# Aneurysm of the left atrial appendage: a rare anomaly

## *Sol atriyal apendiks anevrizması: Nadir bir anomali*

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The aneurysmal dilatation of the left atrial appendage in the absence of demonstrable left ventricular or mitral valvular disease is very rare. Two such cases of isolated left atrial appendage aneurysm underwent successful surgical treatment at our institute. Two male patients aged 29 and 48 presented with palpitation and dyspnea on exertion (NYHA class 2). Their clinical examination and electrocardiogram revealed atrial fibrillation. The diagnosis was established by chest X-ray together with transthoracic and transesophageal echocardiography and was confirmed by contrast-enhanced computed tomography. An aneurysmectomy was done through the median sternotomy under cardiopulmonary bypass in view of associated moderate mitral regurgitation in one case and a possible clot in the aneurysm cavity in the other. Atrial fibrillation reverted to sinus rhythm during the immediate postoperative period and the follow-up at three months and one year revealed that the patients were asymptomatic with normal sinus rhythm.

*Key words:* Aneurysm; left atrial appendage; mitral apparatus; spiral computed tomography scan.

Belirgin sol ventriküler hastalık ya da mitral kapak hastalığı yokluğunda sol atriyal apendiksin anevrizmal dilatasyonu oldukça nadirdir. İzole sol atriyal apendiks anevrizmasına sahip bu gibi iki olguya kurumumuzda başarılı cerrahi tedavi uygulandı. Yirmi dokuz ve 48 yaşında iki erkek hasta çarpıntı ve efor dispnesi ile (NYHA sınıfı 2) başvurdu. Hastaların klinik muayene ve elektrokardiyogramlarında atriyal fibrilasyon saptandı. Tanı göğüs grafisi ve transtorasik ve transözofageal ekokardiyografi ile kondu ve kontrastlı bilgisayarlı tomografi ile doğrulandı. Anevrizmektomi bir olguda eşlik eden orta dereceli mitral regürjitasyon diğer olguda ise anevrizma boşluğunda pıhtı bulunması olasılığı nedeni ile kardiyopulmoner bypass altında median sternotomi ile gerçekleştirildi. Atriyal fibrilasyon ameliyattan hemen sonraki dönemde sinüs ritmine döndü ve üç ay ve bir yıl sonraki takipte hastaların normal sinüs ritmi ile asemptomatik olduğu görüldü.

*Anahtar sözcükler:* Anevrizma; Sol atriyal apendiks; mitral aparat; spiral bilgisayarlı tomografi tarama.

Congenital aneurysm of the left atrial appendage (LAA) is extremely rare. Dimond et al.,[1] in 1960, described the first case of congenital aneurysm of the LAA, and to date, very few cases of isolated LAA aneurysm have been reported. Most of the cases are recognized by the supraventricular arrhythmia that leads to cardiac insufficiency and systemic embolism along with their grave sequelae.

We describe two cases of giant aneurysm of the LAA that underwent successful treatment at our institute.

## CASE REPORT

***Case 1–*** A 29-year-old male presented with palpitation and dyspnea on exertion New York Heart Association (NYHA) class 2. A physical examination revealed an irregularly irregular pulse. An electrocardiogram showed atrial fibrillation with a fast ventricular rate. A chest X-ray revealed a prominent bulge at the left heart border (Figure 1a). A transthoracic and transesophageal echocardiogram showed an aneurysm of the LAA projecting posterolaterally from the left atrium (LA) and pushing the posterior mitral leaflet anteriorly, causing moderate mitral regurgitation (MR). The mitral valve leaflets, chordae, and papillary muscle appeared normal. There was no clot or obstruction of the pulmonary venous flow. Cardiac catheterization revealed a main pulmonary artery (MPA) pressure of 55/30 mmHg with mean of 45 mmHg, pulmonary capillary wedge pressure of 28 mmHg, and left ventricular end diastolic pressure of

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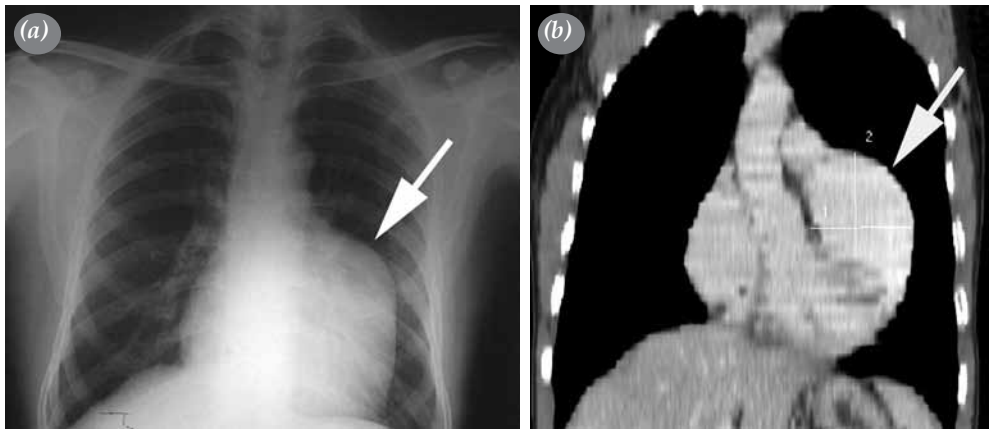


**Figure 1. (a)** Chest X-ray showing prominence at the left heart border (arrow). **(b)** Contrast enhanced computed tomography showing giant aneurysm of left atrial appendage (arrow).

30 mmHg. A pulmonary arteriogram done in levo phase revealed a swirling of dye in the LA moving posteriorly into the LAA aneurysm. Coronary angiography showed normal coronaries. A contrast-enhanced, spiral computed tomography (CT) scan showed (Figure 1b) a large well-defined rounded 9.2x7.2x9.0 cm lesion arising from the LA with dilated pulmonary veins. In view of the moderate MR, aneurysmectomy was performed through median sternotomy using cardiopulmonary bypass (CPB) and cold blood cardioplegia. Intraoperative findings were (Figure 2) a giant LAA aneurysm measuring about 10.5x9x7 cm with a neck of 5 cm width compressing the left ventricle from behind and distorting the mitral annulus leading to moderate mitral regurgitation. The mitral valve morphology appeared normal, and there was no clot in the LA or aneurysm. The giant aneurysm along with part of the LA wall was excised (Figure 3), and the edges were approximated using a pledgetted 4-0 polypropylene suture in two layers. The LA was opened to check the mitral valve, and it was tested and found competent. The LA was closed, and smooth weaning from CPB was achieved in sinus rhythm. An intraoperative transesophageal echocardiogram showed a competent mitral valve with trivial MR. The immediate postoperative, three-month, and one-year follow-up showed an asymptomatic patient, and his electrocardiogram and two dimensional echocardiogram revealed normal sinus rhythm and mild mitral regurgitation with an ejection fraction of 60%. A histopathological examination showed an irregularly thickened myocardium with mild congestion and focal chronic inflammation with extensive fibrosis.

***Case 2–*** A 48-year-old male presented with dyspnea on exertion NYHA class 2, palpitation, and giddiness. A physical examination revealed an irregularly irregular pulse. An electrocardiogram showed atrial fibrillation with a fast ventricular rate, and a chest X-ray revealed a prominent bulge at the left heart border. A transthoracic echocardiogram showed an LAA aneurysm extending posterosuperiorly which was lateral to the pulmonary artery with a layered clot in it and trivial MR.

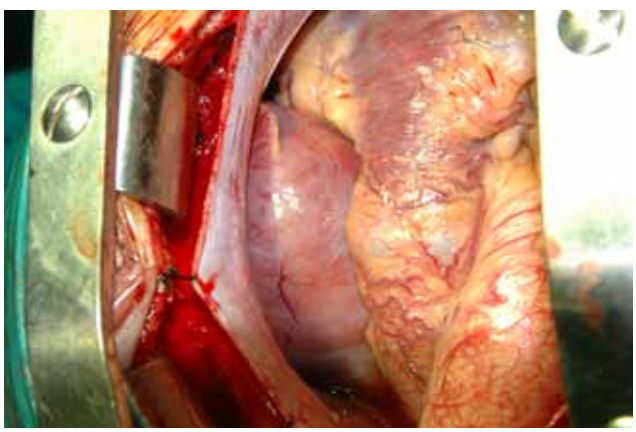

**Figure 2.** Giant aneurysm of left atrial appendage compressing surrounding structures.

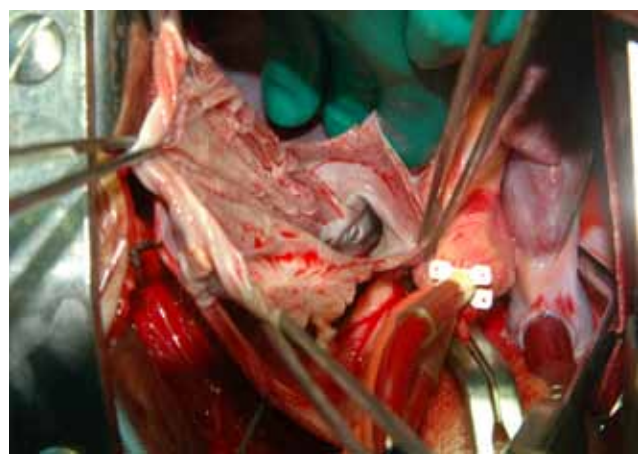

**Figure 3.** Excision of left atrial appendage aneurysm.

Transesophageal echocardiography revealed an LAA aneurysm of 7.5x5.3 cm, posterior inferior lateral to the left ventricle (LV), showing dense contrast and a small clot at the apex. Cardiac catheterization showed MPA pressure of 23/11 mmHg, and a pulmonary arteriogram in levo phase revealed opacification of the LA and LAA aneurysm. A contrast-enhanced, spiral CT scan showed an LAA aneurysm measuring 9.5x8.7x5.8 cm with no evidence of thrombus or calcification. In view of the doubtful clot in the aneurysm, the procedure was performed through median sternotomy and CPB using cold blood cardioplegia. Intraoperative findings were a giant LAA aneurysm measuring 15x7x7 cm with a 5 cm neck and the absence of a clot with a normal mitral valve. The LAA aneurysm was excised, and the edges were approximated with a 4-0 polypropylene suture in two layers. Weaning from the CPB was achieved in sinus rhythm. On immediate postoperative, three-month, and one-year follow-up, the patient was asymptomatic, and his electrocardiogram and two-dimensional echocardiography showed normal sinus rhythm and mild mitral regurgitation with good biventricular function. A histopathological examination revealed an irregularly thickened myocardium with the overlying epicardium being comprised of fibroelastic tissue lined by mesothelial cells with extensive fibrosis.

## DISCUSSION

Aneurysms of the LA may be either congenital or acquired. Acquired aneurysms are more frequent, tend to affect the atrium as a whole, and result from pathologies that increase the intra-atrial pressure or myocarditis that weakens the atrial wall in a chronic manner. Zhao et al.[2] stated that congenital aneurysms of the atrial appendage are extremely rare. The atrium is normally not enlarged, and such aneurysms are usually not associated with other pathologies. Yaliniz et al.[3] reported that the aneurysm is intrapericardial, but there have been a few cases with partial defects of the pericardium. Victor and Nayak[4] attributed the origin of the congenital aneurysm to dysplasia of the pectinate muscles. In the majority of cases (75%), the main symptoms leading to diagnosis of congenital LAA are recurrent or continuous supraventricular arrhythmia, systemic embolism, cardiac insufficiency, and chest pain. The most common complications are supraventricular arrhythmia and thromboembolic episodes. A routine chest X-ray always shows a prominent left heart border.[2-7] The diagnosis can be confirmed by conventional, noninvasive imaging techniques, such as echocardiography and spiral CT scan or magnetic resonance imaging.[2-7] The treatment is always surgical. Vagefi et al.[7] described various approaches, for example, median sternotomy, left thoracotomy, and mini-thoracotomy or port access. The resection can be carried out with or without CPB. Indications for the median sternotomy approach and use of CPB are associated with conditions like mitral regurgitation or a clot in the aneurysm or LA as in our cases. Straightforward and isolated LAA aneurysms can be excised through either left thoracotomy, mini-thoracotomy, or port access approaches without the use of CPB. Various techniques have been used to close the appendage, including ligation, direct suturing, pledgetted sutures, or stapling. The range of approaches used is striking, but all have proved adequate. Resection of the aneurysm results in an immediate cessation of atrial arrhythmia and a return to sinus rhythm.[2-7] Both our patients presented with palpitation secondary to atrial fibrillation, and their diagnosis was confirmed on chest X-ray and echocardiography. We used a median sternotomy approach with CPB and cardioplegic arrest for our patients because of associated moderate MR and the possibility of a clot in the aneurysm. Both patients came back to sinus rhythm immediately after the aneurysm excision, and they remained in sinus rhythm at follow-up. We believe that the use of CPB is a safe method for aneurysmectomy when associated conditions like mitral regurgitation or clot is present, and the excision of the LAA aneurysm is adequate to bring patients back to sinus rhythm.

### Declaration of conflicting interests

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