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Case Report

Asymptomatic late embolization of Amplatzer septal occluder device

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ABSTRACT

Atrial septal defects of Ostium Secundum type with suitable anatomy and margins are commonly closed with septal occluder devices. With the increasing number of catheterization laboratories and increasing availability of different devices, the device closure procedure is very commonly performed in different institutes. Embolization of the septal occluder is one of the most dreaded complications of this procedure, which usually occurs in the early hours or days after the procedure. We report a case of silent embolization of the Amplatzer septal occluder, detected seven months after its use to close an Ostium Secundum atrial septal defect, which was detected during pre-anaesthetic evaluation and echocardiography for non-cardiac surgery. The patient denied having any symptom in-between. The device was retrieved and the defect was closed surgically.

1. Introduction

Device closure is one of the main strategies of managing patients with Ostium Secundum atrial septal defects. Amplatzer septal occluder is one of the most commonly used devices for this purpose. One of the major complications of this procedure is the device migration after implantation, which is a potentially life threatening complication. Device embolization commonly occurs during the initial hours to the first 24 h, but can also occur late after implantation. Patients develop symptoms depending upon the chamber to which the device is migrated. Migration of large device to left side will most commonly present with obstruction of mitral inflow or left ventricular outflow. In such cases, there will be breathlessness and features of left sided heart failure of varying severity. In case of right sided migration, the device may be in the right ventricle producing ventricular arrhythmias and may also produce symptoms due to right ventricular inflow or out-flow tract obstruction. Immediate retrieval of the device percutaneously or by surgery and closing the defect is the usual line of management.

2. Case report

A 48 year old woman was referred to cardiology out-patient department for pre-operative evaluation as she was suffering from recurrent severe pain abdomen due to multiple large gallstones requiring early surgery. She underwent device closure of her Ostium Secundum atrial septal defect (ASD) in another institute seven months prior to the presentation. Medical records revealed that she had an Ostium Secundum ASD of 26 mm and an Amplatzer type septal occluder of 30 mm was used to close the defect. Transthoracic echocardiography at two weeks after the procedure in the same institute reported a normal position of the device without residual shunt. She was put on Aspirin 150 mg and Clopidogrel 75 mg daily, which she was continuing after the procedure. There was no record of any follow-up after that and she denied having any symptom subsequently. On examination, her heart rate was 88 beats per minute regular, blood pressure was 126/70 mm Hg, and Jugular veins were not engorged. S_1 was normal; S_2 had wide and fixed splitting with loud P_2. There was a grade 3/6 ejection systolic murmur at left upper parasternal area and a pansystolic murmur of grade 3/6 at left lower sternal border. ECG showed sinus rhythm with incomplete right bundle branch block. Patient was having all the clinical signs of a Secundum ASD which should not have been there after closure of the defect. She was taken for immediate transthoracic echocardiography and subcostal view showed a large Ostium Secundum ASD without any occluder device in and around the ASD [Fig. 1(a)]. The defect was measured to be of 25 mm in long axis of the septum with left to right shunt. The inferior vena cava (IVC) and the aortic rim of the defect were absent [Fig. 1(b)]. Further evaluation revealed that the device embolized to the right ventricle and was lying in the right ventricular cavity below the attachment of the septal leaflet of the tricuspid valve [Fig. 2(a)] and partially across the right ventricular outflow tract without obstructing the flow across right ventricular outflow tract [Fig. 2(b)]. The tricuspid valve function was almost normal with mild tricuspid regurgitation. The calculated Qp/Qs

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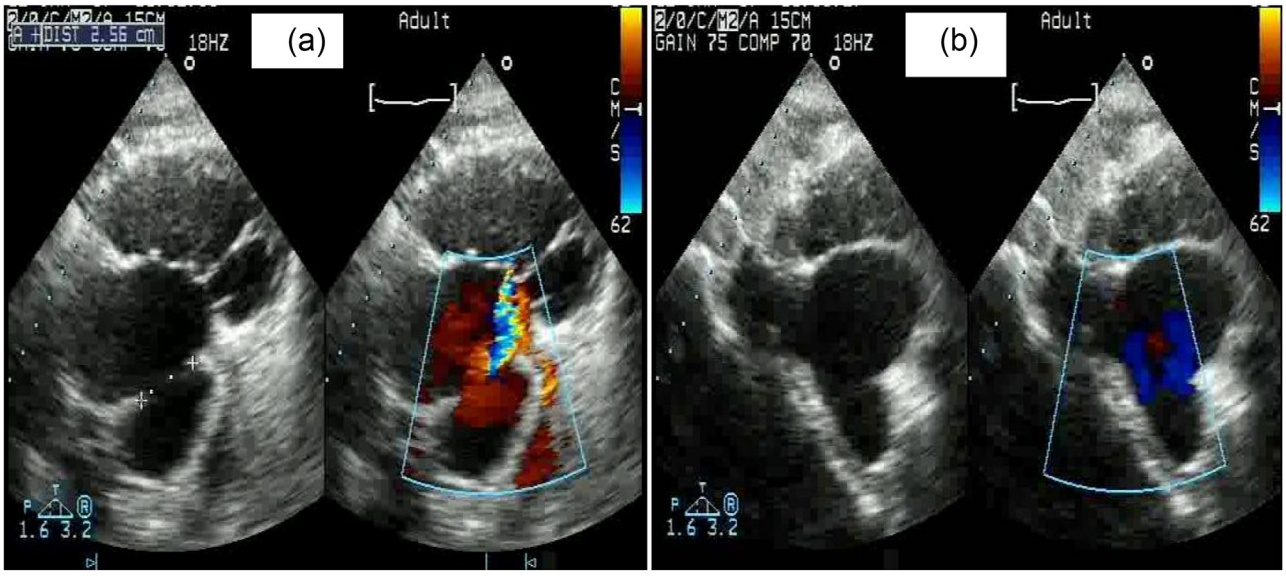

Fig. 1. Echocardiography with color Doppler in subcostal view. 1(a) Ostium Secundum ASD with left to right flow and mild tricuspid regurgitation, 1(b) Total absence of IVC and aortic rim.

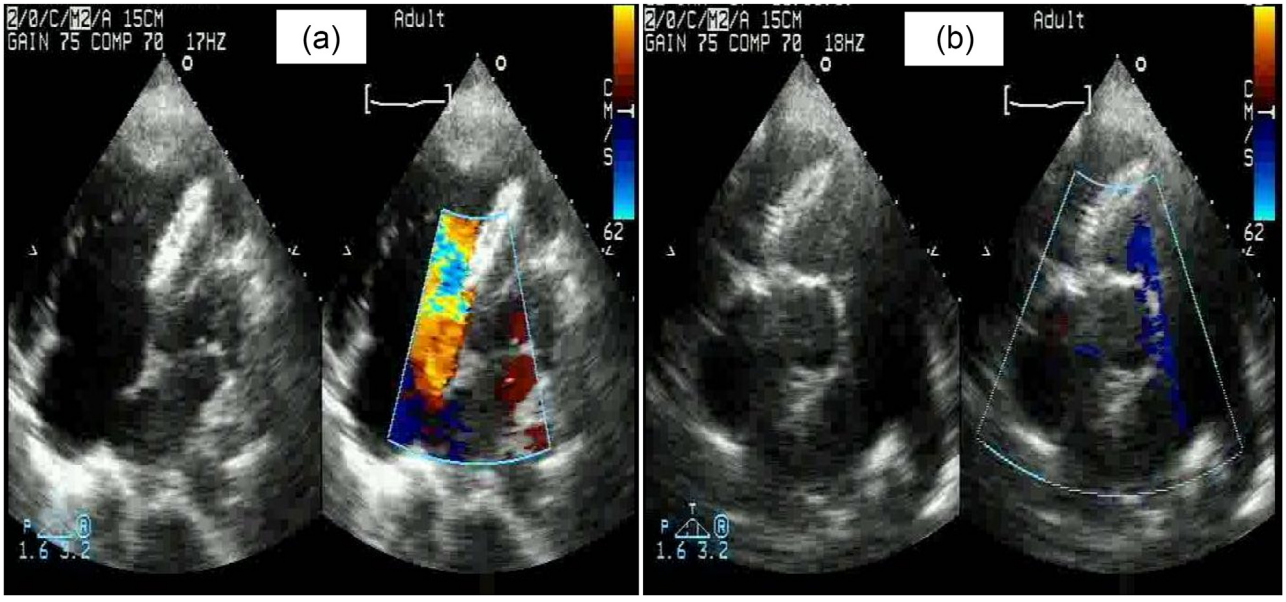

Fig. 2. Embolized Amplatzer septal occluder device in 2(a) right ventricular cavity, 2(b) partially across the right ventricular outflow tract.

were 3.7 and the right ventricular systolic pressure from tricuspid regurgitation jet was 40 mm Hg. Left ventricular function was normal. There was no gross thrombus deposition over the device in echo and no vegetation was detected anywhere. Patient was referred for surgical retrieval of the device with surgical closure of the ASD. The time of the embolization could not be ascertained as she denied having any symptom after the device closure. She also did not have any regular follow up after two weeks of the device closure.

3. Discussion

The incidence of atrial septal occluder embolization has been reported as 0.55%[1] to 1.1%[2] in the hands of experienced operators. The common causes of embolization are large defects, larger devices, inadequate rims, undersized device, or insufficient left atrial size to accommodate a device. Deficient rim means any rim width of less than 5 mm in the vicinity of superior vena cava (SVC), inferior vena cava, right upper and lower pulmonary veins, coronary sinus, and atrioventricular (AV) valves. However, this definition is not followed in majority of catheterization laboratories and larger devices are deployed to splay the discs of the device in both sides of the aorta. It is also observed that the aortic rim is known to be deficient in about 89% of patients with ASD device closure where deployed larger devices led to erosion. [3] Total absence of aortic rim in multiple views under TEE and deficient or floppy consecutive one or more rims makes a device vulnerable for embolization and hence, should be considered as contraindications. IVC rim is also seems to be inadequate in most of the cases and hence, absence of combined aortic and IVC rims make a device vulnerable for embolization. Proper assessment of the rims (Aortic rim adjacent to the aortic valve, SVC rim adjacent to the SVC,

Superior rim in between SVC and aortic rim, posterior rim opposite to the aortic rim, IVC rim adjacent to the IVC, and AV valve rim adjacent to the atrioventricular valve) and defect size should be assessed in at least three TEE views (four-chamber view for AV valve and superior rim, aortic short axis view for aortic and posterior rim and bi-caval view for SVC and IVC rim). [4] Most common time of embolization is the first few hours after implantation till one or two days. Very rarely, silent embolization has been reported at one week[5] or even at two years after implantation. [6] Left sided embolization is almost always symptomatic as the dislodged device may obstruct the left ventricular inflow or the outflow, leading to varied grade of dyspnea[7] or symptoms of left heart failure. However, Errahmouni A et al. reported a case of silent embolization into the left ventricular outflow tract, which was detected in routine echocardiography at one week after the device deployment. [8] Dislodgement to right side may have varied presentation, depending upon the site of its dislodged position. Right ventricular inflow or outflow obstruction may lead to features of right heart failure. Acute dislodgement to right ventricle most commonly leads to incessant ventricular arrhythmias. Rarely, it seems, embolization to mid cavity of right ventricle may be asymptomatic. Regular follow-up is needed to detect any late embolization or other complications like erosion or perforation leading to tamponade, that have been reported as late as three years after device closure. [3] Hence, an initial follow-up with echocardiography at two weeks and at three months and subsequent follow-ups every six months may be helpful in detecting and treating late complications.

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