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Combined Radiofrequency Ablation and Myxoma Resection Through a Port Access Approach

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Myxomas are common cardiac tumors that are traditionally managed by complete excision through a median sternotomy approach with the use of cardiopulmonary bypass. We discuss a patient with left atrial myxoma and chronic atrial fibrillation who underwent surgical excision and combined irrigated radiofrequency ablation for atrial fibrillation through a Port Access approach. Minimally invasive operations constitute an expanding field for the treatment of many cardiac diseases and may be an alternative for the treatment of this pathology because of less surgical trauma and cosmetic superiority. In this case, both excision of the myxoma and radiofrequency ablation were feasible through this minimally invasive approach. The combination of direct and endoscopic views enabled both procedures to be performed safely and efficiently.

(Ann Thorac Surg 2004;78:1470-2)

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Technologic developments have extended the applications of minimally invasive techniques. Endoscopic systems have enabled cardiac surgeons to perform procedures such as atrioventricular valve replacement or repair, myxoma resection, and surgical radiofrequency ablation safely and efficiently through a small incision.

A 62-year-old man was admitted to the hospital with complaints of chronic cough, exercise dyspnea, and palpitations. He had had chronic atrial fibrillation for 2 years and was in New York Heart Association functional class III. Transthoracic echocardiography revealed a 6.4 ×

4.2-cm lobulated mass originating from the interatrial septum in the left atrium. Two-dimensional color flow Doppler echocardiography revealed a pedunculated left atrial mass that prolapsed into the mitral valve orifice in diastole, causing functional mitral valve stenosis and mild mitral regurgitation. Cardiac catheterization confirmed mild mitral regurgitation and normal coronary arteries with a mildly dilated left ventricle, but overall normal left ventricular function. The patient was scheduled for removal of myxoma and radiofrequency ablation through a Port Access (Cardioventions, Somerville, NJ) approach.

The patient underwent a detailed preoperative evaluation that included computed tomography and arterial Doppler examination to detect any contraindications for Port Access operations, such as lung adhesion or iliac artery disease. After such risk factors were ruled out, the patient underwent operation.

After the standard induction of anesthesia, the patient underwent double-lumen intubation for single-lung ventilation. After the administration of heparin 2 mg/kg, a 19F arterial cannula (DLP Inc, Grand Rapids, MI) was introduced through the right internal jugular vein percutaneously to assist venous drainage during cardiopulmonary bypass (CPB). Transesophageal echocardiographic (TEE) examination confirmed the presence of the tumor, which arose from the interatrial septum, was localized next to the fossa ovalis and 1 cm close to the mitral valve annulus, and was moving across the mitral valve into the left ventricle. The patient was placed in the supine position with the right side tilted approximately 30 degrees, and external defibrillation pads were placed. A 4-cm right lateral minithoracotomy in the fourth intercostal space was performed. A soft tissue retractor (Cardioventions, Somerville, NJ) was used for exposure of the surgical field, avoiding the division or traction of any ribs. A 5-mm camera port (Storz; Karl Storz GmbH and Co, Tuttingen, Germany) was introduced through the fourth intercostal space. A second port was introduced through the sixth intercostal space on the midaxillary line for left atrial venting and carbon dioxide insufflation, which began immediately after the right lung was deflated. Simultaneously the right femoral artery and vein were prepared by means of a 2-cm oblique incision in the groin. CPB was established by femoral arterial and venous cannulas. A 19F arterial cannula (DLP Inc) was used for arterial cannulation. Venous drainage was obtained with a 24F to 29F femoral cannula (DLP Inc) and the 19F arterial cannula, which was previously inserted into the right internal jugular vein, thus allowing adequate venous drainage. The pericardium was opened 2 cm above and parallel to the phrenic nerve. The patient was cooled to 28°C. Both vena cavae were encircled with tapes. A transthoracic aortic clamp (Chitwood clamp; Scanlan, St. Paul, MN) was introduced percutaneously from the second intercostal space on the front axillary line. After the cross-clamping of the aorta, blood cardioplegia was administered through a custom-made (DLP Inc) antegrade cardioplegia cannula inserted into the ascending aorta. The right atrium was opened, and the fossa ovalis was

Accepted for publication July 10, 2003.

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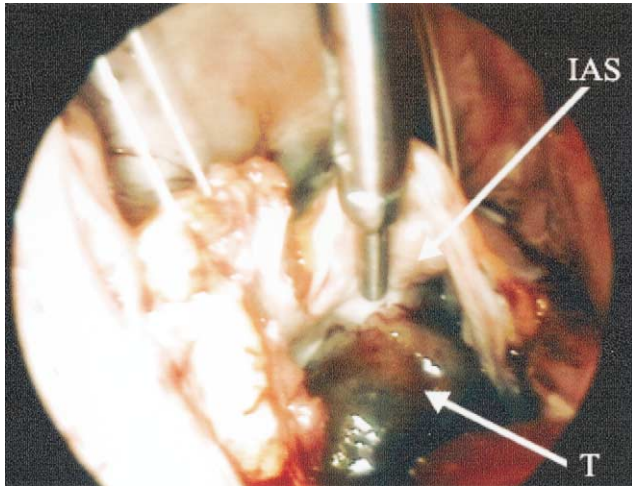


Fig 1. After the longitudinal incision of the interatrial septum, the myxoma was excised. (IAS = interatrial septum; T = tumor.)

located. The interatrial septum was incised longitudinally, and the tumor was excised, leaving a 1-cm margin around its pedicle (Fig 1). Autologous pericardium was used to close the defect in the atrial septum. The excised myxoma was 6.5×5.5 cm in size. After excision of the tumor, left atrial radiofrequency ablation (Cardioblate; Medtronic Inc, Minneapolis, MN) was performed (Fig 2). The ablation pattern is shown in Figure 3. The ablation procedure added 9 minutes to the ischemic time. The atrial septum was closed primarily afterward to prevent any possible damage to the suture lines from the radiofrequency energy. The mitral valve was tested with saline and was competent. The durations of CPB and aortic cross-clamp were 160 and 120 minutes, respectively. After weaning from CPB, TEE revealed no mitral valve

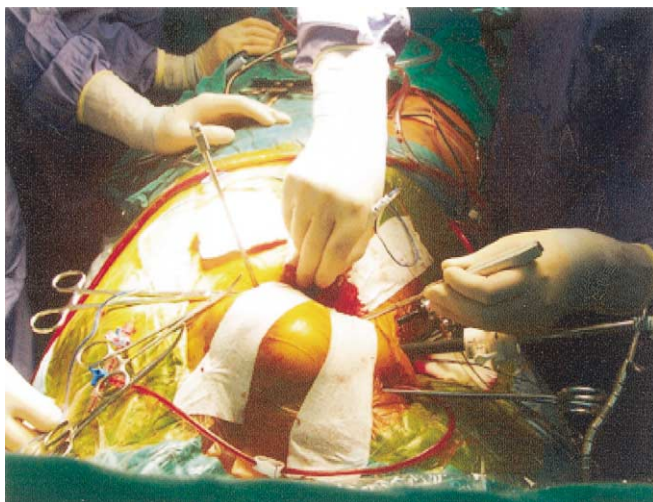


Fig 2. The operative field.

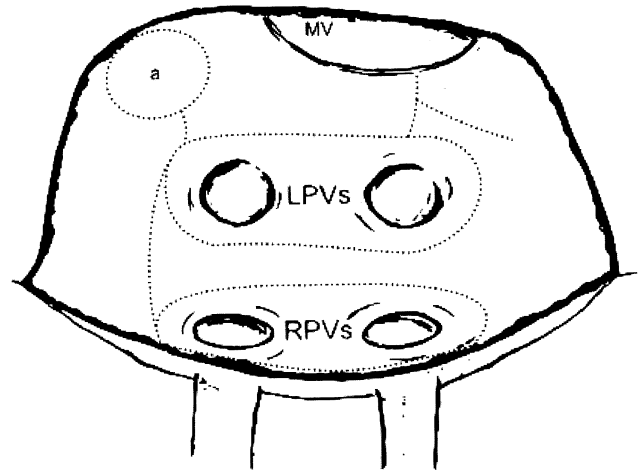


Fig 3. Dots indicate endocardial ablation lines inside the left atrium. (a = left atrial appendage; LPVs = left pulmonary veins; MV = mitral valve; RPVs = right pulmonary veins.)

insufficiency and no gradient on the mitral valve. Sinus rhythm was gained without cardioversion at the end of the procedure. Histopathologic examination of the mass identified myxoma. The patient was extubated 3 hours after the operation and had a rapid and uncomplicated recovery. He was discharged from the hospital on the eighth day in sinus rhythm. Three months later, the patient was in New York Heart Association class I. Holter monitoring revealed a stable sinus rhythm, and transthoracic echocardiography revealed atrial contractility with a prominent A wave.

Comment

Myxomas are common primary cardiac tumors that are mostly attached to the septum around the fossa ovalis as a polypoid and often pedunculated mass. The curative treatment of choice for myxomas is surgical removal, because the potential embolic complications may be debilitating or lethal. Conventional operation requires a median sternotomy incision and has an operative mortality rate of less than 3%.

Port Access operations have arisen as a viable alternative to conventional methods, especially during mitral valve operation. The safety and efficacy of this approach have been established by many series. Port Access operation can provide minimal discomfort, less postoperative pain, fast postoperative recovery, excellent cosmetic healing, and a shortened hospital stay [1, 2]. In addition, young patients are satisfied with the size of their incisions. Tumor manipulation should be minimal during this kind of operation to prevent intraoperative tumor dislodgment and embolization [3], which is another advantage of Port Access operation, because manipulation of the heart is minimal. Resection of myxomas through a Port Access approach has been reported previously [4, 5]. However, a combined tumor resection and radiofre-

quency left-sided Maze procedure is a novel approach. Radiofrequency ablation is a well-established less invasive method for the surgical treatment of atrial fibrillation, and the safety and efficacy of the method have been previously published [6]. Although various lesion patterns for ablation have been suggested, we chose a left-sided ablation procedure that replicates the Maze procedure. The aim was to combine 2 less invasive procedures during a single operation. The application of radiofrequency ablation through minimally invasive approaches can broaden its use, especially during such concomitant procedures.

Optimal exposure greatly facilitates left atrial myxoma resection and is mandatory for safe and effective tumor resection. To avoid recurrence, excision must include a wide base of the atrial septum and a part of the atrial septal wall, which must be removed, with the pedicle of the tumor. Biatrial exposure is usually recommended to limit manipulation of the tumor and to allow visualization of all 4 chambers of the heart [7, 8]. After proper localization of the tumor with TEE guidance, my colleagues and I preferred right atriotomy and a transeptal approach. Access was easily provided to the atrial septum, the mitral valve, and the free atrial wall, and the myxoma could be resected with an adequate button of normal interatrial septum. As mentioned previously, adequate exposure is vital during this type of operation, and cosmetic concerns should not compromise surgical results. In this case, the Port Access approach provided an excellent direct and endoscopic view for both procedures and facilitated complete surgical removal of the tumor and radiofrequency ablation without compromising the efficacy or safety of the operation.

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Recurrent Pericardial Tamponade From Atrial Hemangioma

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We encountered a 72-year-old woman with a left atrial hemangioma arising in the appendage and growing like an extracardiac mass. Life-threatening cardiac tamponade, recurrent over a 5-year clinical course, was the only sign of this rare tumor. The extraatrial growth pattern of the tumor made it difficult to distinguish the cardiac origin from a paracardiac mass. With the aid of cardiopulmonary bypass, the tumor was removed from the left atrium at the base of the appendage. Pathologic diagnosis was a combination of cavernous- and venous-type hemangioma. The postoperative course was uneventful, and the patient was doing well with no pericardial effusion at the 10-month follow-up.

(Ann Thorac Surg 2004;78:1472-5)

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Primary cardiac tumors are uncommon, with an incidence of 0.001% to 0.03% at autopsy. Of these, hemangiomas are extremely rare, accounting for less than 3.5% of all cardiac tumors [1, 2]. Recent advances in various imaging modalities have facilitated the diagnosis and surgical treatment of such lesions. In general, patients with intracardiac masses may present with exertional dyspnea, thromboembolic episodes, pericarditis, arrhythmia, or congestive heart failure, depending on the size and location of the mass. However, tumors with extracardiac extension may be rarely symptomatic and are occasionally found incidentally. We report herein a case of left atrial hemangioma arising in the appendage and growing like an extracardiac mass, with recurrent cardiac tamponade as the only sign.

A 72-year-old woman was brought to our hospital by ambulance with a sudden onset of exertional dyspnea and chest pain. Blood pressure was 70 mm Hg on palpation, and the pulse rate was 130 beats per minute. Physical examination revealed distant cardiac sounds with no murmur. Chest roentgenography revealed mild cardiomegaly and signs of pulmonary congestion. Electrocardiography identified a normal sinus rhythm with low voltage and nonspecific ST-T wave changes. Trans-thoracic echocardiography revealed massive pericardial

Accepted for publication July 10, 2003.

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