

A case of cardiac tamponade following esophageal resection

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Abstract

We report a rare case of cardiac tamponade after esophageal resection for esophageal cancer. A 69-year-old man underwent subtotal esophagectomy and reconstruction of the gastric tube with cervical anastomosis via the poststernal route and three-field lymphadenectomy via a median sternotomy. On postoperative day 4, the patient developed dyspnea, chest oppression, and hemodynamic instability due to cardiac tamponade. Emergency percutaneous catheter drainage was performed to manage the cardiac tamponade. Acute pericarditis due to the original surgical procedure was suspected to be the cause of the tamponade. Although rare, cardiac tamponade should be considered as a cause of hemodynamic instability after esophageal resection.

Key words Esophageal carcinoma · Pericarditis · Complication

Introduction

Early detection combined with esophageal resection and three-field lymph node dissection offers the best chance for long-term survival in patients with esophageal carcinoma [1]. However, esophagectomy with esophageal reconstruction is associated with many fatal complications, including infection, anastomosis leakage, and respiratory and hemodynamic problems. We have documented a rare case of cardiac tamponade caused by acute pericarditis following esophagectomy.

Case report

A 69-year-old man with no previous contributing medical history was scheduled for subtotal esophagectomy.

A stenotic area measuring 4 cm in length in the upper third of the thoracic esophagus was identified. Esophagoscopy and biopsy confirmed the presence of squamous cell carcinoma. Although no demonstrable metastasis was confirmed upon examination of all cervical, chest, abdominal, and pelvic structures, irradiation and chemotherapy for downstaging were commenced prior to surgery because a transesophageal echo revealed that the tumor might have infiltrated the muscle layer.

The patient underwent subtotal esophagectomy via a standard right thoracoabdominal approach with median sternotomy and esophagogastrostomy, gastric pull-up with cervical anastomosis via the poststernal route, and three-field lymphadenectomy. No complications occurred during surgery. The patient was mechanically ventilated for the first two postoperative days, and sulbactam/ampicillin was administered for the first four postoperative days.

On postoperative day 4, the patient developed dyspnea and sudden loss of consciousness. His systemic blood pressure, respiratory rate, and heart rate were 84/52 mmHg, 28 breaths/min, and 130 beats/min, respectively. The central venous pressure was 22 cm H₂O. Heart sounds were normal; there were no rubs, gallops, or murmurs. Peripheral blood tests were normal, with the exception of the white blood cell count, 9000/mm³; hemoglobin 8.4 g·dl⁻¹; hematocrit 25.3%; platelets 119000/mm³; aspartate aminotransferase, 75 IU·l⁻¹; creatinine kinase, 507 IU·l⁻¹; C-reactive protein, 1.43 mg·dl⁻¹. Arterial blood gas analysis revealed pH 7.44, PaO₂ 75.2 mmHg, PaCO₂ 24.5 mmHg, bicarbonate 16.4 mEq·l⁻¹, base excess -6.9, and SaO₂ 95.2%. Chest radiographs revealed slight cardiomegaly (Fig. 1). Echocardiography revealed pericardial effusion (Fig. 2). An emergency echo-guided subxyphoid pericardiocentesis with a catheter was performed, and 340 ml of bloody serous fluid was aspirated. The hemoglobin level in this fluid was 0.1 mg·dl⁻¹. Culture of the fluid,

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Fig. 1. **A** Chest radiographic examination revealed slight cardiomegaly prior to pericardiocentesis. **B** Cardiothoracic ratio was decreased from 57% to 53% after pericardiocentesis

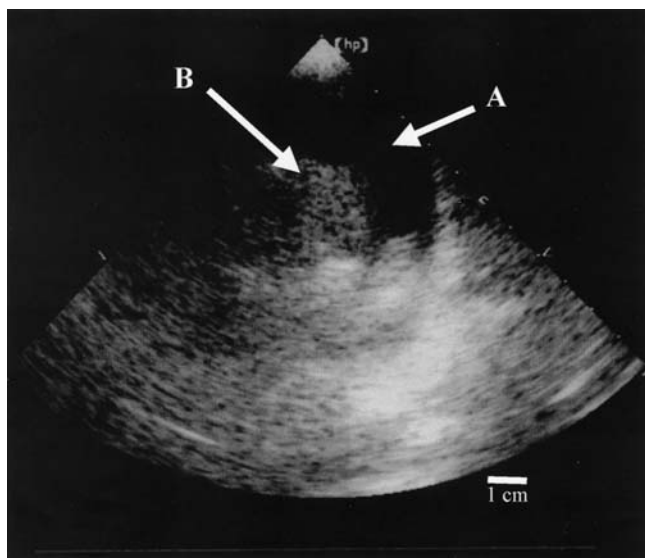


Fig. 2. Ultrasonography revealing massive pericardial effusion with an oppressed heart. **A**, Echo-free space; **B**, left ventricular inferior wall

including acid-fast bacillus (tuberculosis), was negative; and cytological findings were normal. After the pericardiocentesis, the patient experienced complete relief of symptoms, and the remaining course of hospitalization was uneventful. He recovered without further complications and was discharged on postoperative day 24. At 7 months following discharge, the patient remained in good health.

Discussion

The most frequent causes of spontaneous pericardial tamponade are neoplastic invasion, idiopathic or infectious pericarditis, and uremia. Both penetrating and nonpenetrating trauma are also well-recognized causes

of cardiac tamponade [2,3]. Esophagectomy with reconstruction of the esophagus is associated with many fatal complications, such as infection, anastomosis leakage, and respiratory and hemodynamic problems; however, cardiac tamponade following esophagectomy is rare. Kitamura et al. reported only one patient in 277 cases who suffered cardiac tamponade after surgery for thoracic esophageal carcinoma [4]. Levitt et al. reported a case of intraoperative cardiac tamponade complicating esophagogastrectomy [5]. Fukumoto et al. reported cardiac tamponade in an esophagectomy patient resulting from a gastric ulcer caused by a gastric tube [6].

The patient we reported revealed the typical signs of acute cardiac tamponade: a decrease in arterial blood pressure, an increase in central venous pressure, and a small, quiet heart. These symptoms are primarily seen with acute, rapidly progressing cardiac tamponade that results from trauma. It is difficult to think that laceration of the pericardium occurred during surgery. Furthermore, analysis of the pericardial effusion and pleural effusion revealed that the lactate dehydrogenase and glucose values were markedly different. Also, the negative serum analysis ruled out pericarditis due to viral or acid-fast bacillus (tuberculosis) infection. Thus, we believed the cause might be acute pericarditis due to the surgical procedure itself. Proper analysis of simultaneously aspirated pleural effusion and pericardial fluid, as well as venous hematocrit, oxygen content, and coagulation studies, may clarify the pathogenesis [7]. We believe that, though rare, cardiac tamponade should be considered as a cause of hemodynamic instability after esophageal resection.

References

1. Sugimachi K, Watanabe M, Sadanaga N, Ikebe M, Kitamura K, Mori M, Kuwano H (1994) Recent advances in the diagnosis and

- surgical treatment of patients with carcinoma of esophagus. *J Am Coll Surg* 178:363–368
2. Jones EW, Helmsworth J (1968) Penetrating wounds of the heart: thirty years' experience. *Arch Surg* 96:671
 3. Shoemaker WC, Carey JS, Yao ST, Mohr PA, Amato JJ, Printen KJ, Corley RD, Monson DO, Youssef J, Shoemaker NJ (1970) Hemodynamic alteration in acute cardiac tamponade after penetrating injuries of the heart. *Surgery* 67:754–764
 4. Kitamura M, Nishihira T, Hirayama K, Shineha R, Sekine Y, Sanekata K, Mori S (1989) Cardiocirculatory disturbances after surgery of carcinoma of the thoracic esophagus (in Japanese with English abstract). *Nippon Kyobu Geka Gakkai Zasshi* 37:17–24
 5. Levitt MA, Cunningham JD, Curtiss SI, Brower ST (1998) Intraoperative cardiac tamponade complicating esophagogastrectomy. *J Cardiovasc Surg* 39:245–247
 6. Fukumoto A, Watanabe A, Yamada T, Sawada H, Yamada Y, Nakano H (1997) A case of cardiac tamponade due to perforation of peptic ulcer in the gastric tube after surgery for esophageal cancer (in Japanese with English abstract). *Nippon Shokakibyo Gakkai Zasshi* 30:1756–1760
 7. Mimbs JW, Weiss AN (1976) Spontaneous cardiac tamponade due to sternotomy wire suture. *Am Heart J* 92:630–633