A 37-year-old man was referred to our emergency department after 4 days of a spiking fever of up to 40°C, myalgia, and new development of multiple, small, nontender erythematous macular lesions on his palms and soles compatible with Janeway lesions (Figure 1). He had a history of a large secundum atrial septal defect for which he underwent transcatheter closure with a 24-mm Amplatzer septal occluder (ASO; AGA Medical Corporation, Golden Valley, Minnesota) 4 years prior. The procedure was successful without any residual shunts. One month before his febrile episode, he had received periodontal scaling without antibiotic prophylaxis based on the current guidelines. He adamantly denied a history of intravenous drug abuse, and there was no evidence of immunodeficiency disorders. His blood cultures grew methicillin-sensitive Staphylococcus aureus within 24 hours.

Transesophageal echocardiography revealed a 2.1 × 1.4 cm nonmobile hyperechogenic mass attached to the right atrial side of his ASO, which encompassed the aortic rim and extended into the intervalvular fibrosa, compatible with aortic root abscess (Figure 2A and Movie I in the online-only Data Supplement). Bicaval views revealed that the 2 discs of his ASO were heaving with hyperechogenic materials (Figure 2B and Movie II in the online-only Data Supplement). Additionally, there was a large (1.6 cm in maximal length) elongated hypermobile echogenic material attached to the left atrial side of the device (Figure 2C and 2D and Movies III and IV in the online-only Data Supplement). Three-dimensional transesophageal echocardiography and cardiac-gated computed tomography clearly visualized the hyperechogenic materials and surrounding abscesses (Figure 3A and 3B and Movies V and VI in the online-only Data Supplement).

Subsequently, he underwent surgery to remove the seriously infected ASO through a right atrial approach. Abscess pockets and necrotic debris were found around the device rims (Figure 4A). The noncoronary sinus was severely inflamed and a partial rupture was suspected. Therefore, the defect and rim and extended into the intervalvular fibrosa, compatible with aortic root abscess (Figure 2A and Movie I in the online-only Data Supplement). Bicaval views revealed that the 2 discs of his ASO were heaving with hyperechogenic materials (Figure 2B and Movie II in the online-only Data Supplement). Additionally, there was a large (1.6 cm in maximal length) elongated hypermobile echogenic material attached to the left atrial side of the device (Figure 2C and 2D and Movies III and IV in the online-only Data Supplement). Three-dimensional transesophageal echocardiography and cardiac-gated computed tomography clearly visualized the hyperechogenic materials and surrounding abscesses (Figure 3A and 3B and Movies V and VI in the online-only Data Supplement).

Subsequently, he underwent surgery to remove the seriously infected ASO through a right atrial approach. Abscess pockets and necrotic debris were found around the device rims (Figure 4A). The noncoronary sinus was severely inflamed and a partial rupture was suspected. Therefore, the defect and noncoronary sinus were repaired with bovine pericardium. The removed ASO exhibited incomplete endothelialization on the left atrial surface of the metallic mesh (Figure 4B). There were infected materials on either surface and between the two discs (Figure 4C). Postoperatively, the patient received 6 weeks of antibiotics with nafcillin in combination with rifampin, including synergistic therapy with gentamicin initially. He recovered without further complication, and was discharged to his home.

Over the past few decades, the development of several occluding devices has made percutaneous device closure a less invasive alternative to open heart surgery, with widely acceptable results. Although animal studies have demonstrated complete endothelialization by neoendothelium at 3 months after ASO implantation,1 the reports of incomplete endothelialization of the device complicated by thrombus formation, delayed bacterial endocarditis, or late dislocation cause great concern.2,3 Moreover, human autopsy findings of an ASO at 5 months after device implantation revealed almost no endothelialization on the surface of the metallic mesh, even though the atrial septal defect seemed to be completely closed on echocardiography.4 Currently, antiplatelet therapy and prophylaxis of endocarditis are recommended for 6 months after device implantation, although the recommendation thereof is based solely on the results from animal experimentation. Moreover, there is no specific method for confirming complete endothelialization on the surface of the device through follow-up of individual patients. Our case suggests the prolonged administration of antibiotic prophylaxis to prevent serious delayed complications after ASO implantation until there are conclusive data.

Disclosures
None.

References


**Figure 1.** Multiple, small, nontender erythematous macular lesions on palms and soles.

**Figure 2.** Two-dimensional transesophageal echocardiography visualizes (A) aortic root abscess, (B) infested materials between the 2 discs of the device, and (C and D) a large elongated hypermobile echogenic material attached to the left atrial side of the device (arrows). Ao indicates aorta; IVC, inferior vena cava; LA, left atrium; LV, left ventricle; RA, right atrium; and SVC, superior vena cava.
Figure 3. Three-dimensional transesophageal echocardiography (A) shows hyperechogenic materials attached to the left atrial side of the device, and cardiac-gated computed tomography (B) visualizes multiple abscess pockets around the device (arrows). LA indicates left atrium; and RA, right atrium.

Figure 4. Intraoperative findings (A) are compatible with abscess pockets and necrotic debris around the device rims, and the removed ASO (B and C) exhibits incomplete endothelialization on the surface of the metallic mesh.
Late Bacterial Endocarditis and Abscess Formation After Implantation of an Amplatzer Septal Occluder Device
Dong-Jun Kim, Chi Young Shim, Seng Chan You, Seung-Hyun Lee and Geu-Ru Hong

Circulation. 2015;131:e536-e538
doi: 10.1161/CIRCULATIONAHA.115.016339
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2015 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/131/25/e536

Data Supplement (unedited) at:
http://circ.ahajournals.org/content/suppl/2015/06/22/CIRCULATIONAHA.115.016339.DC1

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org//subscriptions/