Atrial Septal Aneurysm

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Abstract

Atrial septal aneurysm is defined as area of excessive mobility of interatrial septum at least 10mm in width and moving away from the normal plane of the septum by at least 10 mm. Nearly 75% of patients with atrial septal aneurysm have a patent foramen ovale. Usually there is no or minimal left to right shunt due to higher pressure of left atrium. In conditions with raised right atrial pressure, right to left shunt may occur. Atrial septal aneurysm with patent foramen ovale is associated with higher incidence of cryptogenic stroke and migraine with aura. It is not clear if patent foramen ovale is responsible for these comorbidities. Atrial septal aneurysm is also associated with higher incidence of mild to moderate mitral and aortic valve regurgitation and supraventricular arrhythmias.

Keywords: Atrial septum; Cryptogenic stroke; Migraine; Right to left shunt; Supraventricular arrhythmias

Atrial Septal Aneurysm

It is an area of excessive mobility of atrial septum (Figure 1). As some mobility of atrial septum is normal, movement of at least 10mm from the plane of the remaining part of septum and at least 10mm in width is defined as atrial septal aneurysm [1,2] (Figure 2). Movement of the aneurysm depends on relative pressures of the two atria. Usually it is displaced towards right atrium due to relatively higher pressure of the left atrium throughout the cardiac cycle (Figure 3A). During inspiration, there is increased filling of the right side of heart due to increased venous return. This

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Figure 1: Subcostal four chamber view showing aneurysm of interatrial septum (A). LA- Left atrium, RA- right atrium, LV- left ventricle, RV- Right ventricle.

Figure 2: Diagrammatic representation of definition of aneurysm of interatrial septum. LA- Left atrium, LV- Left ventricle, RA- Right atrium, RV- Right ventricle, A- Aneurysm.
may result in transient mild elevation of right atrial pressure and transient movement of the aneurysm towards left atrium (Figure 3B).

Other conditions that increase right atrial pressure also displace the atrial septal aneurysm to left during some part of the cardiac cycle. These conditions include right ventricular hypertrophy (Figure 4), tricuspid regurgitation (Figure 5) and tricuspid stenosis (Figure 6). Thrombi may form on either side of the aneurysm and may result in thromboembolic events [2,3].

**Concurrent Pathologies**

**Patent foramen ovale**

Nearly 75% of the cases of atrial septal aneurysm are associated with patent foramen ovale (PFO) [1,2]. PFO represents failure of the primum and secundum septa to fuse. Septum appears structurally intact but some left to right shunting can be demonstrated by either contrast or colour flow imaging [1]. Release phase of valsalva maneuver and cough transiently increase right heart pressure and may produce small right to left shunt [4]. Other conditions that raise right atrial pressure also push septum primum to left and open patent foramen ovale with right to left shunt (Figure 7 A, B).

Patients with a large PFO (>4mm) with substantial right to left shunt are considered to be at risk of paradoxical embolism [4,5]. However, randomized trials have not shown any clear benefit of PFO closure [6].

Association of PFO and atrial septal aneurysm is associated with higher incidence of stroke than PFO alone [2]. Exact mechanism is not clear. Thrombus formation in aneurysm could be responsible
for higher incidence of stroke in patients with PFO with aneurysm of interatrial septum [2,3,7]. Higher incidence of supraventricular arrhythmias in these patients could also contribute to higher incidence of embolic stroke. Atrial septal aneurysm with PFO has also been observed to be associated with platypnoea-orthodeoxia syndrome [8]. This rare syndrome is characterized by dyspnea and arterial oxygen desaturation induced by upright position and relieved by supine position. Preferential flow of blood from inferior vena cava through PFO is considered responsible for oxygen desaturation in upright position. Association of PFO and atrial septal aneurysm is also associated with higher incidence of migraine with aura [9]. It is not clear if it has any etiologic correlation or it is a comorbidity [10].

**Mild to moderate mitral and aortic valve regurgitation**

Higher than normal incidence of atrio-ventricular valve prolapse has been observed in association with atrial septal aneurysm [11,12].

**Supraventricular arrhythmias**

Atrial conduction heterogenecity has been observed in cases of atrial septal aneurysms and supraventricular arrhythmias [11,13].

**References**