Cardiac Tamponade Due to Coronary Artery Rupture After Pulmonary Resection

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We present a case of cardiac tamponade after lung resection. A 68-year-old man underwent single-staged bilateral lung resection (right wedge resection and left S8 segmentectomy) for metastatic lung tumors from rectal cancer and lost consciousness on postoperative day 4. Because an enhanced whole-body computed tomography scan showed pericardial effusion as the only abnormal finding, we performed rethoracotomy, which revealed that the cardiac tamponade was due to coronary artery rupture. We suggest that it would be more reasonable to approach the pericardial space by rethoracotomy rather than median sternotomy because exploration of the surgical site is the first essential step. (Ann Thorac Surg 2013;96:e97–9) © 2013 by The Society of Thoracic Surgeons

Cardiac tamponade is a very rare complication of lung resection, and only a few such cases have been reported thus far. The etiology of cardiac tamponade in these patients appeared to be associated with surgical intervention. We present a patient with cardiac tamponade after single-stage right wedge resection and left S8 segmentectomy for bilateral metastatic lung tumors. An emergent rethoracotomy revealed that coronary artery rupture was the cause of this potentially lethal complication.

A 68-year-old man, without coronary artery disease, hypertension, or diabetes, was diagnosed with rectal cancer with synchronous bilateral pulmonary metastases. The patient underwent a previously resection of the rectum and received 14 cycles of a chemotherapy regimen comprising 5-fluorouracil, leucovorin, and oxaliplatin, with or without bevacizumab [1]. Because a computed tomography scan showed persistent pulmonary nodules, without any appearance of new metastatic lesions (Fig 1A and B), he underwent video-assisted wedge resection of the right lower lobe and left S8 segmentectomy 8 weeks after bevacizumab was discontinued.

On postoperative day 4, he suddenly lost his consciousness, with hypotension and cyanosis. After regaining consciousness, he complained of chest pain, without paralysis of the extremities, and his hypotension was sustained. An electrocardiogram showed no myocardial ischemic change, with regular sinus rhythms and slight ST elevation in all leads. A bedside echocardiogram showed a modest pericardial effusion. An enhanced whole-body computed tomography scan did not show dissection or aneurysm of the aorta or pulmonary thromboembolism, but the pericardial effusion was apparent (Fig 1C). He was transferred to the operating room 160 minutes after the syncopal event. An emergent left rethoracotomy revealed no abnormality in the transected pulmonary hilum structures but a distended dark-purple color pericardial sac. Although on opening the pericardium the blood pressure was restored to normal, we could not identify the bleeding site. We consulted the cardiovascular surgeons, and, by elevating and rotating the heart, they identified continuous bleeding from the left circumflex branches of the coronary artery (Fig 2A). Hemostasis was achieved by applying a fibrinogen-thrombin-collagen-based hemostatic agent (TachoComb Tissue Sealing sheet, CSL Behring, Tokyo, Japan; Fig 2B). The intraoperative bleeding was 760 g.

The patient was discharged 11 days after the rethoracotomy procedure, without any additional adverse events. He remains alive, with peritoneal dissemination, in the palliative care unit 28 months after the lung resection. During the follow-up period, computed tomography examinations revealed neither pericardial involvement nor a new thoracic metastatic region.

Comment

We present a patient with hemorrhagic cardiac tamponade caused by coronary artery rupture. The following three causes of cardiac tamponade after lung resection have been reported. First, an inadequately dissected pulmonary vein may be retracted intrapericardially, resulting in intrapericardial bleeding [2]. Second, a variant bronchial artery arising from the intra-pericardial space may be broken off during the operation, and the transected proximal end of the artery may be retracted into the pericardial sac, which would attribute to cardiac tamponade [3]. Finally, any damage to the ascending aorta during lymphadenectomy of the right upper mediastinum may result in pericardial bleeding [4].

In the present patient, left rethoracotomy revealed no abnormalities of the surgical stumps of the pulmonary artery and bronchus. Moreover, we did not disturb the right mediastinal structure during the right wedge resection. We thus conclude that the surgical intervention did not cause cardiac tamponade in this patient. Because the bleeding site was located toward the right side, visual confirmation of the bleeding site warranted elevation and rotation of the heart.

Several etiologies have been suggested for coronary artery rupture: anomaly, localized infection, coronary
artery dissection, and trauma [5–8]. The patient’s previous medical and family history revealed no hereditary disorder, such as Ehlers-Danlos syndrome, traumatic injury, hypertension, or atherosclerotic disease. Preoperative computed tomography examinations did not indicate any local calcifications or anomalous vessel formation. Because we did not identify any underlying etiologies, it might be reasonable to consider the present case as that of spontaneous coronary artery rupture. However, we could not completely exclude a possibility that an undetectable vulnerable lesion in the coronary artery would be affected by postoperative status changes in hormones or inflammatory cytokines. In this sense, we all should note that this lethal event could occur in the postoperative state of any type of surgical intervention.

The patient has since received another bevacizumab-containing regimen after the appearance of peritoneal dissemination, without exhibiting any associated hemorrhagic event. Therefore, the causative role of bevacizumab in this event is debatable and would require a study of several similar cases.

In patients with cardiac tamponade after lung resection, it is reasonable to approach the pericardial space by rethoracotomy rather than median sternotomy, because exploration of the surgical site is the first essential step. If necessary, median sternotomy may also be performed.

References
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