Video-Assisted Thoracic Surgery for Delayed Pericardial Effusion Post-CABG*

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Delayed-onset pericardial effusion following coronary artery bypass grafts can give rise to significant morbidity in its presentation and in its management by traditional surgical techniques. A video-assisted thoracoscopic technique to create a pericardial window, with the advantage of a minimally invasive approach combined with excellent visualization in such a patient is described.

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CABG=coronary artery bypass graft; LIMA=left internal mammary artery; VATS=video-assisted thoracic surgery

Thoracoscopy was initially developed as a diagnostic tool for intrathoracic disease; however, recent technical advances in video camera technology have led to a resurgence of interest in thoracoscopy for both diagnostic and therapeutic uses. Video-assisted thoracic surgery (VATS) allows intrathoracic operations to be performed without formal thoracotomy. It allows visualization and assessment of the pericardium. While surgical approaches to drainage of pericardial effusions have been described since 1829,2 the ideal surgical management of pericardial effusions remains controversial in both approach and extent of resection. VATS may become another technique to deal with this condition of diverse etiology.3

CASE REPORT
A 58-year-old man was admitted to the hospital with unstable angina. He was a nonsmoker but had a strong family history of coronary artery disease and a moderately raised cholesterol level. Coronary angiography demonstrated significant three-vessel coronary artery disease with minor dyskinesia of the inferior surface and the anterior free wall of the left ventricle. The patient was referred for coronary artery bypass graft (CABG) surgery.

At operation the left internal mammary artery (LIMA) was harvested and both pleura were opened. The patient had a saphenous vein graft placed to the posterior descending branch of the right coronary artery and another to the first marginal branch of the circumflex system. The LIMA was used to bypass the critical proximal lesion in the left anterior descending artery. The pericardium, which had been opened through a vertical midline pericardiotomy, was not closed prior to closure of the sternum. Three chest drains were used, one in the pericardium and one in each of the pleural cavities.

Postoperatively, the patient did well, remaining 1 day in intensive care; his chest drains were removed on the first postop-

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operative day. Serial ECGs and daily estimates of cardiac isoenzymes showed no evidence of myocardial infarction and the patient was discharged home on the tenth postoperative day, taking aspirin, 300 mg daily, and acetaminophen (Paracetamol) for analgesia as required.

He again presented 5 weeks later with vague symptoms of dyspnea on exertion and weakness. On examination he was afebrile, had a sinus tachycardia of 100 beats/min and an arterial blood pressure of 100/70 mm Hg. The jugular venous pulse was not elevated and the lung fields were clear. A chest radiograph revealed a globular-shaped heart with cardiomegaly (Fig 1). A significant pericardial effusion with impaired diastolic function of the left ventricle was demonstrated by echocardiography.

Results of hematologic investigations were unremarkable. Pericardial drainage of 1 L of straw-colored fluid was performed under echocardiographic control on two separate occasions with initial symptomatic relief. Reaccumulation of the fluid and recurrence of the symptoms occurred within 1 week on both occasions despite the addition of hydrocortisone and indomethacin. The protein content of the fluid was 61 g/L; cytologic study demonstrated reactive cells and no organisms were cultured. The patient underwent VATS to create a pericardial window.

**Technique**

The operation was performed under general anesthesia with double-lumen endotracheal intubation. Correct position of the endotracheal tube was confirmed with a flexible pediatric bronchoscope. The patient was placed in the left lateral position and draped in the standard fashion for formal thoracotomy. Mechanical ventilation of the right lung was discontinued. Even though preoperative echocardiography had revealed a large diffuse effusion, it was decided to use a right-sided approach. Cacciavale, in a previous description of VATS for a pericardial window, advocated a right-sided incision because the pericardial sac, when distended with fluid, tends to fill the left hemithorax making visualization difficult due to the proximity of the scope to the pericardium. He also noted that the pericardial fat, which is well vascularized, tends to be more extensive over the bulging left ventricle. His series, however, did not include postcardiac surgical patients. In a post-CABG patient, the placement of the grafts at the original operation is a major factor to be considered before attempted drainage of the pericardium, and our main reason for adopting a right-sided incision was that the adhesions were likely to be more dense on the left side with the lung adherent to the chest wall following harvest of the LIMA graft.

Video-optics consisted of a 10-mm 0° panoramic view diagnostic telescope, a camera, camera head, and video monitor. An initial 2-cm incision was made in the fifth intercostal space in the midaxillary line for insertion of the thoracoscope and camera through a 10-mm thoracocort (cylindrical plastic tube). Exploratory thoracoscopy was then performed, which revealed adequate deflation of the right lung, a small pleural effusion, and pleural adhesions to a tense pericardium. A second thoracocort was placed in the fifth space anterior axillary line under direct vision. The right lung was easily separated from the pericardium with gentle traction with a grasping forceps passed through the anterior thoracocort. With the excellent view of the pericardium afforded by the video telescope, damage to an underlying coronary graft should be unlikely, particularly where the effusion is large, generalized, and the pericardium is tense. However, we advocate aspiration of a few milliliters of fluid with a long 18-gauge needle prior to making an initial incision in the pericardium at the site of the aspiration, as it is the initial incision in the pericardium that is most hazardous in the patient post-CABG.

The presence of a pericardial effusion was confirmed by aspiration with a long 18-gauge cannula, prior to creation of the window. Using a sharp-pointed scissors passed through the anterior thoracocort, and counter traction with a grasping forceps passed directly through the chest wall in the seventh intercostal space midaxillary line, an 8X1-cm incision was easily made in the pericardium anterior and parallel to the phrenic nerve. Bleeding from pericardial vessels was minimal and easily controlled with diathermia. There was free drainage of pericardial fluid through this window. Two chest drains were placed through the operating sites, one directly into the pericardial cavity, and the camera was removed and its insertion site closed. Drainage gradually decreased from 350 ml/day and the drains were removed after 1 week. Repeated echocardiography demonstrated a clear pericardium with no reaccumulation of fluid and good left ventricular function. The patient was discharged home receiving no medication and remains well 6 months later.

**DISCUSSION**

The optimal surgical management of pericardial effusions remains controversial. Approaches advocated include the subxiphoid incision and pericardial window, anterior thoracotomy or median sternotomy with creation of a pericardial window, and varying degrees of pericardiec- tomy. Excellent results are achievable with all of these methods and the surgical option used is often dictated by the etiology of the effusion and the condition of the patient. Recently, with the resurgence of interest in thoracoscopy and the advent of VATS, drainage of pericardial effusions by video-assisted thoracoscopic techniques has been described. However, this technique has not been reported previously for drainage of postoperative effusions following coronary artery bypass surgery.

Although rare in comparison to the incidence of pericardial effusions associated with the postpericardiotomy syndrome, the delayed appearance of a pericardial effusion after cardiac surgery has been reported previously and can lead to significant morbidity. Management of the
problem has followed the traditional surgical approaches of subxiphoid incision or thoracotomy, in addition to drainage under echocardiographic guidance. The options first considered in our patient were steroids to cover the possibility of a delayed postpericardiotomy syndrome and drainage under echocardiographic control. While this echocardiographic drainage was successful on both occasions, it was followed by rapid reaccumulation of fluid. It was decided to create a pericardial window by VATS rather than place another percutaneous drain or follow one of the more traditional surgical approaches to the subxiphoid incision or thoracotomy.

Advocates of the subxiphoid approach list as its chief advantages that it can be performed under local anesthetic and that it maintains dependent drainage of the pericardium. In our experience, placement of a subxiphoid drain under local anesthetic can be difficult in a patient following a recent sternotomy, and in addition, our patient was in good medical condition with no contraindication to general anesthesia. While dependent drainage may be a factor in decreasing the incidence of recurrence, VATS affords excellent visualization of the pericardium and allows accurate placement of the pericardial drain. This accurate placement of an intrapericardial drain at thoracoscopy ensures continued decompression of the pericardium and facilitates the formation of intrapericardial adherions, and these may reduce the recurrence rate. This factor may be of more importance than the dependent drainage facilitated by the subxiphoid approach.

Proponents of thoracotomy drainage claim that the better visualization of the pericardial sac at thoracotomy facilitates breakdown of intrapericardial adhesions and drainage of loculated fluid. Also, this together with the opportunity to widely excise pericardial tissue should result in a lower reaccumulation rate. However, the extent of pericardial resection required to prevent recurrence of the effusion is controversial. The diversity of causes of pericardial disease may explain the wide range of reported recurrences with the transthoracic approaches in previous series. The extent of resection required probably depends largely on the etiology of the effusion and in cases where the etiology is in doubt, wider excision of the pericardium may correctly be the more prudent option. In the patient post-CABG, it is possible with VATS to safely create an adequate pericardial window anterior to the phrenic nerve to decompress the pericardium without the morbidity of a thoracotomy. In addition, a left anterior thora
cotomy following CABG entails dissection through adhesions formed following harvest of a LIMA graft. This difficulty is obviated by a right-sided VATS.

While the development of thoracoscopy and VATS continues, at this early stage, we consider its chief advantages in the drainage of late pericardial effusions following CABG over the more traditional surgical approaches to be the excellent visualization of the thoracic cavity and pericardium afforded without the morbidity of a thoracotomy. In addition, it allows the creation of an adequate pericardial window to decompress the pericardial sac and facilitates accurate placement of a pericardial drain. However, we advise careful planning, taking particular note of the position of grafts and the extent of the effusion.

**REFERENCES**


**Massive Hemoptysis in Takayasu's Arteritis During Pregnancy*\**

M. Patricia Rocha, M.D.;
Kalpalatha K. Guntupalli, M.D., F.C.C.P.;
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Takayasu’s arteritis is an uncommon condition affecting predominantly young women. Because the disorder affects women in childbearing age, it may be recognized the first time during pregnancy. Various cardiovascular events may occur in the perinatal period. We describe a patient with Takayasu’s arteritis who presented with massive hemoptysis. To our knowledge, this manifestation has not been documented previously.

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*References:*


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