Postesophagectomy Mediastinal Chylothorax Causing Upper Airway Obstruction Misdiagnosed as Asthma*

A Report of Two Cases

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Injury to the thoracic duct resulting in chylothorax is an uncommon but well-documented complication of esophagectomy. In two cases, which were associated with signs of life-threatening upper airway obstruction, an initial diagnosis of asthma was made. It appears that this complication of esophagectomy has not been reported previously. (CHEST 1997; 111:1126-28)

Key words: airway obstruction; asthma; case report; chylothorax; esophagectomy; esophagus; postoperative complications

Mediastinal chylothorax after esophagectomy caused upper airway obstruction, which was mistakenly diagnosed as asthma, in two cases. This complication has not been reported before.

CASE REPORTS

Case 1

A 56-year-old woman had a 4-month history of progressive dysphagia. She smoked 20 cigarettes a day but had been previously well with no respiratory symptoms. Results of a barium swallow test and endoscopy revealed the presence of an obstructive lesion of the middle third of the esophagus, and a biopsy specimen confirmed the clinical diagnosis of carcinoma. Surgical resection was planned. Preoperative respiratory function testing showed that the total lung capacity was normal but that there were mild obstructive features (FEV1/FVC ratio, 68%).

An Ivor-Lewis esophagectomy was performed via a thoracic and right thoracic incisions without apparent complications. Histologic studies confirmed well-differentiated squamous cell carcinoma with no involvement of the resection margins or of the mediastinal lymph nodes.

The postoperative course was marked by persistently high-volume drainage of serosanguineous fluid from the chest drain, which was at times in excess of 2,000 mL/24 h. On the 12th postoperative day, the patient became febrile; hypotension, tachycardia, and metabolic acidosis were noted. Blood, sputum, and urine cultures were sterile, and a water-soluble contrast study showed no evidence of anastomotic leak. Two days later, the patient suddenly developed respiratory distress and an audible wheeze initially diagnosed as acute asthma. However, there was no response to nebulized albuterol (Salbutamol), and the diagnosis was reviewed. Drainage from the intercostal drain ceased. Later that day, she suffered an episode of syncope and respiratory arrest from which she recovered rapidly when placed in a supine position and given supplemental oxygen. The jugular venous system was noted to be engorged, and a diagnosis of pulmonary thromboembolism was considered. However, before appropriate investigations could be undertaken, she suffered a further collapse, which was more resistant to resuscitation. She was intubated and mechanically ventilated; for hypotension, treatment with inotropic agents by infusion was initiated. Inflation pressures were unexpectedly high, and bronchoscopy revealed extrinsic compression of the distal trachea and proximal major bronchi, without intrinsic obstruction. A CT scan of the thorax showed loculated fluid, which was compressing the trachea and heart, within the mediastinum (Fig 1).

At thoracotomy, a tense collection of jelly-like material was evacuated from the posterior mediastinum. A hole in the thoracic duct was identified, and the duct was ligated.

Postoperatively there was immediate hemodynamic improvement, allowing early cessation of treatment with inotropic agents, and ventilatory pressures normalized. The patient made slow but steady progress and was discharged 2 weeks later without recurrence of dyspnea.

Case 2

A 61-year-old woman had a 3-month history of dysphagia. She was a smoker, but respiratory function tests and arterial blood gas levels were within normal ranges. Results of a barium swallow test, endoscopy, and a biopsy specimen confirmed carcinoma of the lower third of the esophagus. Transhiatal esophagectomy and primary anastomosis were performed without apparent complications. Drains were left in both pleural cavities and the posterior mediastinum. Subsequent histologic studies showed poorly differentiated squamous carcinoma with vascular invasion extending to one resection margin but no lymphatic involvement.

Initial recovery was uneventful, but 3 days postoperatively a pleural effusion of the right lung had formed, and insertion of a second pleural tube in the right lung drained 1,500 mL of serosanguineous fluid. Drainage from this tube persisted for the next 3 weeks. A water-soluble contrast study showed no evidence of anastomotic leak. Cultures of the fluid were consistently negative for bacteria. The fluid became milky the day after the patient resumed an oral diet.

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FIGURE 1. A CT scan of chest (case 1) showing compression and displacement of left main bronchus by encysted chylothorax.

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One month postoperatively, the patient became markedly dyspneic. A chest radiograph showed mediastinal widening and a pleural effusion of the right lung. Dyspnea persisted after further drainage of the pleural collection.

On postoperative day 34 the patient suddenly developed severe respiratory distress suggestive of asthma and a tachycardia of 160 beats per minute. Inspiratory stridor and expiratory wheeze were audible. She was intubated and ventilated for incipient respiratory failure. At subsequent thoracotomy, a tense mediastinal collection of lymph was drained. No site of lymphatic leakage could be identified. In view of her poor general condition, mechanical ventilation was continued postoperatively, but gas exchange was much improved and wheeze was no longer evident.

The patient suffered a stormy course complicated by the development of a further mediastinal collection of lymph requiring thoracotomy and drainage. At this operation, a hole in the thoracic duct was identified, and the duct was ligated. The patient developed multiple organ failure and died 8 weeks after her original surgery.

DISCUSSION

Chylothorax is caused by lymphatic leakage from damage to the thoracic duct or its tributaries. It is an uncommon complication of esophagectomy; the reported incidence is 0.2 to 10.5%.1 Risk increases if the transhiatal approach is used. This complication is associated with increased mortality.2

The thoracic duct arises from the chyle cistern at the level of the first lumbar vertebra. It enters the thorax through the aortic hiatus and ascends in the posterior mediastinum to empty into the venous system at the junction of the left subclavian vein and left internal jugular vein. It is in close proximity to the lower esophagus and is easily damaged during surgery when the esophagus is being separated from the prevertebral structures. Usually, the duct lies to the right of the esophagus in the lower part of its course and crosses to lie on the left side above the level of the fifth thoracic vertebra, but anatomic variation is common.3

The management of chylothorax after surgery is controversial; there are advocates for both conservative and aggressive surgical approaches.3,6 Individual experience is limited, and there are no large comparative studies. Conservative management may include enteral and parenteral nutrition, continuous drainage of chyle, controlled ventilation with positive end-expiratory pressure, and measures to reduce the production of chyle by the use of a low-fat diet5 or somatostatin.6 This may result in an overall success rate of 85%, but the time to closure may be as long as 62 days.4 In one series, the median time to closure with conservative management was 35 days.1

Chylous leak causes a significant loss of lymphocytes and protein-rich fluid; losses of these latter items may result in nutritional and immune deficiency.9 With no oral intake, lymph flow in the thoracic duct is 10 mL/kg/d, and this increases at least tenfold after eating.3 Patients who have carcinoma are more likely to be nutritionally depleted and may be less able to withstand a prolonged lymph leak than otherwise healthy patients who develop chylothorax after trauma or cardiac surgery. Hence, it has been suggested that the complication of chylothorax associated with surgery for carcinoma should be managed by early thoracotomy and ligation or repair of the thoracic duct.3,6 Prophylactic ligation of the main thoracic duct in all cases of extensive esophageal resection also has been recommended.2

Two cases of the complication of chylothorax associated with surgery for carcinoma are reported. Initially treatment was conservative, with chest drainage and total parenteral nutrition. After 2 (case 1) and 4 weeks (case 2), the patients developed severe respiratory distress, which was initially thought to be asthma. In both cases, urgent surgical exploration led to a diagnosis of large airway compression by tense mediastinal collections of chyle. Thoracic duct damage usually will lead to an encysted retropleural collection of lymph which ruptures into the pleural space. Breathlessness is then due to slowly progressive lung compression.3

These two cases are unusual in that thoracic duct damage caused large airway obstruction and cardiac tamponade. Tube thoracostomy proved inadequate to prevent accumulation of fluid and compression of mediastinal structures. It is of interest that in the first case the fluid was jelly-like and too viscous to drain via a tube. Loculation and blockage of tubes by fibrinous chyle is a recognized problem of chylothorax and may be misleading. Surgical drainage of posterior mediastinal collections produced rapid relief in both cases. A posterior mediastinal swelling is more likely to cause large-airway obstruction due to the absence of cartilage in the posterior trachea.

A feature of both cases was delay in recognizing that the pleural drainage was in fact lymph and this has been commented on by others discussing chylothorax. Although excessive drainage, from either pleural or abdominal drains,10 continuing for more than 72 h after esophagectomy should raise the possibility of thoracic duct damage, the absence of the characteristic milky appearance of chyle may suggest an inflammatory cause or anastomotic leak. A low serum albumin value may be believed to be the cause of a persistent transudate, rather than having been caused by persistent loss of proteinaceous fluid.

Chyle may remain straw-colored despite the administration of intravenous lipids. Administration of a fatty fluid such as cream, either orally or via a jejunal feeding tube, may aid diagnosis as this will cause chyle to become milky. This may also aid identification of the site of leakage at operation. Methylene blue may be used in a similar way. Confirmation that fluid is lymph may be made by the detection of a high fat content in the form of chylomicrons, if the patient is receiving enteral nutrition, and a preponderance of lymphocytes. Lymphangiography may be helpful in demonstrating the site of leakage and response to treatment.11 Prompt recognition of thoracic duct damage and early ligation may reduce morbidity and mortality.

The radiographic appearances of a mediastinal lymph collection after esophagectomy may be difficult to interpret both on the plain radiograph and on a CT scan due to the presence of the stomach in the chest. The use of a contrast medium aids differentiation. The differential diagnosis includes abscess, anastomotic leak, seroma, and mucocele of the esophagus.12
Tracheal compression due to thoracic duct injury associated with thoracic vertebral fracture has been reported, but the two cases reported herein seem to be the first reported cases of mediastinal lymphocele causing large-airway obstruction after esophagectomy.

REFERENCES

Pleural Effusion From Acute Lung Rejection*

Marc A. Judson, MD; John R. Handy, MD; and Steven A. Sahn, MD

A single-lung transplant recipient developed an ipsilateral pleural effusion from acute lung rejection 2 weeks after transplantation. The pleural effusion was exudative and contained more than 80% lymphocytes on two separate determinations. Acute lung rejection should be added to the differential diagnosis of a lymphocyte-predominant exudative pleural effusion.

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Key words: lung rejection; lung transplantation; lymphocytosis

Pleural effusions are common in the early postoperative period after lung transplantation. New or increased pleural fluid in the 2nd to 6th week after heart-lung transplantation is common in patients with acute lung rejection; however, the characteristics of a pleural effusion associated with acute lung rejection have not been previously described. We report the characteristics of such a pleural effusion that was related to acute lung rejection.

CASE REPORT

A 38-year-old man with severe bullous lung disease secondary to sarcoidosis underwent a right single-lung transplant. He had a negative tuberculin skin test with positive controls prior to transplantation. His postoperative course was complicated by transient pulmonary edema in the allograft, which delayed extubation until the 3rd postoperative day. He also developed colonic distension postoperatively, which slowly resolved with conservative measures by the 14th postoperative day.

As the patient’s abdominal distension resolved and he was able to walk farther, he began to notice dyspnea. On the 13th postoperative day, oxygen desaturation with walking was observed and worsened over the next 2 days. Spirometry (Fig 1) revealed a severe restrictive ventilatory defect. A chest radiograph (Fig 2) showed a moderate-sized right pleural effusion. A thoracentesis was performed which revealed a lymphocyte-predominant exudative pleural effusion (Table 1). Stains were negative for bacteria, mycobacteria, and fungi. Thoracoscopic inspection of the right pleural space did not reveal any abnormalities. Bronchoscopy showed an intact, well-healed bronchial anastomosis with a normal airway examination. Histologic examination of transbronchial biopsies showed minimal acute lung rejection (grade A1). Stains were negative for bacteria, mycobacteria, fungi, and cytomegalovirus.

Although the transbronchial biopsy revealed only grade A1 rejection, acute lung rejection was considered as a cause of the patient’s dyspnea, pulmonary dysfunction, and right pleural effusion. However, there was concern that there might be underlying infection that would worsen if the patient were to...