

# Left Atrial Appendage Enlarged by Coronary Artery Fistula after Surgical Closure of Appendage

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## Abstract

### Keywords

- cardiovascular surgery
- arrhythmia therapy
- surgery
- complications

Two years previously, a 73-year-old man with mitral regurgitation underwent mitral annuloplasty and left atrial appendage (LAA) exclusion by suturing the orifice from the endocardium. However, the mitral regurgitation became exacerbated, and the left atrium enlarged rapidly over a 6-month period. Computed tomography showed a heterogenic mass in the LAA, and coronary angiography revealed a coronary artery–LAA fistula. Reoperation revealed a thrombus filling the appendage and two small orifices of the coronary artery–LAA fistula located in the endocardium of the appendage. We excised the LAA and closed these fistula orifices concomitant with mitral valve replacement.

## Introduction

We herein report a very rare case of a coronary artery–left atrial appendage (LAA) fistula that led to thrombus formation in the LAA after prior surgical LAA closure.

## Case Report

A 73-year-old man was admitted to our hospital with shortness of breath. He had undergone mitral annuloplasty and LAA closure 2 years earlier for mitral regurgitation (MR) and atrial fibrillation; the LAA was excluded by closing the orifice from the endocardium with a running suture, and annuloplasty was performed with a 30-mm Physio ring (Edward Lifesciences, Irvine, California, United States). Postoperative echocardiography showed negligible MR and no flow communication between the left atrium and LAA. The MR subsequently became exacerbated, and the left atrium enlarged rapidly over a 6-month period. Computed tomography showed a heterogenic mass (68 × 87 × 100 mm) in the LAA (►Fig. 1). Coronary angiography (CAG) revealed two coronary artery fistulae draining from the circumflex artery

into the LAA (►Fig. 2). These fistulae had been present during the CAG performed before the first operation.

We reoperated to correct the MR and LAA enlargement. The appendage contained a thrombus that had been isolated from the left atrium by the initial LAA closure. We found two small orifices in the endocardium after removing the thrombus from the LAA and speculated that these orifices might be fistulae between the LAA and coronary arteries. Antegrade cardioplegic solution was delivered to confirm the continuity of the orifices and coronary arteries. The cardioplegic solution flowed from these orifices during infusion, suggesting the presence of coronary artery–LAA fistulae. We excised the LAA and closed the fistula orifices by suturing because the orifices were located in the remnant LAA wall. The mitral valve was then examined. Both the anterior and posterior leaflets of the mitral valve were thickened and shortened, although the Physio ring was not detached and remained in the proper position. We presumed that the exacerbation of MR had been caused by degeneration of the mitral valve and thus replaced the mitral valve with a Mosaic porcine bioprosthesis (Medtronic Co., Minneapolis, Minnesota, United States). The

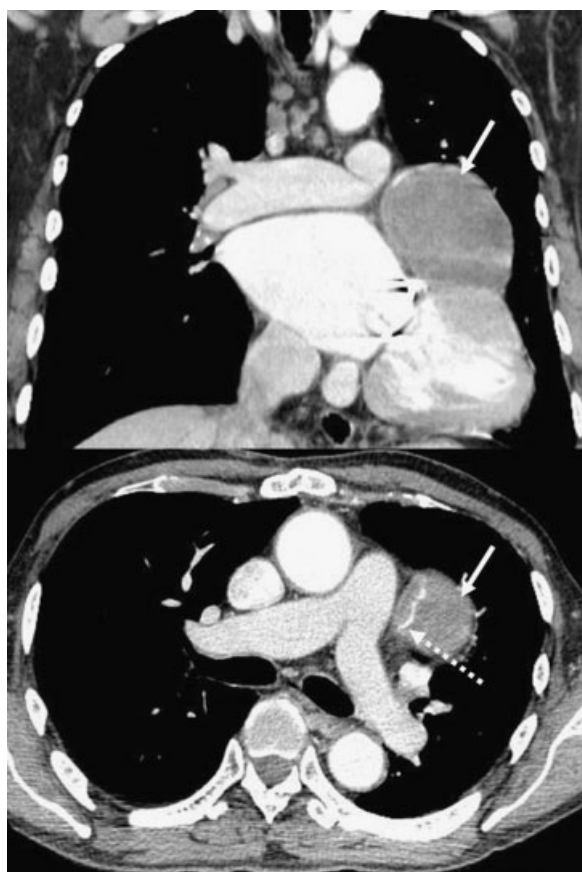
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**Fig. 1** Heterogenic mass occupying the left atrial appendage as seen on computed tomography. The appendage measures  $87 \times 68 \times 100$  mm, and linear enhancement is apparent within the mass.

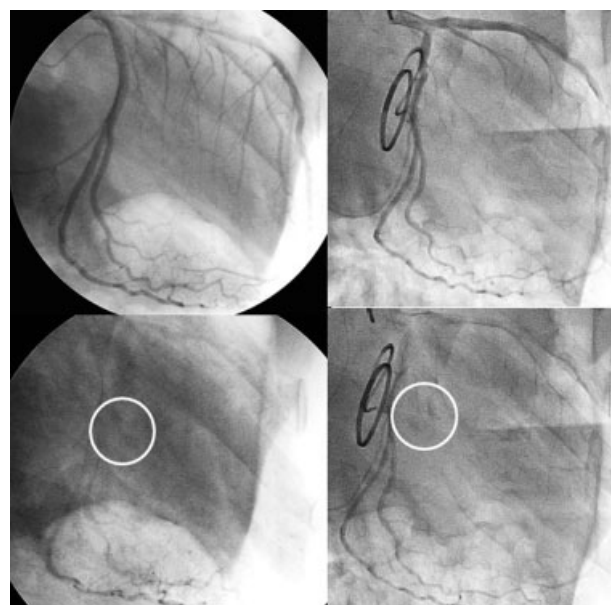
postoperative course was uneventful, and no sign of recanalization of the fistula was observed during 1 year of follow-up.

## Discussion

This is the first case report of a coronary artery–LAA fistula leading to LAA enlargement after suture exclusion of the LAA. CAG revealed the presence of a fistula draining from the left circumflex artery into the LAA in our patient. Fistula orifices had developed in the endocardium of the LAA, causing it to fill with a large thrombus.

Coronary artery fistulae are observed in  $\sim 0.2\%$  of patients who undergo CAG.<sup>1</sup> Only 10% of fistulae open into the left heart chambers, and most of these (80%) enter the left atrium.<sup>2</sup> In our patient, we could not identify the coronary artery–LAA fistula before the initial operation because it was difficult to determine the clinical significance of the small, dim shadows associated with this rare fistula during CAG. The presence of a small fistula could have enlarged the LAA secondary to thrombus formation after its closure.

We sometimes encounter remnant communication between the left atrium and LAA after LAA exclusion. In previ-



**Fig. 2** Coronary angiography shows a fistula arising from the circumflex artery and draining into the left atrial appendage in both the first and second operations (white circle). The fistula shadow appears just after the arterial phase. (A, B) Coronary angiography before the first operation. (C, D) Coronary angiography before the second operation.

ous reports,<sup>3,4</sup> surgical closure of the LAA was unsuccessful in 38 to 60% of patients. These studies emphasized that incomplete LAA closure occurred more often in patients treated with suture exclusion than in those treated with excision (77 versus 27%, respectively) and advised excision for primary treatment. Indeed, LAA excision might have been a more suitable initial operation for our patient, and we were fortunate that no suture breakage occurred during the second operation.

## References

- 1 Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cathet Cardiovasc Diagn* 1990;21(1):28–40
- 2 Chirichilli I, Frati G, Muzzi L, Pugliese G, Ricci M, Santo C. Coronary artery–left atrial fistula: displayed by 64-slice computed tomography. *Tex Heart Inst J* 2011;38(1):90–91
- 3 Katz ES, Tsiamtsiouris T, Applebaum RM, Schwartzbard A, Tunick PA, Kronzon I. Surgical left atrial appendage ligation is frequently incomplete: a transesophageal echocardiographic study. *J Am Coll Cardiol* 2000;36(2):468–471
- 4 Kanderian AS, Gillinov AM, Pettersson GB, Blackstone E, Klein AL. Success of surgical left atrial appendage closure: assessment by transesophageal echocardiography. *J Am Coll Cardiol* 2008;52(11):924–929