A 78-year-old woman with permanent atrial fibrillation was referred to our institution for percutaneous left atrial appendage (LAA) occlusion. The patient had a high thromboembolic risk based on a CHA2DS2-VASc score of 8 and was on oral anticoagulant therapy with rivaroxaban at a dose of 20 mg/d. Because of major postural instability, the patient experienced recurrent falls with subsequent large and disabling superficial hematomas. The HAS-BLED score was 4. The procedure was performed under general anesthesia and with transesophageal echocardiogram guidance. After transseptal puncture, a 5-Fr multipurpose catheter was used to engage and inject the LAA. The maximal diameter of the ostium and the landing zone of the LAA were measured at 22 and 25 mm using transesophageal echocardiogram (Figure 1A) and at 22 and 21 mm using angiography (Figure 1B). Based on these measurements, we estimated an average diameter of the landing zone of 23 mm and we decided to implant a 26-mm Amplatzer Cardiac Plug (ACP; St. Jude Medical).

After device deployment, all criteria of correct implantation were checked. Adequate compression of the device lobe was noted with a good separation between the device lobe and the disc. The device lobe was aligned with the neck of the appendage (Figure 2A) and more than two third of the device lobe was located distal to the circumflex artery (Figure 2B). Finally, we applied a slight tension on the delivery cable (wiggle test), which confirmed device stability (Figure 2C).

The ACP was then released by removing the delivery cable. The patient experienced no procedural complication and was discharged the following day after control transthoracic echocardiogram showing no pericardial effusion and the absence of device dislodgement. Dual antiplatelet therapy with aspirin and clopidogrel was given, and a transesophageal echocardiogram control was planned at 6 weeks. One month after the procedure, the patient was readmitted to our institution, out of working hours, for acute dyspnea at rest and severe hypotension. Chest radiograph disclosed major pulmonary edema, and...
the ECG showed atrial fibrillation with diffuse ST-segment depression. A control transthoracic echocardiogram showed a suspicion of dislodgement of the ACP into the left ventricle (LV). Embolization of the ACP into the LV was confirmed by transesophageal echocardiogram with entrapment of the device in the anterior mitral apparatus. Severe mitral regurgitation secondary to mitral chordae rupture was noted with the presence of a flail anterior leaflet (Figure 3A and 3B; Movies I–III in the Data Supplement). Moreover, the device caused dynamic obstruction of the LV outflow tract. Because of the critical hemodynamic state, a decision was made for urgent surgical removal of the device. Unfortunately, the patient went into cardiac arrest before access to the operating room and ultimately died.

Discussion
Percutaneous LAA occlusion is an effective alternative to oral anticoagulation in patients with atrial fibrillation and previous major bleeding or at high-bleeding risk. However, as with most invasive procedures, it is not free of complications. Embolization of LAA closure devices has been reported with an average rate of 3.9% and occurs mainly in the early postprocedural period. Although device embolization into the aorta or the left atrium is usually asymptomatic and can be managed by percutaneous retrieval, embolization in the LV cavity is a more serious complication, which usually requires surgical retrieval. To the best of our knowledge, this is the first report of delayed embolization of a LAA closure device resulting in fatal outcome. Several important aspects of this case deserve comments. First, in case of embolization, the likelihood that a large-sized device, such as the one implanted in our patient (lobe diameter, 26 mm; disc diameter, 32 mm), could exit the aortic valve is low. Second, as the ACP device was stuck in the LV cavity, it caused severe damage to the mitral apparatus with subsequent severe mitral regurgitation and major hemodynamic instability. Finally, this case shows that delayed and serious complications can occur after LAA closure, underscoring the need for careful clinical and echocardiographic follow-up in these patients.
Disclosures
Dr Aminian is consultant and proctor for St. Jude Medical.

References

Keywords: Amplatzer Cardiac Plug • complications • death • embolization • left atrial appendage closure • mitral valve insufficiency

Figure 3. Delayed embolization. A, Entrapment of the Amplatzer Cardiac Plug (yellow arrow) in the anterior mitral apparatus with flail leaflet (yellow dotted arrow). B, Severe mitral regurgitation (yellow dotted arrow) and left ventricular outflow tract (LVOT) obstruction (yellow arrow). LA indicates left atrium; and LV, left ventricle.
Delayed and Fatal Embolization of a Left Atrial Appendage Closure Device
Adel Aminian, Iman Chouchane, Michèle Compagnie, Michael Decubber and Jacques Lalmand

Circ Cardiovasc Interv. 2014;7:628-630
doi: 10.1161/CIRCINTERVENTIONS.114.001546
Circulation: Cardiovascular Interventions is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2014 American Heart Association, Inc. All rights reserved.
Print ISSN: 1941-7640. Online ISSN: 1941-7632

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circinterventions.ahajournals.org/content/7/4/628

Data Supplement (unedited) at:
http://circinterventions.ahajournals.org/content/suppl/2014/08/01/CIRCINTERVENTIONS.114.001546.DC1

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation: Cardiovascular Interventions 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: Cardiovascular Interventions is online at:
http://circinterventions.ahajournals.org//subscriptions/