

Congenital Pulmonary Valvular Stenosis Treated with Balloon Valvuloplasty in a Woman with 73 Years of Age

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Pulmonary stenosis is one of the most common congenital heart defects, accounting for about 7% of patients in most large study populations.¹ In 95% of cases with pulmonary stenosis the etiology is congenital. Although valvular pulmonary stenosis may be isolated lesion, it can be associated with tetralogy of Fallot, double-outlet right ventricle, ventricular septal defect, tricuspid atresia, transposition of the great arteries or truncus arteriosus.² Pulmonary stenosis can be found in all ages of patients, but in large series, it occurs most commonly in younger ages.^{3,4} Yet, older patients, although rarely, were occasionally reported.^{5,6} Hardy reported three patients of pulmonary stenosis associated with atrial septal defect, the ages were 44, 59 and 69, respectively,⁵ while Sherman reported 4 cases of pulmonary stenosis with ages of 48, 52, 61 and 67, respectively.⁶ In the present report, a 73-year-old female patient with pulmonary stenosis who had been treated successfully with balloon valvuloplasty was reported.

CASE REPORT

This 73-year-old female patient visited our cardiology Out-patient Clinic in May 2013 with complaints of

exertional dyspnea and cyanosis for years. She was diagnosed to have pulmonary valve disease years ago in another hospital when she was suggested to have operation but she refused it. At physical examination, she was at a low blood pressure of 74/45 mmHg with normal heart rate of 82/min. She was noted having clubbing of fingers and toes with cyanotic lips. A harsh Grade IV/VI systolic ejection murmur with a prominent systolic thrill was noted at pulmonary area. It was diagnosed as pulmonary valvular stenosis. Electrocardiogram (Figure 1-A) showed right axis deviation with peaked and tall P wave with prominent initial R wave and clockwise rotation of QRS complexes in right precordial leads, interpreted as right ventricular hypertrophy and right atrial enlargement. Chest x-ray showed prominent pulmonary conus with diffusely reduced pulmonary vasculature. Echocardiography revealed a pressure gradient of 166 mmHg across tricuspid valve indicating very high right ventricular pressure. Right atrium and right ventricle were dilated.

She underwent cardiac catheterization 4 weeks after the first clinical evaluation. A pigtail catheter was advanced via right femoral vein to the main pulmonary artery by the Selinger method. Main pulmonary artery pressure was 29/15 mmHg (mean 23 mmHg) with oxygen saturation of 52%. Right ventricular pressure was 170/18 mmHg. Right brachial arterial blood showed decreased oxygen saturation of 87%.

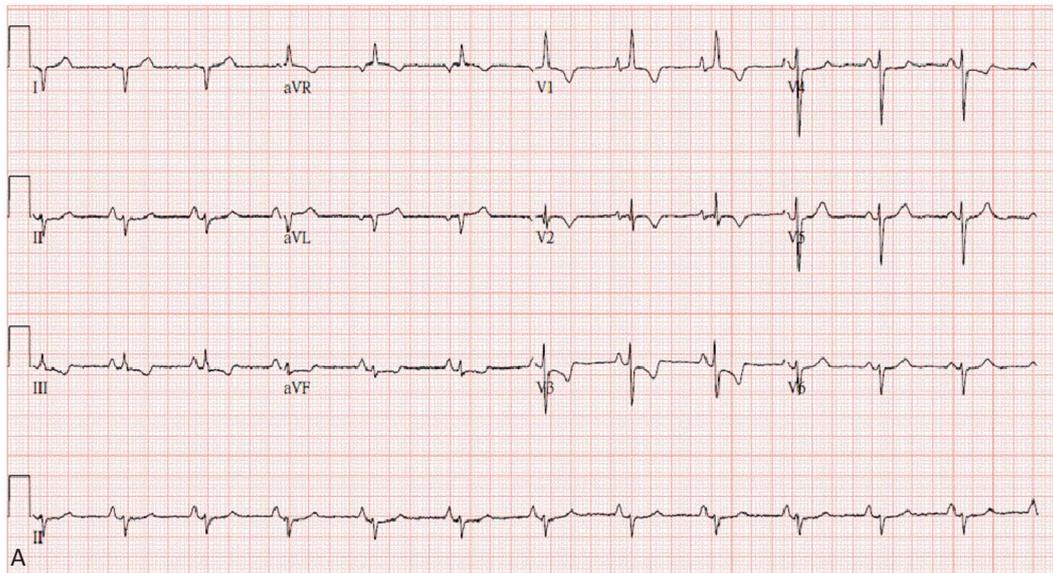
Right ventriculography was performed at right ventricular outflow tract with hand injection of 10 ml contrast medium. It showed thickened pulmonic valve leaflets with dome-shaped pulmonary stenosis and marked post-stenotic dilatation of main pulmonary artery (Figure 2, A, B).

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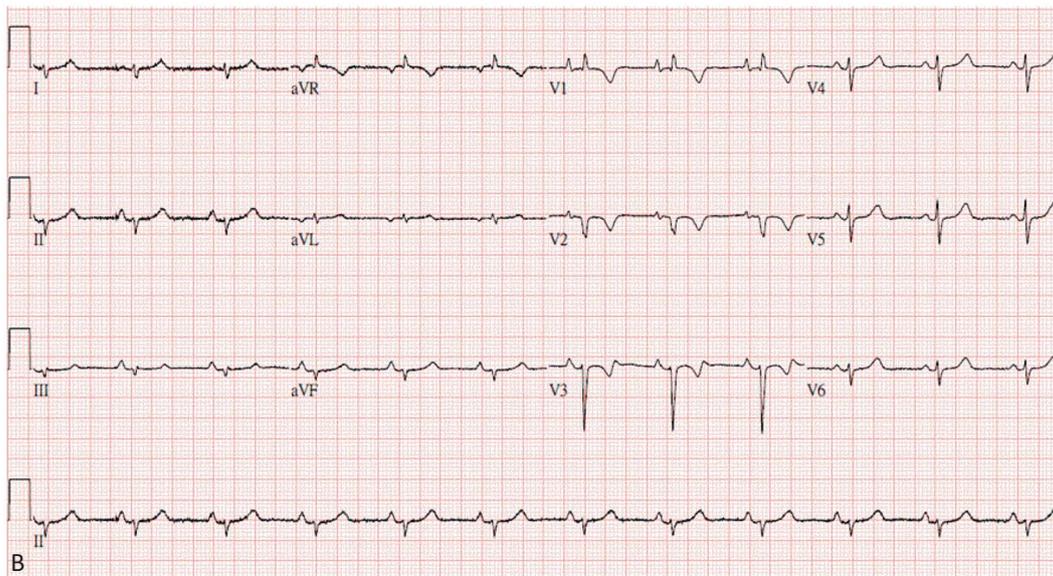
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Electrocardiogram, May 3, 2012, before pulmonary valvuloplasty



Electrocardiogram, May 17, 2018, 6 years after pulmonary valvuloplasty

Figure 1. Electrocardiograms before (A) and 6 years after (B) pulmonary valvuloplasty.

Subsequently pulmonary balloon valvuloplasty was performed first with a 12 × 40 mm Admiral balloon (Admiral balloon CardioVascular Lifeline, Medtronic, Minnesota, USA) introduced via right femoral vein along the 0.035 inch wire to override the stenotic pulmonary valve. The pulmonary valve was dilated for 3 or 4 times each persisting for about 10 seconds. Yet, the pressure gradient was still very high. Thereafter, another balloon of 12 × 40 mm (Wanda, Boston Scientific, Marlborough, USA) was introduced in combination of the Admiral bal-

loon to simultaneously perform dilatation (Figure 2, C, D). A total of 10 dilatations resulted in the final right ventricular pressure of 57/11 mmHg. The final main pulmonary artery pressure was 25/12 mmHg with a pressure gradient across pulmonary valve of about 32/0 mmHg. Post-procedure angiographies showed better visualization of right ventricular outflow tract with thickened pulmonary valves (Figure 2, E, F).

After pulmonary valvuloplasty, her dyspneic symptoms were much improved. At 2.5 months after dis-

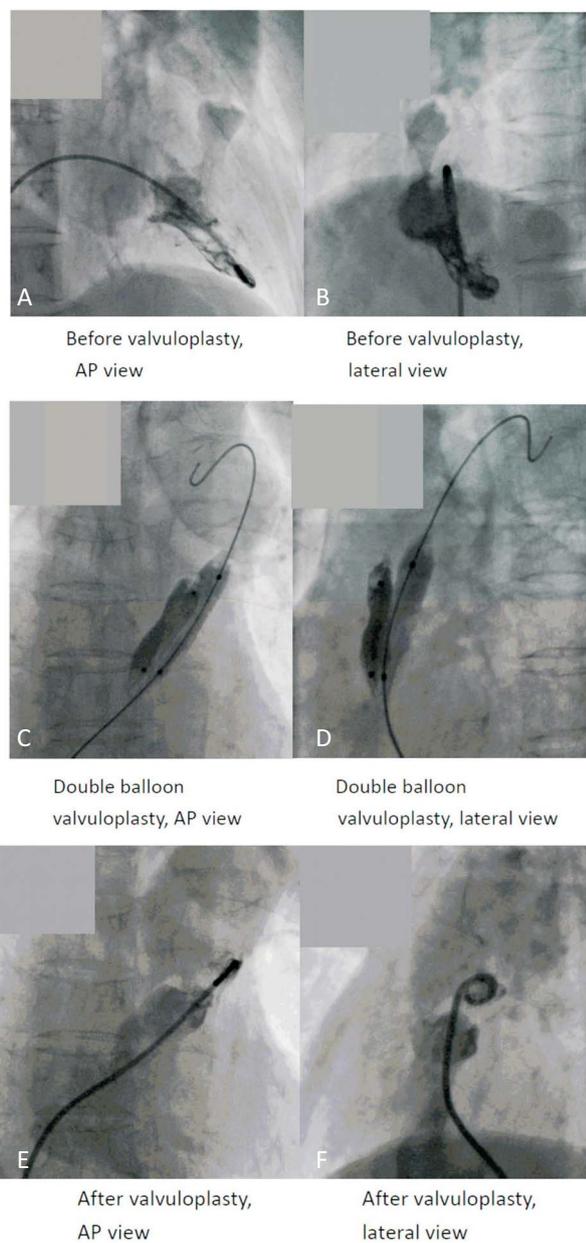


Figure 2. Angiography before during and after balloon valvuloplasty. Before valvuloplasty, the valve was thickened as shown in anterior-posterior view (A) and lateral view (B). (C, D) Pulmonary valvuloplasty was performed with double balloon dilatation. There were some indentations of the balloons at both anterior-posterior view (C) and lateral view (D), indicating some resistance to the balloon dilatations. Angiography of the pulmonary valves after balloon dilatation (E, F). The subinfundibular portion and the valve seemed somewhat increased in size in both anterior-posterior view (E) and lateral view (F). The right ventricular pressure decreased significantly from 170 mmHg to 57 mmHg.

charge, follow-up echocardiography showed a pressure gradient of 58 mmHg across tricuspid valve. She came

for out-patient clinic follow-up for several times in 1 year and then lost follow-up until 6 years after the catheterization when she suffered from some gastro-intestinal problem and came to visit our Emergency Department again, at age 79 years. This time she was found mild cyanotic and electrocardiogram (Figure 1, B) still revealed right atrial and right ventricular enlargement but with less ST-T changes. Echocardiography showed a moderate tricuspid regurgitation with a pressure gradient of 57 mmHg across tricuspid valve suggesting stable pulmonary stenosis.

DISCUSSION

The natural history of many congenital cardiac anomalies in older patients has not been completely defined and will become increasingly difficult to delineate as larger numbers of uncomplicated defects are repaired early in life.⁷ Although data on the incidence of various abnormalities during childhood are available, less is known of their frequency in the older population.

The classical treatment for valvular pulmonary stenosis is surgery.⁴ In 1982, Kahn introduced valvuloplasty for valvular pulmonary stenosis which made the treatment much more accessible.⁸ The Inoue balloon valvulotomy was first introduced for the treatment of valvular pulmonary stenosis in 1993.⁹ We applied the valvuloplasty in this elderly patient, at 73-year of age, for treatment of a severe pulmonary stenosis, first with one balloon followed by double balloons to obtain the acceptable reduction in pressure gradient of the pulmonary valve stenosis.

The patient got much improvement in right ventricular outflow pressure gradient after pulmonary valvuloplasty which persisted after follow-up for 6 years.

This old female patient with severe pulmonary valvular stenosis has been treated with balloon valvuloplasty at an extremely aged 73 years with good results. More interestingly, she has been examined 6 years after first balloon valvuloplasty, at age 79 years, which demonstrated persistent effects of balloon dilatation.

LEARNING POINTS

1. From the experience on this patient, we can learn that

older age is not a contraindication for the treatment of congenital pulmonary stenosis when the patient is in good clinical condition.

2. When the condition is suitable, balloon valvuloplasty should be the first choice for the treatment of congenital pulmonary stenosis. In our patient, we first applied one balloon to dilate the pulmonary stenosis but results were rather unsatisfactory. We then applied double balloon valvular dilatation which gained acceptable results. This step-wise escalation of dilatation balloon size was practical and could obtain safe and better results.

DECLARATION OF CONFLICT OF INTEREST

All the authors declare no conflict of interest.

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