Incomplete Endothelialization and Late Development of Acute Bacterial Endocarditis After Implantation of an Amplatzer Septal Occluder Device

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A 4-year-old girl with a history of a moderate-sized secundum atrial septal defect and mild mitral valve prolapse underwent transcatheter closure with a 22-mm Amplatzer septal occluder (ASO) (AGA Medical Corporation, Golden Valley, Minn) device. Approximately 12 months later, she presented to the emergency department in septic shock with a 5-day history of fevers up to 105°F and was transferred to the pediatric intensive care unit. Her blood and urine cultures grew methicillin-sensitive Staphylococcus aureus within 24 hours. Multiple septic emboli were found on a brain magnetic resonance imaging scan.

A transthoracic echocardiogram revealed vegetations on the mitral and tricuspid valves (Figures 1 and 2 and Movies I and II), with a perforation in the mitral valve and severe mitral insufficiency. The patient was taken to the cardiovascular operating room, and severe mitral and tricuspid valve endocarditis was confirmed. The ASO device showed only minimal endothelialization (Figure 3) and extensive purulent material was present throughout, with several loculated abscesses adherent to the device (Figure 4). There was a large, windsock-like vegetation on the mitral valve. The mitral valve had several perforations and necrosis of ≈75% of the anterior leaflet, and the tricuspid valve had a large abscess adherent to the septal leaflet. The ASO device was removed, the mitral valve was repaired, and the defect was closed with pericardium. At the completion of the repair, the patient had mild to moderate mitral regurgitation with no mitral stenosis.

Postoperatively, the patient recovered without further complications. She was treated for 6 weeks with nafcillin, including synergistic therapy with gentamicin initially. At the time of discharge, the patient had moderate mitral insufficiency, mild tricuspid regurgitation, and good biventricular function.

This is the first case of late endocarditis with an ASO device. The patient was previously known to have an abnormal mitral valve with mild prolapse and trivial regurgitation, and she was maintained on subacute bacterial endocarditis prophylaxis for cause. The endocarditis, however, was located primarily between the ASO device and the anterior leaflet of the valve. The infection extended throughout the ASO device and to both the left and right atria. The patient survived without neurological deficits but did have significant residual cardiac defects that subsequently necessitated a second mitral valve repair ≈18 months after the surgical procedure described in the present report. At the most recent follow-up, she had trivial mitral regurgitation, no mitral stenosis, a mildly dilated left atrium, and normal biventricular size and function.

The lack of endothelialization and development of late endocarditis in this patient are both causes for concern. Although in animal models, most atrial septal defect devices fully endothelialize within 3 months, there has been only 1 study with humans, in which the Clamshell device was used. The lack of endothelialization and development of late endocarditis in this patient are both causes for concern. Although in animal models, most atrial septal defect devices fully endothelialize within 3 months, there has been only 1 study with humans, in which the Clamshell device was used.1

No human studies exist defining the endothelialization of the ASO device. Given the worldwide acceptance and increasing utilization of the ASO device, there are likely additional patients with delayed incorporation that could present a late risk for infectious complications. The appropriate length of subacute bacterial endocarditis prophylaxis for patients after ASO device implantation was arbitrarily determined, and that treatment time has been continued as standard of care. Although the present report is only a single case of a late complication after implantation of an ASO device, it illustrates the need for long-term follow-up of patients who have received this device, as well as an increased index of suspicion for device complications if these patients present with septic or embolic phenomenon.

Disclosures

None.

Reference

Figure 1. Transthoracic echocardiographic image in the parasternal long-axis plane showing a large, irregular vegetation on the mitral valve. LV indicates left ventricle; AO, aorta; and LA, left atrium.

Figure 2. Transthoracic echocardiographic image in a modified apical 4-chamber imaging plane showing a large vegetation located above the tricuspid valve. The ASO device is seen within the atrial septum, and the mitral valve vegetation is again visualized. RV indicates right ventricle; LV, left ventricle.

Figure 3. Intraoperative photograph showing the minimal endothelialization of the ASO device while still in place on the atrial septum.

Figure 4. Intraoperative photograph showing a loculated abscess on the ASO device.
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