

## Inverted Left Atrial Appendage: A Cause of Left Ventricular Inflow Obstruction

A Molaie, A Tabib, M Meraji, RHH Shemirani

Rajae Cardiovascular Medical & Research Center, Tehran, Iran

When a new left atrial mass is discovered by means of echocardiography, the differential diagnosis is usually between thrombus, vegetation, and tumor. In the past decade, however, the physicians were able to document another cause. Our aim is to introduce a case of postoperative inverted left atrial appendage which caused left ventricular inflow obstruction requiring reoperation. We report a 4- year old boy who had inverted left atrial appendage after atrial septal defect repair. He showed signs and symptoms of pulmonary edema postoperatively. We assessed him by echocardiography and discovered a mass in his left atrium necessitating re-operation. The surgeon found and restored inverted left atrial appendage intra-operatively. Because inverted left atrial appendage can cause severe and occasionally life threatening complications, we believe intraoperative transesophageal echocardiography is highly essential to diagnose this pathology and to avoid restorative reoperation.

**Keywords:** Inverted Left Atrial Appendage, Operation, Echocardiography

### Introduction

When a new left atrial mass is discovered by means of echocardiography, the differential diagnosis is usually between thrombus, vegetation, and tumor.<sup>1</sup> In the past decade, however, the physicians were able to document another cause.

In 1997 Bradley and colleagues reported two patients which have postoperative left atrial mass due to inverted left atrial appendage (ILAA).<sup>1</sup>

In 1998 Corno reported a 4 year old child with postoperative new left atrial mass due to ILAA.<sup>2</sup>

There are few other reports on inverted left atrial appendage (ILAA) in patients with or without surgery.<sup>3-5</sup>

### Case presentation

We report a 4- year old boy presented with mild exertional dyspnea. He had S2 splitting and 2/6 ejection type murmur at upper sternal border at physical examination. There was evidence of right atrial enlargement and right ventricular volume overload in electrocardiography. Chest radiography

showed an increased pulmonary vascular markings and cardiomegaly. Echocardiography identified large atrial septal defect and functionally common atrium without any other associated abnormality. The patient underwent surgical repair for common atrium. The postoperative examination of the patient revealed respiratory distress and signs of pulmonary edema. The postoperative chest radiography showed pulmonary venous congestion (Fig. 1a) in spite of preoperative chest radiography (Fig. 1b).

The postoperative echocardiogram showed adequate repair without residual defect, but with a left atrial mass which originated from posterior wall of the left atrium above posterior leaflet of the mitral valve, and intra-atrial flow gradient in the left atrium of about 35 millimeter of mercury (Fig. 2a and Fig. 3). Preoperative echocardiography did not show any similar mass in the left atrium (Fig. 2b).

The patient underwent re-operation, because of obstruction in the left ventricular inflow tract and severity of symptoms. During re-operation, ILAA was revealed and compensated successfully. After re-operation, the patient was symptomless and echocardiography did not show any flow gradient in the left atrium.

### Correspondence:

A Molaie

Rajae cardiovascular medical & research center, Tehran, Iran

Tel/Fax: +98-21-996911151

E-mail: akbarmolaie@yahoo.com

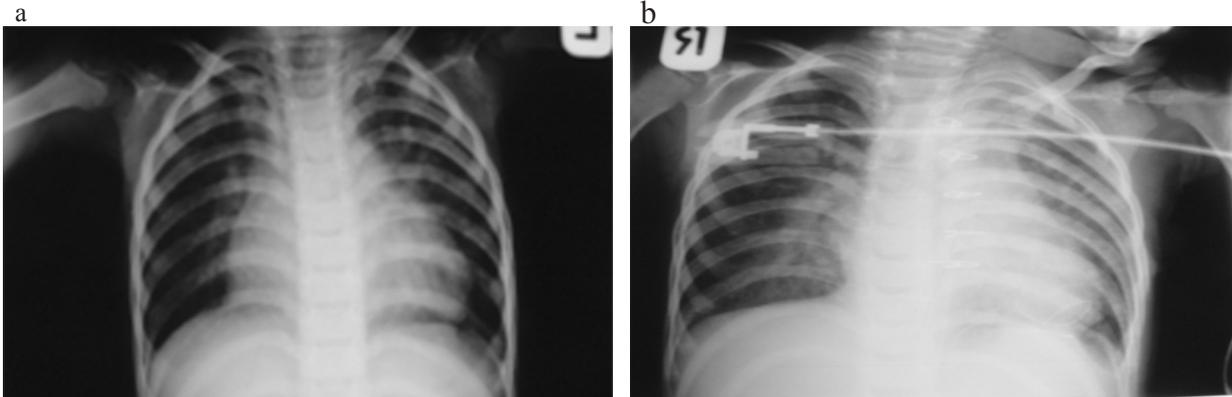


Figure 1. Chest radiography before (a) and after (b) Atrial septum repair

### Discussion

With increasing application of echocardiography for assessing surgical repair both during and after operations, unusual and previously undiagnosed lesions may become apparent.<sup>1</sup> Inversion of the left atrial appendage following cardiac surgery is a rare but important complication that can be transient and prone to spontaneous reversion. It can, however, result in serious complications such as necrosis with potential rupture of the left atrial wall.<sup>3</sup>

The most likely cause for postoperative left atrial inversion is the negative pressure created by the left ventricular vent introduced during surgery via the right superior pulmonary vein. It is also possible that the appendage may be inverted as part of the de-airing maneuvers.<sup>1, 4</sup> The diagnosis of ILAA remains a major challenge. Despite widespread use of postoperative echocardiography, the few reported cases confirm ILAA to be a rare phenomenon. The finding at post-cardiotomy echocardiography of a left atrial mass associated with an absence of the left appendage is highly suggestive of a diagnosis of ILAA.<sup>5</sup> In the case of peri- or postoperative

echocardiography appearance of a new and clearly delineated floating structure in the left atrium indicative of ILAA has to be taken into account.<sup>3</sup>

Intraoperative transesophageal echocardiography, performed routinely, can rule out this complication.<sup>2</sup>

The mass was not present prior to surgery, but was detected postoperatively. The development of left ventricular inflow obstruction and pulmonary edema occurred secondary to ILAA.

As the incidence of complications is yet to be defined, treatment remains controversial, but embolic risk factors such as homeostatic disease or atrial fibrillation invariably lead to surgery.<sup>5</sup> Also surgery is inevitable in cases such as our patient with pulmonary venous congestion and respiratory distress.

In an asymptomatic patient without thromboembolic risks factors, a conservative approach should be considered, because of the risk of reoperation.<sup>5</sup>

Because ILAA can cause severe and occasionally life threatening complications, we believe that intraoperative transesophageal echocardiography

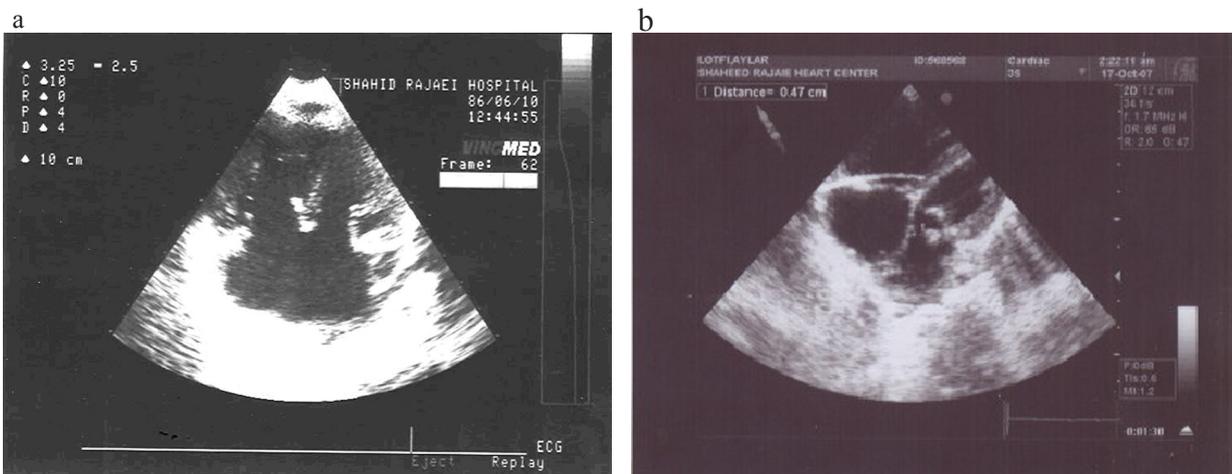
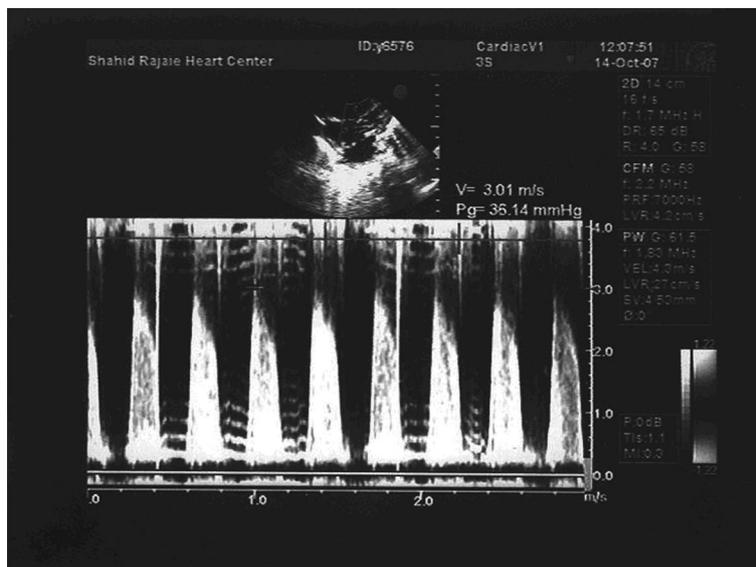


Figure 2. Preoperative (a) and postoperative (b) four chamber views



**Figure 3.** Postoperative flow gradient in left atrium

is highly essential for correct diagnosis of this entity and to avoid reoperation.

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