

Case Report

Interatrial Thrombus in Left-Atrial Septal Pouch Prohibiting Transseptal Puncture for Percutaneous Mitral Valve Therapy

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ABSTRACT

An 82-year-old female patient with severe mitral regurgitation was referred for evaluation of percutaneous mitral valve repair. Transoesophageal echocardiography revealed a left-atrial septal pouch (LASP) with an echogenic structure. Following the heart-team decision, interventional therapy was therefore discarded. During surgery, a thrombus in the LASP was found and carefully resected. Afterward, conventional valve replacement with a biological 31-mm SJM-EPIC prosthesis (Abbott Structural Heart Devices, Santa Clara, CA) was performed. In the fast-evolving field of interventional mitral valve therapy, a trans-septal approach is the common strategy. Therefore, careful evaluation of the interatrial septum—which may contain thrombi with transoesophageal echocardiography before intervention—is of crucial importance.

RÉSUMÉ

Une patiente de 82 ans atteinte d'insuffisance mitrale grave a été orientée vers notre équipe pour évaluer la possibilité d'une réparation mitrale par voie percutanée. L'échocardiographie transœsophagienne a révélé une poche septale atriale gauche (PSAG) échogène. L'équipe de cardiologie a décidé d'écarter la possibilité d'un traitement interventionnel. Au cours de la chirurgie, un thrombus a été détecté dans la PSAG et soigneusement retiré. Par la suite, la valve a été remplacée de la manière classique par une bioprothèse SJM-EPIC de 31 mm (Abbott Structural Heart Devices, Santa Clara, CA). Dans le domaine en constante évolution du traitement interventionnel des troubles mitraux, l'approche trans-septale est la plus courante. Par conséquent, une évaluation rigoureuse du septum interauriculaire — où pourrait se trouver un thrombus — par échocardiographie transœsophagienne avant l'intervention est d'une importance capitale.

Case Presentation

An 82-year-old female patient with degenerative mitral regurgitation (MR) and recurrent episodes of cardiac decompensation was admitted to our centre for further evaluation of mitral valve therapy, using a minimally invasive technique. Transthoracic echocardiography revealed a severe MR. The left-ventricular ejection fraction was normal, and no other extensive echocardiographic abnormality was detected (Fig. 1A). Computed tomography showed a slightly calcified ascending and descending aorta but an extensive calcification of the abdominal aorta and the iliac arteries, which prohibited minimally invasive cardiac surgery using the femoral arteries for cardiopulmonary bypass. Given the increased surgical risk and the patient's desire to avoid median sternotomy,

percutaneous mitral valve therapy was the preferred option. In preparation of the procedure, transoesophageal echocardiography (TEE) was performed (Fig. 1, B-E). The mitral valve showed degenerative alterations with a stiffened and slightly calcified anterior leaflet, in particular at the edge of the middle segment. However, edge-to-edge mitral valve repair was considered suitable. After optimizing the bicaval view with focus on the interatrial septum, a LASP with a movable 15-mm x 10-mm x 5-mm echogenic structure was observed (Fig. 1, C-G). A patent foramen ovale (PFO) was not detected (Fig. 1, C and H).

These findings were discussed within the heart team, and the echogenic structure was assumed to be a thrombus caused by the hemostasis in the pouch, especially in the context of permanent atrial fibrillation, despite at least 2 months of continuous therapeutic anticoagulation with rivaroxaban at a dosage of 15 mg per day, adjusted for renal function. Alternatively, an atypically located myxoma was considered. Eventually, percutaneous mitral valve therapy with transseptal puncture was discarded because of a high risk of cardioembolic complications. These results, and the impact of MR on the patient's general condition with recurrent hospitalizations caused by cardiac decompensations and

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Ethics Statement: This research adhered to relevant ethical guidelines.

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See page 837 for disclosure information.

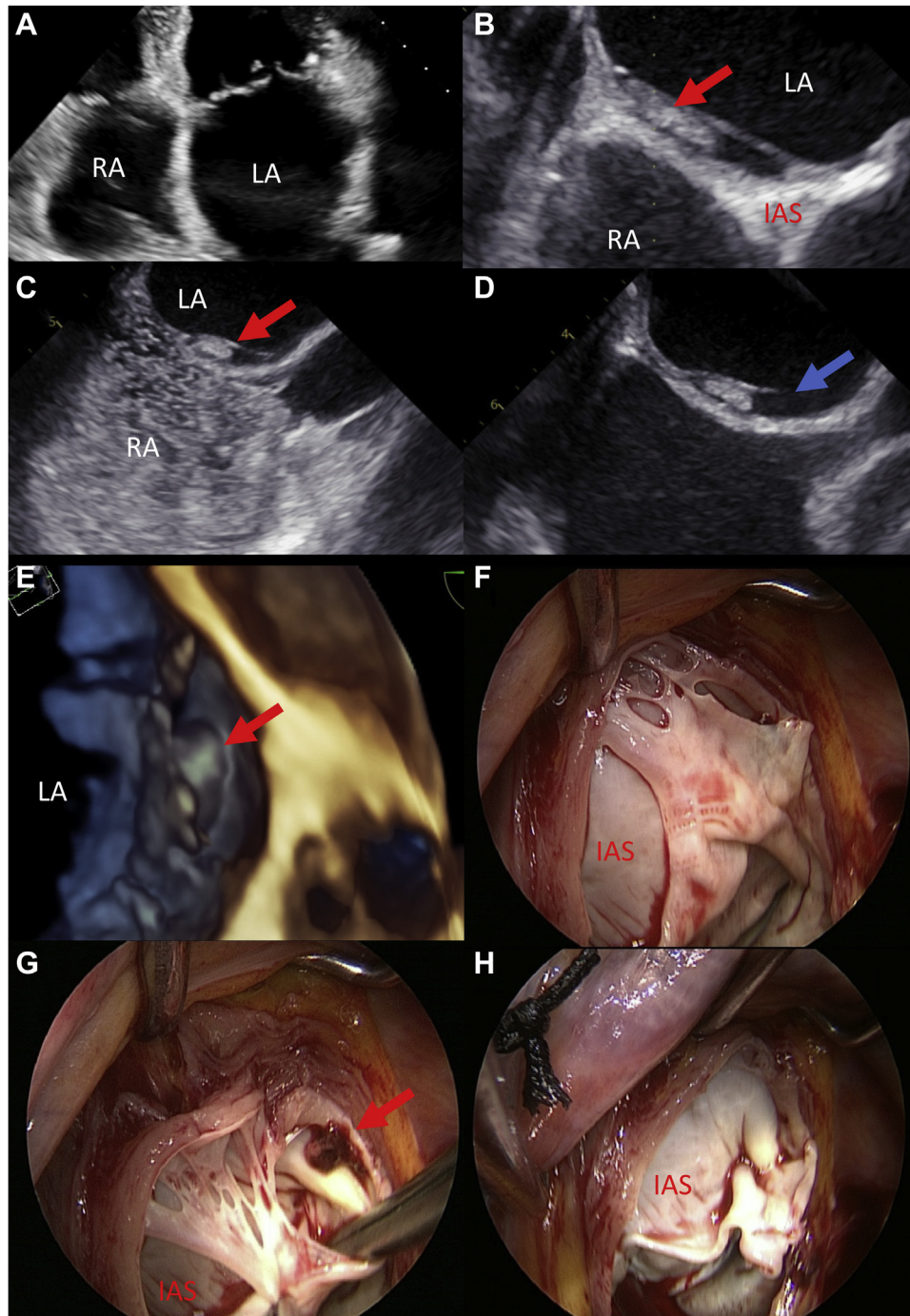


Figure 1. Thrombus in left atrial septal pouch prohibiting transseptal puncture for transcatheter mitral valve intervention. Transthoracic echocardiography showed no sign of a septal pouch (A). The red arrow indicates the thrombus in the left atrial septal pouch in transesophageal 2D echocardiography (B), 3D echocardiography (C), and intraoperative (E,G). The blue arrow shows the entry-connection of the pouch to the left atrium (D). Saline contrast study was negative (C), indicating the absence of a PFO. Accordingly, no PFO was found intraoperatively after removal of perforated membrane covering the interatrial septum (H). IAS, interatrial septum; LA, left atrium; PFO, patent foramen ovale; RA, right atrium.

decreased quality of life, were discussed in detail with the patient. Any further postponement was thus not considered to be appropriate. Eventually, she accepted mitral valve surgery with median sternotomy.

After left-sided atriotomy, the fossa ovalis was examined. It was incompletely covered by a perforated membrane, thus forming a LASP. Within, a thrombus was indeed discovered, and both structures were carefully removed.

Novel Teaching Point

- Careful evaluation of the interatrial septum in TEE before intervention is of crucial importance to detect LASP, which may contain thrombi, to avoid cardioembolic complications in interventional mitral valve therapy.

The calcification on the edge of the anterior mitral leaflet was confirmed, and thus a mitral valve replacement with a 31-mm SJM-EPIC prosthesis (Abbott Structural Heart Devices, Santa Clara, CA) was performed. During the postoperative course, the patient remained free of complications, and after mobilization she was discharged in good general condition to a follow-up treatment in a rehabilitation centre.

Discussion

Atrial septal pouches are the result of incomplete closure of the foramen ovale because of incomplete fusion of the septum primum and secundum.¹ Distinguishing between a left- and right-atrial septal pouch can be challenging. A postmortem study revealed LASP in 39% of randomly chosen hearts.² Mazur et al. estimated a prevalence of 40.8% for left-sided atrial pouches, 5.1% for right-sided pouches, and 3.7% for double pouches.³ Therefore, some authors concluded that left-sided atrial septal pouches might be considered as a normal variant of human heart anatomy.^{3,4}

Holda et al. assume that continuous remodelling of the interatrial septum leads to a closure of a PFO in a septal pouch.⁴ As a consequence, the PFO partly fuses with the left side of the interatrial septum, which is why left-sided atrial pouches are more frequently observed.^{3,4} Careful pivoting during TEE may help to identify the entry-connection of the pouch with the atrium and thus the location (left, right, or double-atrial) of the pouch. In medical literature, differing reports exist regarding LASP as a risk factor for stroke. Strachinaru et al. performed a systematic review and concluded that the presence of LASP alone does not correlate with an increased incidence of stroke, whereas Holda et al. described an association between LASP and cryptogenic stroke in a meta-analysis.^{5,6}

Owing to the morphologic nature as a blind alley, stasis—especially in combination with atrial fibrillation and mitral stenosis—may favour thrombogenesis, even in the presence of therapeutic anticoagulation, as evident in this case.⁷ Little is known about the effectiveness of anticoagulation in patients with thrombus-containing LASP. Elsayed et al. described resolution of a thrombus 1 month after anticoagulant therapy with warfarin.⁸ Our patient, however, had already been sufficiently anticoagulated for

a long period. Whether a more aggressive anticoagulant therapy using a vitamin K antagonist would have been more effective remains speculative. Yet, in the absence of other treatment options, aggressive anticoagulation for dissolution of the thrombus could be justified.

Although a trans-septal approach is the most common strategy in the fast-evolving field of interventional mitral valve therapy, trans-septal puncture of a LASP, which may contain thrombi, could cause cardioembolic complications and thus should be avoided.

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Disclosures

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