

Late Migration of Amplatzer Septal Occluder Device to the Descending Thoracic Aorta

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Percutaneous closure of atrial septal defect (ASD) has become an increasingly common procedure. Serious complications of the procedure, such as cardiac migration, are rare, and usually occur <72 hours after device placement. In this report, we present the case of a patient who underwent successful surgical treatment for the migration of an ASD occluder device to the thoracic aorta 12 months after ASD closure.

Key words: 1. Atrial heart septal defect
2. Septal occluder device
3. Foreign-body migration
4. Thoracic aorta
5. Bilateral thoracotomy

Case report

Atrial septal defect (ASD) is the fourth most common congenital heart defect, with an incidence of 2.78 per 10,000 live births [1]. Surgical closure of ASD has been practiced for more than 45 years and is considered the method of choice. The first application of ASD closure in humans was in 1974, by Lock [2], and the technique was pioneered by William. Recently, a variety of devices for transcatheter closure of ASD have become available, and this technique is increasingly used as an alternative to open surgery [3,4]. The rate of failure, including dislodgement, migration, or embolization, has been reported to be around 0.5% [5]. In this report, we present the case of a patient who underwent successful surgical treatment for the migration of an ASD occluder device to the descending aorta 12 months after ASD closure.

A 65-year-old man was admitted to the cardiology

clinic at Gangnam Severance Hospital with progressively limiting exertional dyspnea. He had an ASD secundum, which had been diagnosed 10 years earlier. Echocardiography on admission showed a 2.3×1.7-cm, oval-shaped ASD. The patient underwent transcatheter closure using a 24-mm Amplatzer septal occluder (AGA Medical Co., Golden Valley, MN, USA) guided by transesophageal echocardiography (TEE). Conventional chest radiography was performed every morning after implantation. The patient was discharged after 3 days of hospitalization. The proper position of the device was confirmed by transthoracic echocardiography (TTE) on the day of discharge. There were no immediate postoperative complications.

The patient underwent clinical examination, electrocardiography, chest radiography, and TTE at 1 month and 6 months after ASD closure. At a routine follow-up visit, a year after implantation, the diagnosis of device migration was made based on a chest

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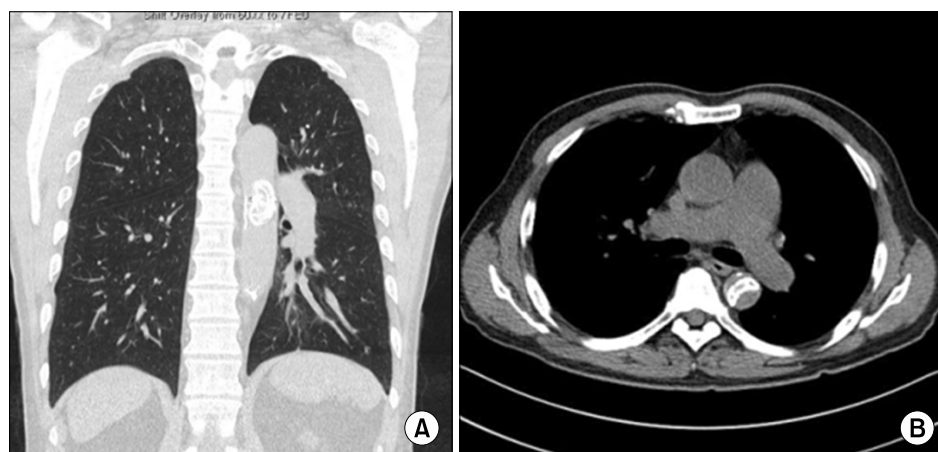


Fig. 1. (A, B) Chest computed tomography scan showing the migrated Amplatzer occluder device.

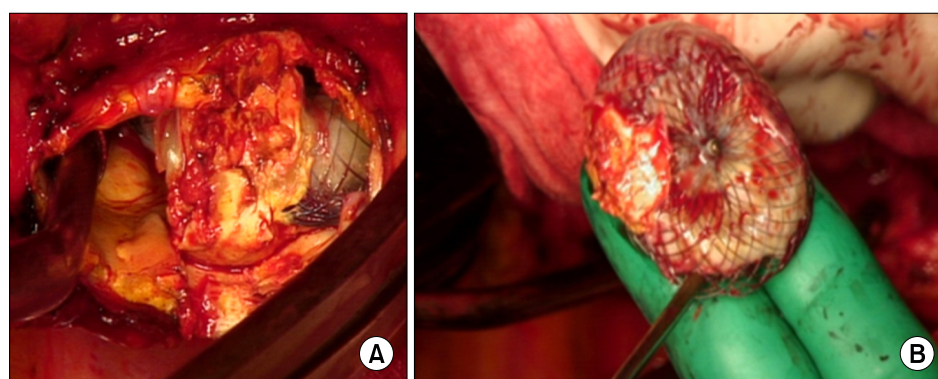


Fig. 2. (A) Photograph taken during surgery showing the tear into the aorta caused by the edge of the Amplatzer device, and (B) an en face view of the device.

computed tomography (CT) scan and echocardiography (Fig. 1). The chest CT scan showed the presence of the ASD occluder device in the descending thoracic aorta at the level of T6-T7. TEE showed no interruption in aortic blood flow between the device and the aortic lumen. The patient had no symptoms, such as chest discomfort or dyspnea, associated with ASD occluder migration. Physical examination revealed no abnormal findings. Because of the risk of aortic plugging or perforation, the patient was referred to the operating room.

With the patient in the supine position, clamshell incisions were made bilaterally into the fifth intercostal space, and the pericardium was incised vertically. Following standard bicaval cannulation and aortic cross-clamping, antegrade blood cardioplegia was introduced. Patch repair of ASD was carried out using a bovine pericardial patch.

During the rewarming period, the descending thoracic aorta was cross-clamped at the level of T5 (proximally) and T8 (distally), and was opened

longitudinally. The device was removed through the incision after adhesiolysis (Fig. 2). The aortic wall was closed using a primary simple suture. Pathological examination of the retrieved specimen showed that structural integrity of the device was maintained without distortion (Fig. 2).

The aortic cross-clamp (ACC) time for the removal of the ASD device was 9 minutes, and the total operation time was 116 minutes with an ACC time of 43 minutes. The patient stayed in the intensive care unit for 36 hours postoperatively. There were no perioperative or postoperative complications.

Discussion

Until recently, open surgical repair of ASD has been the only available treatment [1]. A number of different devices are available for transcatheter ASD closure, with the Amplatzer device being the first choice for closing defects of secundum ASD larger than 18 mm [4].

The overall incidence of complications of transcatheter ASD closure has been reported to range from 6.1% to 11.1%, with embolization and malposition being the most common (3.5%), accounting for half of the complications during hospitalization. Embolization occurs with 24-mm or larger devices, while malposition occurs with 19-mm and 22-mm devices [1].

The dislocated device can migrate to the main pulmonary artery [1,5], left ventricle, left atrium [6], ascending aorta [6], aortic arch [4], or descending thoracic aorta. Devices usually embolize into the main pulmonary artery (89%). Most migrations (67%) are detected within the first 24 hours [5], and migration to the descending thoracic aorta in the late post-operative period (>1 year) is an extremely rare occurrence. This case was remarkable for the fact that migration occurred a few months after implantation, highlighting the need for careful follow-up, particularly when the rim of the ASD is insufficient.

Divekar et al. [6] reviewed all the 29 reported complications of Amplatzer septal occluder devices and found that embolization tended to occur when the aortic rim was insufficient. In our case, it appeared that the posterior rim of the atrial septum was very thin and highly mobile.

Classically, median sternotomy provides exposure to the anterior and middle mediastinum, and it is ideal for access to the heart and innominate vessels. However, the descending thoracic aorta and posterior aspect of the aortic arch are inaccessible through this approach. Bilateral anterior thoracotomies (clamshell) allow access to all aspects of the thoracic aorta, both pulmonary vessels, superior vena cava, inferior vena cava, both atria, and both ventricles [7]. Furthermore, this approach allows for easy extension to the neck and abdomen if further control is required [8]. Therefore, a clamshell incision was chosen for ASD device removal and ASD repair.

To the best of our knowledge, this is the first reported case of the late migration of an occluder device to the descending thoracic aorta, and the only reported use of a clamshell incision for ASD device removal and ASD repair.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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