Major hemorrhage and subsequent cardiac tamponade during mediastinoscopy

Jung-Jyh Hung, MD, Yu-Chung Wu, MD, Han-Shui Hsu, MD, Kung-Ming Wang, MD, and Wen-Hu Hsu, MD, Taipei, Taiwan

Mediastinoscopy was originally described by Carlens\(^1\) in 1959. It is used for the staging of lung cancer and for the diagnosis of mediastinal lesions. Low perioperative morbidity (0.6%-3.7%) and mortality rates (0%-0.3%) for mediastinoscopy have been reported in some series. Although major hemorrhage caused by injury to the great vessels within the mediastinum is an uncommon event, it may lead to a catastrophic and fatal outcome.\(^2\) We present the case history of a patient who had major hemorrhage and subsequent cardiac tamponade during mediastinoscopy.

Clinical Summary
A 79-year-old woman was referred to our clinic because of intermittent chest pain of 2 months’ duration. The chest film revealed a widened mediastinum. A computed tomographic scan of the chest demonstrated a well-defined lesion (5.6 × 1.7 × 2 cm) in the lower paratracheal and pretracheal area without enhancement after contrast injection (Figure 1). Thallium 201 perfusion scan did not show myocardial ischemia. Owing to the persistence of symptoms, video-assisted mediastinoscopy was performed for diagnosis. After dissection of the cystlike lesion, the capsule was opened and clear fluid drained. Hemorrhage occurred during biopsy of a lymph node in the right lower paratracheal region. The bleeding was temporarily controlled after initial management with sterile gauze packing. The hemodynamic stability lasted only a few minutes. The patient was transferred to the intensive care unit for emergent surgery. A median sternotomy was performed. A communication was identified between the cyst and the pericardium. The cystic structure was excised, with pathologic examination revealing a pericardial cyst. The patient received a total of 4000 mL of crystalloid and 20 units of packed red blood cells (RBC) for an estimated blood loss of 8000 mL. The patient was extubated in the intensive care unit on the third day after surgery. Postoperative recovery was uneventful, and she was eventually discharged without any morbidity.

Discussion
Mesothelial cysts represent 5% to 10% of mediastinal tumors, with more than half being asymptomatic. They include lesions of bronchogenic, pleural, pericardial, thymic, and other rare origins. Sarin\(^3\) reported the first successful removal of a pericardial cyst by mediastinoscopy in 1970. Several series have reported successful excision of paracardial cysts by mediastinoscopy without major morbidity and mortality.\(^4\) The present case suggests possible morbidity of major hemorrhage and subsequent intraoperative cardiac tamponade.

Complications of mediastinoscopy include hemorrhage, pneumothorax, recurrent laryngeal and phrenic nerve injuries, esophageal perforation, tracheobronchial laceration, and wound infection. Park and associates\(^2\) reported 14 major hemorrhages (0.4%) necessitating additional surgical exploration for definite control in 3391 mediastinoscopies. The most frequently injured vessels were the azygos vein and the innominate and pulmonary arteries. Only one major hemorrhage was caused by bronchial artery injury. In a series of 324 mediastinoscopies, Urschel\(^5\) reported 2 major hemorrhages, both successfully controlled by gauze packing. Cardiac tamponade during mediastinoscopy has never been reported in the literature. In the present case, the hemorrhage from the bronchial artery was temporarily controlled after initial conservative management with gauze packing. The hemodynamic stability lasted only a few minutes. The patient was transferred to the intensive care unit for emergent surgery. A median sternotomy was performed. A communication was identified between the cyst and the pericardium. The cystic structure was excised, with pathologic examination revealing a pericardial cyst. The patient received a total of 4000 mL of crystalloid and 20 units of packed red blood cells (RBC) for an estimated blood loss of 8000 mL. The patient was extubated in the intensive care unit on the third day after surgery. Postoperative recovery was uneventful, and she was eventually discharged without any morbidity.

From the Division of Thoracic Surgery, Department of Surgery, Taipei Veterans General Hospital and National Yang-Ming University, Taipei, Taiwan.

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Address for reprints: Wen-Hu Hsu, MD, Division of Thoracic Surgery, Department of Surgery, Taipei Veterans General Hospital, No. 201, Sec. 2, Shih-Pai Road, Taipei 112, Taiwan (E-mail: whhsu@vghtpe.gov.tw).

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Figure 1. Thoracic computed tomogram showing a lesion (56 × 17 × 20 mm; arrowheads) in the lower paratracheal and pretracheal area without enhancement after contrast injection.
few minutes, however, before persistent tachycardia and hypotension developed. Where there is gauze packing in the pretracheal space, blood may initially accumulate in the lower pretracheal space. In our patient, a pressure gradient was generated between the lower pretracheal space and the pericardial space, and the accumulated blood was therefore forced to enter the pericardial space through the communication between the cyst and the pericardial space. Continuous blood inflow into the pericardial space led to subsequent cardiac tamponade. This may account for the persistence of the hemodynamic instability despite fluid resuscitation and packed RBC transfusion. Therefore, immediate surgical exploration through a median sternotomy or thoracotomy should be performed in patients with persistent hemodynamic instability despite adequate fluid resuscitation.

In conclusion, although mediastinoscopy appears to be a safe procedure, deaths can occur as a result of major hemorrhage. Excision of the paratracheal cysts by mediastinoscopy has been reported without morbidity and mortality. However, cardiac tamponade may occur even with minor hemorrhage during mediastinoscopy. Removal of paratracheal cysts during mediastinoscopy should incorporate the intact capsule owing to the risk of cardiac tamponade cause by major hemorrhage.

References

Figure 2. A, Transesophageal echocardiogram showing pericardial fluid and right-sided cardiac tamponade with right ventricular compression. B, Cystic structure (Cy) in the lower pretracheal region adjacent to the root of the ascending aorta and communicating with the pericardial space (black arrow). RA, right atrium; RV, right ventricle; Ao, aorta; PE, pericardial effusion; lnV, innominate vein; lnA, innominate artery.