



A One-Step Autotransplantation Can Facilitate the Excision of Cardiac Tumors Invading the Lung

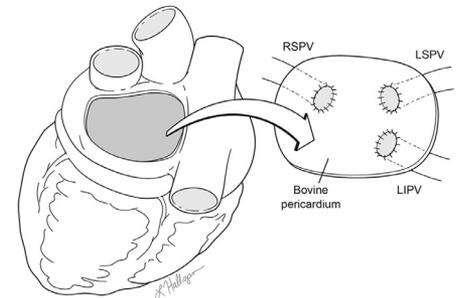
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We read with great interest the review by Yanagawa et al, entitled Surgery for tumors of the heart,¹ where the authors thoroughly review cardiac tumors classification, diagnosis sequence, as well as the suggested method of treatment for the different kinds of tumors. The authors address sarcomas as one of the rare malignant tumors and suggest a two-step surgical approach to sarcoma that involves the heart and lung.

We would like to report a case of a 29-year-old patient transferred from an outside hospital where he was initially hospitalized due to shortness of breath, pulmonary edema, and syncope. CT angiography revealed a large left atrial mass extending into the right lung lower lobe (Fig. 1). In addition, multiple sclerotic bone lesions of axial skeleton were noted concerning for metastatic disease. Echocardiography confirmed the cardiac finding and revealed that the tumor was protruding through the mitral valve into the left ventricle inducing severe mitral stenosis; preoperative MRI suggested that the tumor was consistent with a cardiac sarcoma. The patient continued to experience syncope with intermittent obstruction of the left heart circulation, thus he was taken to the OR for a one-step resection of the presumed sarcoma using a modified autotransplantation.

TECHNIQUE

Induction of general anesthesia was safely performed after micropuncture catheters were inserted in the femoral vessels in anticipation of venoarterial Extracorporeal membrane oxygenation (ECMO) cannulation for extracorporeal life support. Next, median sternotomy was performed. Prior to cardiopulmonary bypass (CPB), nodes from different mediastinal stations as well as pleural fluid were sampled to verify no mediastinal metastasis, the right lower lobe was mobilized, and partial hilar dissection was performed in preparation for



Operative procedure illustration.

Central Message

Cardiac reconstruction during autotransplantation can facilitate a one step excision of a cardiac tumor invading the lungs.

lobectomy. The patient was then placed on CPB using standard aortic, and bicaval cannulation, following cardioplegic arrest (using PLEGISOL blood cardioplegia) and placement of an aortic cross clamp the heart was excised; the SVC, IVC, aorta, and PA were divided and the left atrium was opened on the left side where it was most free of tumor involvement. The heart was then removed from the field and placed in an iced saline solution in the back table for ~150 minutes. A large posterior left atrial tumor which extended into the right lower lung lobe through the right lower pulmonary vein was excised along with the posterior left atrium, the right lower lobe pulmonary vein, and the entire right lower lobe. Next, the left atrium was reconstructed using a bovine pericardium, holes were cut into the patch, and each vein was sewn separately into it (Fig. 2). As the intra-atrial septum was also invaded by the tumor, it was excised and reconstructed using a patch of bovine pericardium. Next, the superior and inferior vena caval cuffs were fashioned for bicaval cardiac transplantation. The IVC had to be augmented using a 20-mm Gortex tube graft sewn end to end. We then proceeded with cardiac implantation per usual. Once the heart was implanted, it was defibrillated to a normal sinus rhythm. The patient was slowly weaned from CPB, and the operation was terminated as customary. The patient was discharged from the hospital 10 days post-op with no substantial complications, on anticoagulation regimen due to the amount of cardiac prostatic

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Funding: None.

Conflicts of Interest: None.

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DOI of original article: <http://dx.doi.org/10.1053/j.semtcvs.2018.09.001>.

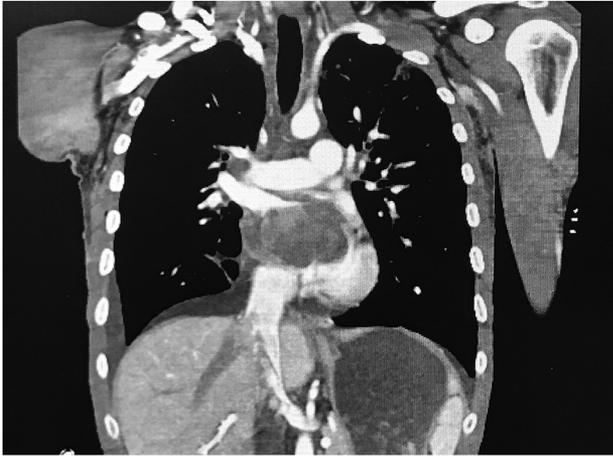


Figure 1. CT angiography of the chest, coronal view, the tumor can be seen in the left atrium invading the right lung.

material. He is currently being treated with doxorubicin in combination with olaratumab chemotherapy and has experienced paroxysmal AF.

COMMENT

Cardiac sarcomas are among the rarest forms of cardiac tumors. Some of these tumors can be addressed by complete removal of the tumors, even when invading into the lungs,

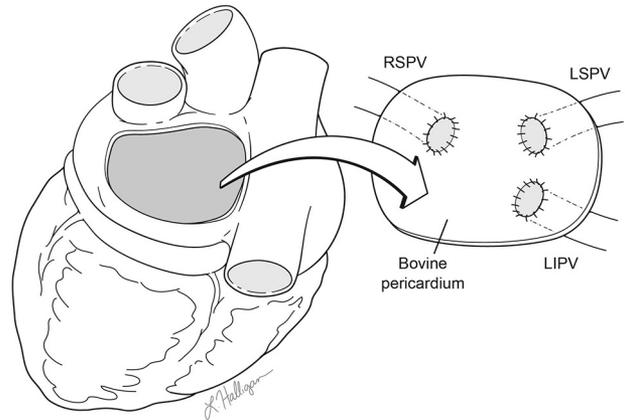


Figure 2. Illustration of the operative procedure, the pulmonary veins were sewn separately into the patch, and then the patch was sewn to the heart.

using a modification of cardiac autotransplantation. A one-step resection approach may be feasible with a multidisciplinary surgical team involving both a cardiac surgeon and a thoracic surgeon.

REFERENCE

1. Yanagawa B, Mazine A, Chan EY, et al: Surgery for tumors of the heart. *Semin Thorac Cardiovasc Surg* 30:385–397, 2018