
Case Report

Closure of a Muscular Ventricular Septal Defect Using the Amplatzer Ventricular Occluder

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Surgical closure of ventricular septal defect is safe, however, the inherent risks associated with cardiopulmonary bypass and the potential early and late postsurgical complications including complete heart block, arrhythmias, postpericardiotomy syndrome, and rare deaths have led physicians to prefer transcatheter occlusion technique for closure of such defects. The use of Amplatzer muscular ventricular septal defect occluder is safe and associated with a higher success rate than other previously used devices. For the first time in Iran, we report an 18-year-old patient with ventricular septal defect who was successfully treated using the Amplatzer ventricular septal defect occluder.

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Introduction

Surgical closure of ventricular septal defect (VSD) is safe,¹ however, the inherent risks associated with cardiopulmonary bypass and the potential early and late postsurgical complications including complete heart block, arrhythmias, post-pericardiotomy syndrome, and rare deaths have led the physicians and patients to prefer transcatheter occlusion technique for closure of such defects.^{1, 2} The use of Amplatzer muscular VSD occluder is safe and associated with a higher success rate than other previously used devices.³ We report the first successful transcatheter VSD closure in Iran, using the Amplatzer VSD occluder.

Case Report

An 18-year-old male student with clinical and echocardiographic diagnosis of VSD was referred to our center for further evaluation and treatment. Transesophageal echocardiography showed the presence of an 11 mm, mid-septal muscular VSD with left-to-right shunt. A right and left heart catheterization was performed, which confirmed the followings: 1) presence of the defect, 2) pulmonary systolic arterial pressure =50 mmHg, 3) aortic pressure =100/50 mmHg, and 4) pulmonary to systemic flow ratio of 1.5. Because of the above findings and the fact that the patient was highly symptomatic, we decided to perform transcatheter VSD closure. Written informed consent was obtained from the patient and his parents.

In June 2003, under local anesthesia, the right femoral artery and the right internal jugular vein were cannulated. The VSD was uneventfully crossed using a retrograde arterial approach with a 6 French right Amplatzer catheter and a guide wire. Transthoracic echocardiography was concomitantly done to guide the wire into the VSD entrance. After entering the wire into the right ventricle, it was advanced into the pulmonary artery, where its end was snared with a 25-mm

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Amplatzer goose-neck catheter and then pulled back into the jugular vein. Then, Amplatzer delivery sheath was inserted and was advanced via the arteriovenous guide wire loop and the VSD into the left ventricle. To increase the device's closing ability, the length of the device was selected 18 mm. An Amplatzer septal occluder (AGA Medical Corporation, USA), screwed on the delivery wire, compressed into the loader and introduced into the sheath. The distal disk was configured in the left ventricle and pulled back under echocardiographic and fluoroscopic guidance, locating the central part of the occluder in the VSD. The proximal disk and then the distal disk deployed once the septal alignment was confirmed. Lastly, the device was released (Figure 1). Left ventriculography was done 10 minutes after the device release, which showed the presence of minimal residual VSD. Intravenous heparin was used and antibiotic for prophylaxis was prescribed.

The patient was discharged and ASA 325 mg once daily and ticlopidine 250 mg twice daily per oral were prescribed for him. He was subsequently visited at one week, two weeks, one month, two months, and three months interval. Although his initial post intervention transesophageal echocardiography had revealed the presence of minimal residual VSD, his last evaluation (3 months later) showed almost complete closure of the defect. During that period, he developed no episode of hemolysis, thromboembolic complications, valvular regurgitation, interventricular septal hematoma, or endocarditis. Holter monitoring was done four times during the follow-

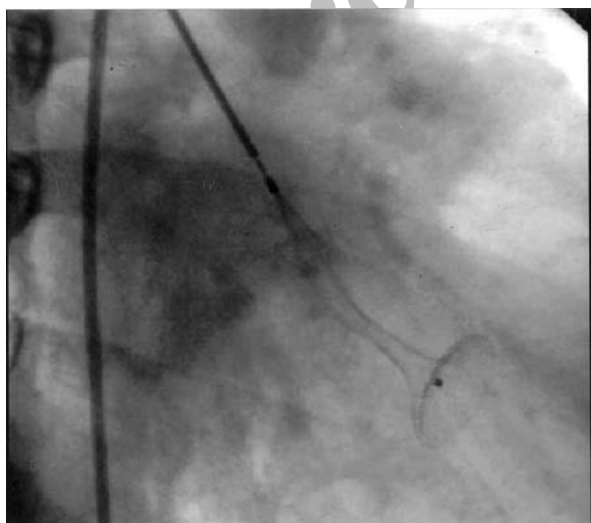


Figure 1. An Amplatzer septal occluder. The distal disk is configured in the left ventricle and pulled back.

up period that did not show any significant arrhythmia or complete heart block.

Discussion

The closure of muscular VSD has remained a challenge to physicians, because the surgical closure might be associated with undesirable complications.^{4 - 7} Therefore, the availability of devices designed specifically to close the muscular VSDs is appealing. Thanopoulos et al were the first who successfully employed the Amplatzer ventricular septal occluder to close muscular VSDs from the venous route in human.⁸ Since then, however, the technique has been used to close these defects using either the venous or arterial routes for device delivery.⁹ In properly selected cases, the transcatheter closure is safe and efficacious, with the success rate being higher with the Amplatzer device compared with other previously used devices.⁵

Our patient is the first one who has successfully and uneventfully undergone muscular VSD closure from the venous/arterial route in Iran. We suggest that this novel treatment can replace the surgical technique and prevent its associated complications.

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