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Case Report

Video-Assisted Thoracoscopic Pericardial Window in the Treatment of Pericardial Effusion: Report of Two Cases

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A 54-year-old man had a history of subxiphoid pericardial window due to suspected tuberculous effusions. Seventeen years later, following chronic heart failure and implantation of a pacemaker, he again developed pericardial and pleural effusion, requiring repeated percutaneous pericardiocentesis, pleurocentesis and chest tube drainage. A 5×5-cm section of pericardium was successfully resected with video-assisted thoracic pericardial window. No recurrence of pericardial effusion has since been encountered during 36 months follow-up. An 85-year-old woman had a history of percutaneous pericardiocentesis and pleurocentesis due to chronic pericarditis. The effusion of unknown origin was refractory to medication and additional pericardiocentesis and percutaneous pericardial and chest tube drainage. A 4×4-cm section of pericardium was also successfully resected. No recurrence of pericardial effusion has been seen during 8 months follow-up. Video-assisted thoracoscopic pericardial window is an effective procedure for treating intractable pericardial effusion.

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Introduction

Symptomatic pericardial effusion is common and may result from a variety of causes, including cardiac surgery, malignancy, and infection. First-line medications include diuretics and cardiac stimulants, but sometimes do not successfully resolve the effusion. Surgical intervention is then considered. However, whether surgical subxiphoid tube drainage or thoracoscopic pericardial window is the optimal treatment for intractable pericardical effusion remains controversial.

We report herein two cases with surgical management of recurrent pericardial effusion using a video-assisted thoracoscopic pericardial window.

Cases

Case 1

A 54-year-old man had a history of subxiphoid pericardial window due to suspected tuberculosis effusions. Seventeen years later, following chronic heart failure and implantation of a pacemaker, he again developed pericardial and pleural effusion. This required repeated percutaneous pericardiocentesis, pleuracentesis and chest tube drainage. However, cytological, bacterial, fungal, and tuberculosis examinations found no definitive cause of effusion. He was therefore referred to our department for further treatment. Copious pleural effusion was seen on chest computed tomography (CT) (Fig. 1). Due to the suspected presence of adhesions around the subxiphoid area, percutaneous drainage seemed difficult. A

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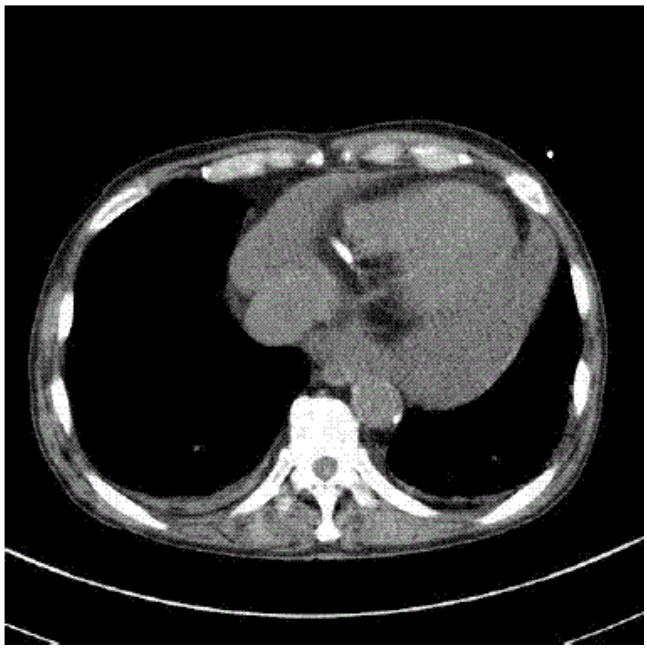

Figure 1. Chest CT for Case 1, showing massive pericardial effusion.

video-assisted thoracoscopic pericardial window was therefore used. With the patient under general anesthesia in a right decubitus position, one camera port and three access ports were created. Scissors were used to open the pericardium, rather than electrocautery, to avoid generating arrhythmia. While ensuring that vital signs remained stable, a 5×5-cm window in the pericardium was resected posterior to the phrenic nerve, taking great care to avoid injury (Fig. 2). A 19-Fr Blake drain® (Ethicon, Somerville, NJ, USA) was inserted into the thorax through a port site with no attempt to drain the pericardium. Intraoperative pleurodesis was not performed. On pathology, fibrosis and inflammatory cell infiltration were identified in the resected pericardium, but no malignant cells. The postoperative course was uneventful, and no recurrence of pericardial effusion has been identified during 36 months follow-up.

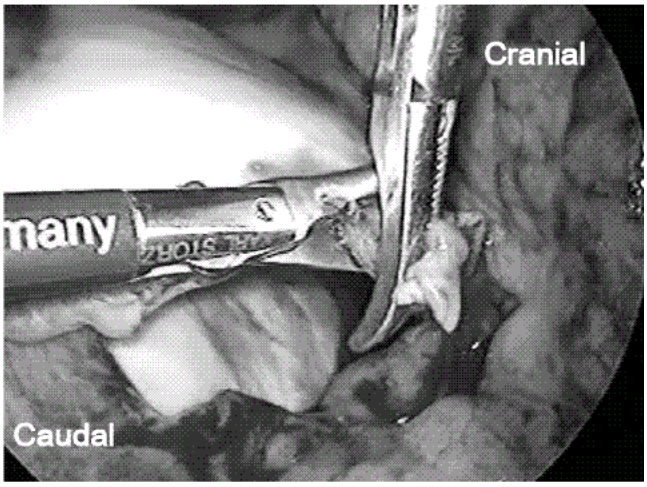

Figure 2. Case 1. The pericardium was cut using endoscopic scissors to avoid injuring the heart.

Case 2

An 85-year-old woman had a history of percutaneous pericardiocentesis and pleuracentesis due to chronic pericarditis about 1 year earlier. Oral prednisolone (10 mg/kg) was administered to reduce pericardial inflammation, but proved unsuccessful. Another pericardiocentesis was needed, and cytological, bacterial, fungal, and tuberculosis examinations found no definitive cause of effusion. Percutaneous pericardial and chest tube drainage were also unsatisfactory. She was therefore referred to our department for further treatment. A video-assisted thoracoscopic pericardial window was created through 3 ports from the right chest cavity. About 4×4-cm of pericardium anterior to the phrenic nerve was resected using the same methods described in Case 1 (Fig. 3). Intraoperative pleurodesis was not performed. On pathology, fibrosis and inflammatory cell infiltration were found in the resected pericardium, but no malignant cells. The postoperative course was uneventful and no pericardial effusion recurrence has been identified during 8 months follow-up.

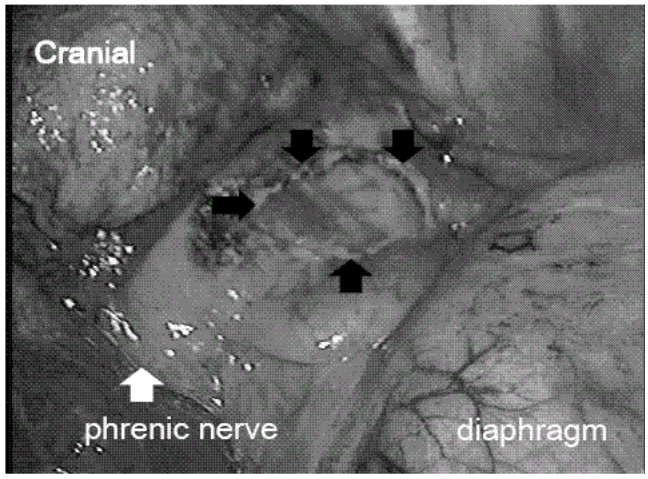

Figure 3. A 4×4-cm area of pericardium (black arrows) anterior to the phrenic nerve (white arrow) was fenestrated.

Discussion

We have successfully treated two patients with intractable pericardial effusions using video-assisted thoracoscopic surgery (VATS) to create a pericardial window.

Various approaches have been described for diagnostic and therapeutic procedures, including percutaneous catheter drainage, pericardiocentesis, and subxiphoid or thoracoscopic pericardial window.[1] Whether surgical subxiphoid tube drainage or thoracoscopic pericardial window represents the optimal treatment for intractable pericardial effusions has been discussed.[2] In our cases, both patients needed frequent percutaneous catheter drainage and pericardiocentesis, and so were referred to our department for thoracoscopic procedures.

A thoracoscopic approach allows better exposure and visualization of the whole thorax, including the pericardium, despite needing general anesthesia and several intercostal incisions. Both relief of symptoms and useful information could be obtained using this procedure. The pleural cavity and lung were examined, and biopsy of the lung and pleura could be performed if indicated. Pleural effusion was evacuated and sent for cytological examination and microbiological culture. The pericardium was also sent for histological examination. A uniportal video-assisted thoracoscopic approach has also been reported[3] as less invasive surgery. Moreover, Katlic et al[4] reported 13 cases of VATS pericardial window successfully performed under local anesthesia and sedation. Although this method was less invasive compared to general anesthesia for patients with unstable hemodynamics, diagnostic biopsy was not performed.

Creation of a VATS pericardial window resulted in more generous resection without the morbidity associated with thoracotomy or sternotomy. Moreover, the durability of the window has been shown to be longer than that of a subxiphoid approach, even though this approach also offers the least morbidity.[5, 6] Georghiou et al.[1] reported that none showed recurrent pericardial effusion at a mean of 12 months after surgery among 11 of the 15 patients with non-malignant disease. For these reasons, we recommend using a video-assisted thoracoscopic pericardial window when the patient requires frequent pericardiocentesis or tube drainage, provided the patient could undergo general anesthesia. On the other hand, Muhammad[2] recommended use of a subxiphoid pericardial window if the life expectancy of the patient was limited and hemodynamic status was unstable, due to the simplicity and speed of this procedure.

Several technical points regarding VATS pericardial windows have been reported.[1-7] First, external defibrillator pads should be applied in case arrhythmia develops during surgery when using electrocautery. Second, using electrocautery at a low setting is important when resecting the pericardium to protect the heart and phrenic nerve.[2] Third, the required area of pericardial resection was not defined, but most reports have recommended an area was approximately 3-5 cm in diameter[6, 7] to ensure adequate drainage of the pericardial space.

We have the impression that a right -sided approach provides more working space within the chest for maneuvering instruments. However, the necessities of the pulmonary or pleural pathology to be investigated and the likelihood of pleural adhesions should be taken into account when selecting the side of the approach. In our cases, we paid attention to the above tips and potential obstacles, with the exception of applying external defibrillator pads. Successful results were achieved in both patients.

Conclusion

Video-assisted thoracoscopic pericardial fenestration is an effective procedure for the treatment of intractable pericardial effusions and the diagnosis of underlying causes. Although thoracic surgeons encounter few opportunities to treat this disease, detailed knowledge of this procedure is warranted.

Disclosures and Freedom of Investigation

We have no personal conflicts of interest to declare and received no outside support for this research.

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