Acquired coronary fistula after left ventricular de-airing by apical needle aspiration

Philippe Unger1,2*, Mickael Moreels1,2, Eric Stoupel1,2, and Didier de Cannière1,2

1Department of Cardiology, Erasme Hospital, Université Libre de Bruxelles, Brussels, Belgium; and 2Department of Cardiac Surgery, Erasme Hospital, Université Libre de Bruxelles, Brussels, Belgium

Received 24 January 2007; accepted after revision 16 March 2007; online publish-ahead-of-print 10 May 2007

Acquired coronary fistula is uncommon, but has been reported to occur after several surgical procedures, acute myocardial infarction, endomyocardial biopsy, coronary angioplasty, and thoracic trauma. We describe the occurrence of a left coronary to left ventricular cavity fistula following resection of a left atrial myxoma, with spontaneous closure in the following weeks. The fistula was likely caused by a needle inserted into the left ventricular apex, a procedure routinely used to ensure left ventricular de-airing.

KEYWORDS
Coronary fistula; Echocardiography; Myxoma

Left ventricular (LV) de-airing is performed at the end of cardiac surgical procedures involving the left heart chambers and/or aortic incision(s). During such interventions, air can be trapped in the left ventricle and/or the left atrium, and be ejected into the arterial blood stream during subsequent cardiac systole. Several venting maneuvers are used to avoid the risk of peripheral air embolism. Among these, insertion of a needle allowing air aspiration from the apex is routinely performed. We describe a patient who developed a coronary fistula following this maneuver.

Case report
A 53-year-old man had a small pedunculated left atrial myxoma (2 × 2.5 × 2.5 cm) excised including wide resection of the pedicle base. At the end of the procedure, LV de-airing was performed, with insertion of a 16-gauge needle into the LV apex. Preoperative coronary angiogram was normal, with a left anterior descending (LAD) coronary artery wrapped around the apex. The operation was uneventful. It is noteworthy that apical puncture is performed under direct visual control at a distance from the apical LAD coronary artery, where visible. Routine transthoracic echocardiogram performed on the 5th postoperative day demonstrated an unexpected and unusual LV apical diastolic flow (Figure 1A and B). Continuous wave Doppler showed predominantly diastolic flow directed towards the left ventricle, with decreasing velocities after the early diastolic maximal velocity (Figure 1C). In addition, a color-flow Doppler study showed continuity with an antegrade diastolic flow in the apicoventricular region, consistent with the location of the LAD coronary artery (Figure 2). These findings were consistent with a coronary to LV fistula, presumably originating from a branch of the LAD coronary artery. No segmental abnormality of LV contractility was seen. Because the preoperative coronary angiography had been normal, the fistula was considered to be secondary to the needle de-airing that had been performed at the end of the surgery. In the absence of symptoms, and in view of the small size of the fistula, no attempt was made to close it. Apical flow was still observed on postoperative day 15, but the subsequent control echocardiogram, performed on the 27th postoperative day, did not show any residual abnormal flow, suggesting spontaneous closure of the fistula. It is noteworthy that no cardiac murmur was heard at any time while the fistula was patent.

Acquired coronary fistulas are uncommon. They have been described after endomyocardial biopsy, coronary angioplasty, acute myocardial infarction, thoracic trauma, and after several surgical procedures. Surgical excision of a cardiac myxoma has been reported to induce a coronary artery to atrial fistula, when neovascularization was incorporated into the atrial suture line. To our knowledge, only two cases of coronary fistula following needle insertion into the LV have been described, both in the French literature. In both cases, the needle had been inserted...
through the right ventricle and the interventricular septum, and in one of the cases, the fistula was only diagnosed 6 years after surgery. The present case suggests, however, that spontaneous early closure may occur, supporting an initial conservative approach to treatment. Despite the paucity of reports on needle-related iatrogenic coronary fistulas, we hypothesize that the incidence of this finding may be underestimated inasmuch as it is not common practice to search for coronary fistulas after uncomplicated cardiac surgery requiring LV de-airing, and as cardiac auscultation may be insensitive in this setting. The real incidence of needle-related iatrogenic coronary fistulas might be assessed during routine postoperative echocardiography by including systematic color-flow imaging of the LV apex. This complication could be prevented by suturing the puncture orifice, and, in cases where the LAD coronary artery is wrapped around the apex, by locating the puncture site on a more lateral aspect of the LV.

**Acknowledgements**

Philippe Unger has received a grant from the Fonds pour la Chirurgie Cardiaque.

**References**