Case Report

One-stage Operation for Descending Thoracic Aortic Aneurysm and Left Lung Cancer: A Case Report

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We performed concomitant graft replacement for a descending thoracic aortic aneurysm and pulmonary resection for squamous cell carcinoma of the left upper lobe in a 79-year-old man. The tumor reached the parietal pleura. No distance metastasis was found, and the tumor was diagnosed preoperatively as a stage IIB (N0, M0, T3) tumor. The descending thoracic aortic aneurysm was saccular, with the greatest diameter being 55 mm, and extending from TH5 to TH8. A left upper lobectomy was performed, and after irrigation with a large volume of saline diluted with povidone iodine, graft replacement for the aortic aneurysm was performed under femoro-femoral partial bypass. To prevent postoperative graft infection, greater omentum was dissected and placed over the resected pulmonary hilum and graft. The patient's postoperative course was uneventful. There was no sign of infection, and the patient was discharged 1 month after surgery.

Artificial graft wrapping with the greater omentum was useful for the prevention of postoperative graft infection, in this case of surgical treatment of lung cancer and a descending thoracic aortic aneurysm. (Ann Thorac Cardiovasc Surg 2001; 7: 237–40)

Key words: concomitant operation, thoracic descending aortic aneurysm, left lung cancer, postoperative graft infection, omental wrapping

Introduction

With growth in the aging population, the number of patients with concomitant lesions has increased. We recently treated a patient by a one-stage operation comprising graft replacement for a descending thoracic aortic aneurysm and pulmonary resection for left lung cancer. Since the graft replacement was performed simultaneously with the pulmonary resection, the possibility of contamination was increased such that the prevention of postoperative graft infection was vital. We used the greater omentum to cover the graft. We present this case to illustrate such wrapping when there is risk of contamination in the operative field.

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Case Study

The patient was a 79-year-old man referred to our hospital for surgery because of a suspected superior mediastinum tumor. The tumor suspected on chest X-ray film (Fig. 1) was diagnosed by subsequent computed tomography (CT) (Fig. 2), magnetic resonance imaging (MRI), angiography, and mass needle biopsy examinations to be squamous cell carcinoma of the lung situated in segment B3c (left). The tumor was 55×85×88 mm, and reached the parietal pleura. Distant metastasis was not found on a Gallium scintigram, and the lung carcinoma was diagnosed preoperatively as T3, N0, M0, Stage IIB tumor. During examinations, a descending thoracic aortic aneurysm was found incidentally. It was located within the TH5-8 level, and was saccular in shape (Figs. 3, 4). It was decided that surgery should be performed immediately for both lesions. A preoperative respiratory test showed obstructive respiratory dysfunction (vital capacity, 84.6%, forced expiratory volume, 49.2%) , and arte-

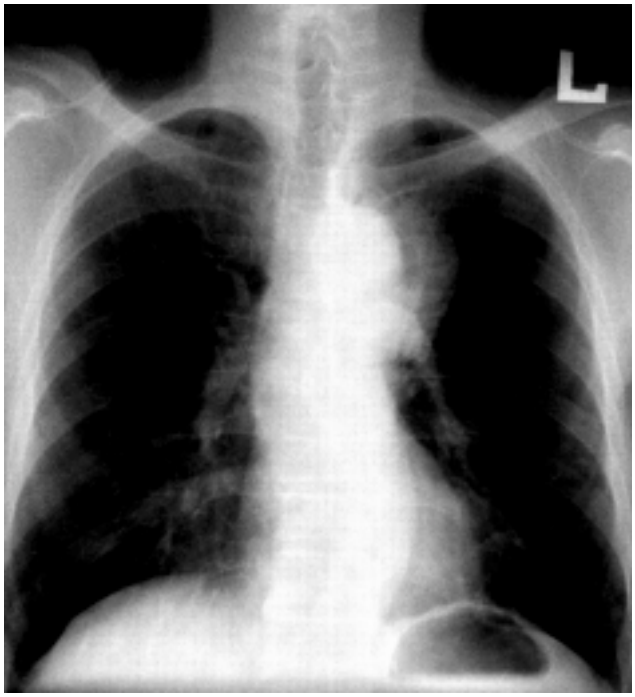

Fig. 1. The antero-posterior chest X ray shows a protrusion shadow in the upper mediastinum, which has no silhouette sign between the distal aortic aorta and descending aorta. In this photo, the descending aortic aneurysmal shadow is not found.

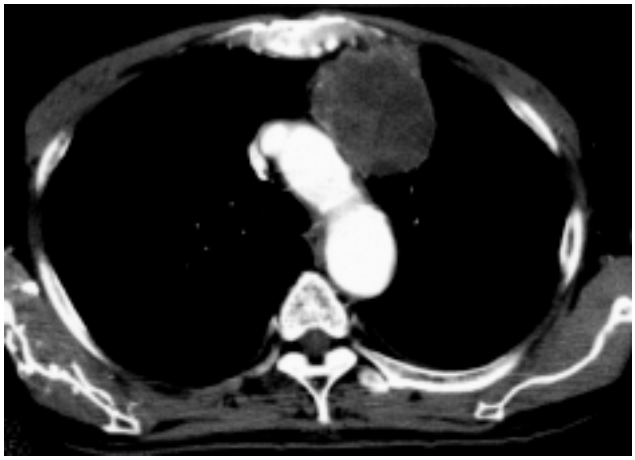

Fig. 2. The enhanced computed tomography shows a mass lesion in the upper mediastinum, which contacted the aortic arch and parietal pleura.

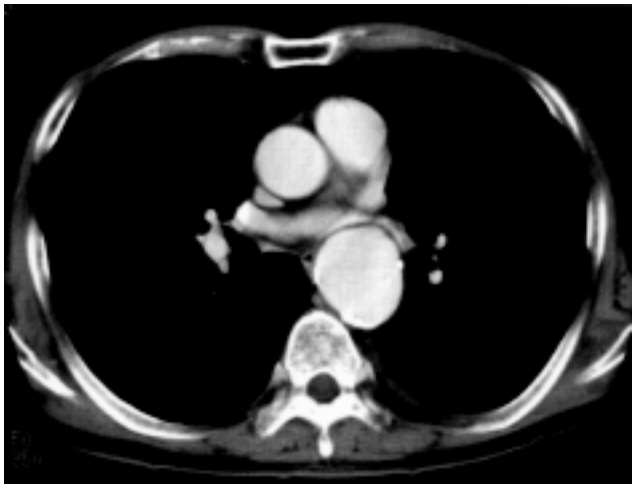

Fig. 3. The enhanced computed tomography shows an aneurysm of the descending aorta. The maximal diameter of the aortic aneurysm was 55 mm.

Fig. 4. The MRI of the thorax shows the sagittal view of the two lesions. The white arrow indicates the lung cancer mass located in the upper mediastinum, and the black arrow indicates the descending thoracic aortic aneurysm.

rial blood gas analysis revealed slight hypoxemia (PH 7.404, PCO_2, 46.5 mmHg, PO_2, 64.8 mmHg, SAT, 91.4%). The preoperative serum squamous cell carcinoma antigen value was elevated at 28.1 ng/ml.

A concomitant left upper lobectomy and graft replacement for the descending thoracic aortic aneurysm was performed. A double-lumen endotracheal tube was used. All procedures were carried out via a fifth intercostal thoracotomy. The left upper lobe was first resected. Because the tumor reached as far as the parietal pleura, the affected pleura was also excised. We used an automatic

anastomosis apparatus to close the bronchial stump. Since lymph node metastasis was not confirmed by the preoperative CT, mediastinal and hilar lymph node dissection was not performed. The operative field was irrigated with a large volume of saline solution with diluted povidone iodine. Graft replacement for the descending thoracic aortic aneurysm was performed under femoro-femoral partial bypass. Extracorporeal perfusion was carried out under a standard heparin dose of 3 mg/kg. Upon dissection of the aneurysm, a larger than normal TH7 intercostal artery was identified, but reconstruction of this intercostal artery was not done because somato-evoked-potential monitoring was unchanged by transient ligation test with a tourniquet. Total bypass time for the graft replacement was 52 minutes. During extracorporeal circulation, no bleeding from the lung parenchyma occurred. At the operation's conclusion, the greater omentum was dissected, and coaxed into the left pleural space via a left subcostal hole to cover the replacement graft and tracheal stump (Fig. 5). The operation spanned 6 hours and 55 minutes, blood loss was 1300 ml, and 1400 ml of autoblood was transfused. Weaning from the respirator was uneventful; it took 16 hours after admission to the intensive care unit (ICU). The patient's postoperative course was uneventful. A bacterial culture of the drain discharge was negative, and there was no sign of infection. The pathology report indicated squamous cell carcinoma with good margins and no lymph node metastasis in the resected lung specimen. After postoperative angiography of the aortic graft, the patient was discharged in good condition 1 month after surgery.

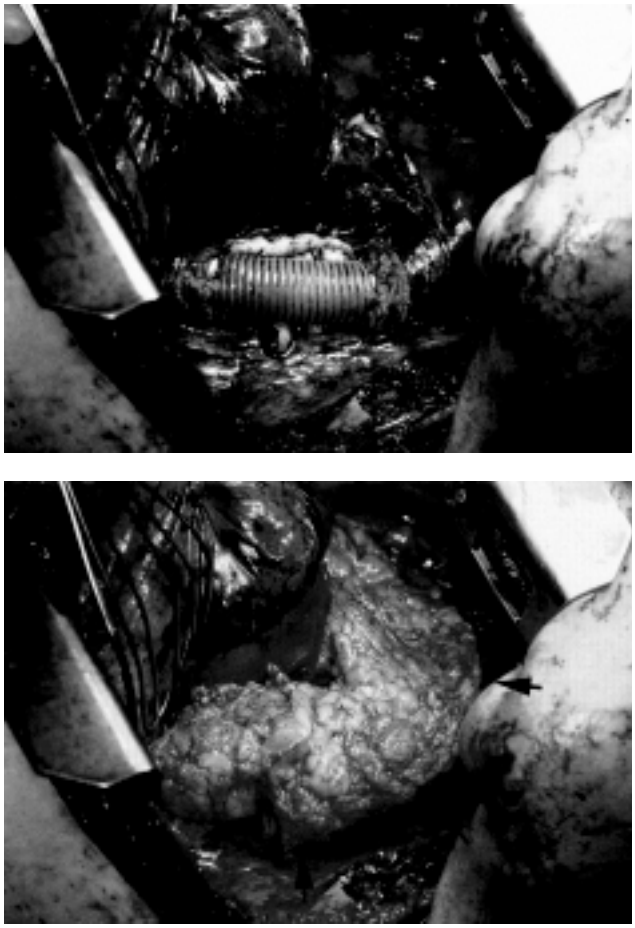

Fig. 5. After left upper lobectomy and graft replacement of the descending thoracic aortic aneurysm (above), the dissected greater omentum was coaxed into left pleural space and used for the coverage of the hilum and the replacement graft (below).

Discussion

With the increase in the aging population, it has not been unusual to see patients with more than one disease requiring surgical treatment. This is particularly true for malignant tumors and atherosclerosis-associated aortic aneurysm, each of which alone is a major cause of death. Despite this increase, few one-stage operation involving graft replacement for the descending thoracic aortic aneurysm and resection of left lung cancer have been performed.[1)] One reason for this is that aortic aneurysm is basically a benign disease, and indications for surgery are based on the aneurysmal diameter and shape. In our case, the aneurysm was saccular, with its largest diameter reaching 55 mm, with a high risk of rupture. Early surgical intervention was necessary for both diseases and thus, one-stage excision was performed. The decision to perform simultaneous operations in the same operative field is made with consideration of the risk to the patient and the disease stage of both lesions. Combined aneurysmectomy and pulmonary tumor resection have the advantage of correcting both problems at once and saving the patient from the pain and risk of a second major operation. Resection of the lung cancer was considered curative in our patient because distant metastasis was not found. During such lung operations, the operative field can become contaminated by bacteria from the opened trachea or bronchi.[2)] What must be absolutely avoided is postoperative graft infection. Use of artificial material in an operative field with such a high possibility of contamination is generally contraindicated. Once an artificial graft is infected, it must usually be removed to cure the infection. In our case, the greater omentum was used to prevent graft infection.[3-6)] In lung surgery, intercostal

muscle, lattisimus dorsi muscle , greater omentum and other materials are used as supply material. Because the whole graft must be covered and it is also necessary to cover the bronchial stump to avoid rupture of the suture, the greater omentum was thought to be the most useful material. The greater omentum is widely used to prevent infection in abdominal surgeries;[3] its length was sufficient for extension into the thorax. For mediastinitis after open heart surgery, the greater omentum is also useful, and is as widely used as the rectus abdominal muscle.[4] In our case, it was also possible after dissection to pull it through the small upper median incision. By creating an opening in the diaphragm between the abdomen and thorax, the greater omentum was easily coaxed into the thorax. During the past 5 years, we used greater omentum wrapping with graft replacement for a mycotic aneurysm of the descending thoracic aorta in 1 patient and for a thoracoabdominal aorta in 2 patients. In these three patients, graft replacement was performed in-situ. All three patients have been well from 3.6 to 5.1 years with an average of 4.8 years after surgery without signs of graft infection.

Conclusion

Our experience with combined surgery for a descending aortic aneurysm and lung cancer showed graft wrapping with the greater omentum to be useful for prevention of postoperative graft infection.

References

1. Hasegawa R, Hagino I, Nakajima M, et al. A successful case of simultaneous operation of aortic arch aneurysm and left lung cancer. *Kyobu Geka* 1999; **52**: 1133–6.
2. Ratto GB, Fantino G, Tassara E, Angelini M, Spessa E, Parodi A. Long term antimicrobial prophylaxis in lung cancer surgery: correlation between microbiological findings and empyema development. *Lung Cancer* 1994; **11**: 345–52.
3. Sherck J, Seiver A, Shantney C, Oakes D, Cobb L. Covering the “open abdomen”: a better technique. *Am Surg* 1998; **64**: 854–7.
4. Yoshida K, Ohshima H, Murakami F, et al. Omental transfer as a method of preventing residual persistent subcutaneous infection after mediastinitis. *Ann Thorac Surg* 1997; **63**: 858–60.
5. Miller JD, Dehoyos A. An evaluation of the role of omentopexy and of early perioperative corticosteroid administration in clinical lung transplantation. The University of Toronto and Washington University Lung Transplant Programs. *J Thoracic Cardiovasc Surg* 1993; **105**: 247–52.
6. Satoh S, Elstrodt J, Hinrichs WL, Feilin J, Wildevuur CR. Prevention of infection in a porous tracheal prosthesis by omental wrapping. *ASAIO Trans* 1990; **36**: M438–40.