Simultaneous Transcatheter Closure of Ventricular Septal Defect and Pulmonary Valvuloplasty

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Received: Jun 18, 2011; Final Revision: May 05, 2012; Accepted: May 27, 2012

Abstract

Background: Transcatheter balloon valvuloplasty has been the accepted first line treatment for congenital pulmonic stenosis (PS) in children. Transcatheter closure of perimembranous ventricular septal defect (VSD) with Amplatzer VSD occluder is an alternative to surgical repair.

Case Presentation: A 12 year old boy presented with history of exertional dyspnea and atypical chest pain. Physical findings were suggestive of severe pulmonic stenosis. Transthoracic echocardiography, right and left ventricular angiography showed medium to large sized perimembranous VSD and severe valvar pulmonary stenosis. Transcatheter closure of VSD was done first so as to avoid large left to right shunt across VSD after balloon pulmonary valvuloplasty.

Conclusion: We demonstrated the feasibility and success in treating combined ventricular septal defect and severe pulmonary valve stenosis with transcatheter interventional procedure in the same session.

Key Words: Balloon Valvuloplasty; Simultaneous Transcatheter; VSD; Pulmonary Stenosis; Balloon Catheterization

Introduction

Congenital pulmonary valve stenosis (PVS) and perimembranous ventricular septal defect (PMVSD) are relatively common forms of congenital heart anomaly. Since the first report of balloon dilation of pulmonary valve stenosis in 1982[1], it has been the treatment of choice for isolated moderate and severe pulmonary valvular stenosis in children[2,3]. Transcatheter closure of perimembranous ventricular septal defect (VSD) is an interesting alternative to surgical repair[4]. However, there are a few case reports where valvular pulmonic stenosis (PS) and PMVSD were addressed simultaneously by transcatheter procedures. We report the successful concurrent percutaneous balloon dilatation of severe pulmonary valve stenosis and Amplatzer VSD occlusion of a large perimembranous VSD in a 12-year-old Iranian boy.

Case Presentation

A 12-year old boy presented with history of exertional dyspnea and atypical chest pain. Physical findings were suggestive of severe valvar
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**Discussion**

Since 1982[1] balloon dilatation of the pulmonary valve has become an established treatment of choice in the management of isolated pulmonary valve stenosis in children[2] as well as in...
adolescents and adults\[5\]. Both short and long term results of pulmonary balloon valvuloplasty in children and adults are excellent\[6,7\]. Transcatheter closure of isolated perimembranous VSD is safe and effective\[8,9\]. The major complication of PMVSD device closure is the development of complete heart block\[8,10\].

Advances in transcatheter interventional therapy, have changed the therapeutic strategy for many patients with congenital heart anomaly. Many congenital heart diseases, such as VSD, atrial septal defect, patent ductus arteriosus, PS, aortic stenosis, mitral stenosis and coarctation of the aorta now can be treated by transcatheter interventional technology\[11-14\].

In a patient with ventricular septal defect and valvular pulmonary stenosis, treating one defect may lead to adverse hemodynamic effect on the other. There is a few case reports wherein transcatheter closure of VSD and pulmonary valvuloplasty were performed simultaneously\[11-12,15\].

The decision to simultaneously attempt VSD device closure and valvuloplasty depends upon various factors: 1) the degree of pulmonary valve stenosis, 2) anatomy of the pulmonary valve, 3) size of VSD, 4) sufficient aortic margin of VSD, and 5) no aortic valve prolapse. Patient with moderate or severe pulmonary valve stenosis and associated medium or large VSD should be subjected to simultaneous closure of the VSD and balloon pulmonary valvuloplasty in the same catheter session.

In our patient ventricular septal defect was done before pulmonary valvuloplasty. Certain technical consideration made us attempt the device VSD closure first. There was a fear of acute congestive heart failure and pulmonary edema as a result of increased pulmonary blood flow into previously protected pulmonary artery circulation. In addition, closure of VSD is technically more difficult and could take long time so the device was implanted before attempting balloon pulmonary dilation.

However, the advantage of simultaneous closure of VSD and pulmonary dilation is obvious, obviating of the need for thoracotomy, and open heart surgery, thus avoiding subsequent surgical scar and post operative pain. The only disadvantage of such a combined transcatheter therapy especially in a country like Iran is higher cost compared to open cardiac surgery\[16\].

**Conclusion**

Transcatheter interventional therapy for compound VSD and valvar PS at the same time is feasible and effective without much added risk.

**References**


