analysis of 91,823 live-born children. *Pediatr Cardiol* 1989; 10: 205-11.
2. Fyler DC. Aortic stenosis. In: Nadas AS, Fyler DC, editors. *Nadas pediatric cardiology*. Philadelphia: Hanley and Belfus; 1992: 493-511.
3. Kiel EA, Van Devanter SH, Readinger RI, Dungan WT, Norton JB. Aortic balloon valvuloplasty with transluminal venous balloon inflow occlusion. *Pediatr Cardiol* 1986; 7: 103-5.
4. Rupprath G, Neuhaus KL. Percutaneous balloon valvuloplasty for aortic valve stenosis in infancy. *Am J Cardiol* 1985; 55: 1655-6.
5. Mullins CE, Nihill MR, Vick GW III, Ludomirsky A, O'Laughlin MP, Bricker JT, et al. Double balloon technique for dilation of valvular or vessel stenosis in congenital and acquired heart disease. *J Am Coll Cardiol* 1987; 10: 107-14.
6. Beekman RH, Rocchini AP, Crowley DC, Snider AR, Serwer GA, Dick M 2nd, et al. Comparison of single and double balloon valvuloplasty in children with aortic stenosis. *J Am Coll Cardiol* 1988; 12: 480-5.
7. Rao PS. Double balloon aortic valvuloplasty in children. *J Am Coll Cardiol* 1989; 13: 1216-7.
8. Dorros G, Lewin RF, Stertz SH, King JF, Waller BF, Myler RK, et al. Percutaneous transluminal aortic valvuloplasty - the acute outcome and follow-up of 149 patients who underwent the double balloon technique. *Eur Heart J* 1990; 11: 429-40.
9. Sharma S, Desai JH, Loya YS, Daxini BV, Bhatt GS. Percutaneous balloon valvotomy for aortic valve stenosis using single or double balloon technique. *J Assoc Physicians India* 1990; 38: 639-42.
10. Peuster M, Paul T, Hausdorf G. Anterograde double-balloon valvoplasty for treatment of severe valvar aortic stenosis in a preterm baby weighing 1400 grams. *Cardiol Young* 2000; 10: 67-9.

**การสวนหัวใจด้วยสายสวนหัวใจชนิดที่มีลูกโป่ง 2 สายพร้อมกันในการรักษาลิ้นหลอดเลือดแดงใหญ่
ตีบรุนแรง : รายงานผู้ป่วย 1 ราย**

ชัยสิทธิ์ แสงทวีสิน, ศิริพร จงย่อกกลาง

คณะผู้รายงานนำเสนอรายงานการรักษาผู้ป่วยลิ้นหลอดเลือดแดงใหญ่ตีบรุนแรง ด้วยการใส่สายสวนหัวใจชนิดที่มีลูกโป่ง 2 สายพร้อมกันสำเร็จเป็นรายแรกในประเทศไทยผู้ป่วยอายุ 7 เดือน น้ำหนัก 6 กิโลกรัม มีแรงดันที่แตกต่างกันระหว่างหัวใจห้องล่างซ้าย กับหลอดเลือดแดงใหญ่ 76 มม.ปรอท และมีขนาดเส้นผ่าศูนย์กลางลิ้นหลอดเลือดแดงใหญ่ 10 มม. หัตถการได้ผลดี ไม่มีภาวะแทรกซ้อนรุนแรงขณะทำตลอดจนในการติดตามต่อมาอีก 1 เดือน
