Chylothorax is a rare complication with both traumatic and non-traumatic causes. The most common non-traumatic cause is malignancy, especially lymphoma. Lymph discharges into the pleural space, causing nutritional, metabolic, immunologic and respiratory complications. We evaluated the case of a patient suffering from a low-grade lymphoma who developed chylothorax that did not respond to chemotherapy and conservative treatment. This patient recovered spontaneously.

CASE

A 67-year-old non-smoking man was referred to our medical center in April 2008. He had been suffering from fever, sweat, and acute onset of cough without any indication of weight loss. A chest CT scan showed an anterior mediastinal mass. The patient had upper gastrointestinal hemorrhage. Upon undergoing upper endoscopy, a large and active duodenal ulcer was discovered. Further tests revealed a large splenomegaly with an aberrant spleen, left side pleural effusion, retro-peritoneal and para-aortic lymphadenopathies, and a nine-millimeter nodule in the liver suspected to be a hemangioma. A CT-guided biopsy on the mediastinal mass confirmed low-grade lymphoma (B cell type). Further evaluations confirmed bone marrow involvement with lymphoma.

Chemotherapy was begun with fludarabine (25 mg/m² for three days), cyclophosphamide (300 mg/m² for three days), rituximab (375 mg/m² on day one), and dexamethasone (32 mg for three days). After three courses of chemotherapy, evaluation indicated a 75% response to the treatment, with the spleen and adenopathy dimensions becoming much smaller than before, and the mediastinal mass size was reduced from 7 cm to 3 cm. However, the pleural effusion volume increased.

After the fourth course of chemotherapy, the patient developed dyspnea. Chest X-ray showed left-sided pleural effusion, for which diagnostic thoracentesis was performed. The biochemistry analysis of the drained chylous fluid showed triglyceride levels of over 2000 mg/dL, cholesterol levels of 106 mg/dL, and a white blood cell level of 4-6 per high power field on light microscopy, which confirmed chylothorax. Culture and smear were negative for any pathogens and acid fast bacilli. Three days after the fifth course, 2.5 liters of chylous fluid was drained from the patient’s pleural space to reduce respiratory symptoms. The same volume was drained a month later, following the sixth course. Twenty-two days after the second drainage, three more liters of chylous fluid was again drained.

The patient was followed up every other week for the next three months. During the early stages of follow...
Case Report

up, the fluid had a steady volume. This amount started to decline in the later stages. Chest x-ray showed no fluid in the pleural space. The two subsequent examinations, one a month and the second three months after the x-ray appeared normal, without the symptoms of underlying and complicated disease. This shows an appropriate response of lymphoma to treatment and spontaneous recovery of chylothorax. The patient gained weight and was performing daily work after one year of follow-up.

Discussion

Thoracic duct damage and subsequent chylothorax can have traumatic and non-traumatic causes (Table 1). Iatrogenic causes form the majority of traumatic group where thoracic surgery, especially esophagectomy is predominant. In the non-traumatic group, malignancies especially lymphoma, are the most common causes.

Depending on its specific cause, the mechanism of thoracic duct damage and chylothorax onset is either direct trauma to the duct or compression of it by a mass or adenopathy or even infiltration of a tumor into the duct, causing rupture or perforation. In Kaposi sarcoma, obstruction of the thoracic duct leads to the lymph excretion from duct wall, hence the chylothorax.

A cluster of clinical signs of chylothorax is the presence of lymph fluid in the pleural space, which leads to respiratory symptoms. Severity of symptoms and signs depends on both the leakage quantity and duration. When trauma is the cause of chylothorax, principal clinical signs are usually similar to any kind of pleural effusion like dyspnea, cough, and chest discomfort. Pleuritic pain of chest wall and fever are unusual because lymph does not irritate the pleural surface. The signs of the underlying disease are usually more dominant than respiratory signs in the non-traumatic group.

The other cluster of clinical signs and symptoms in chylothorax is related to body lymph loss, and includes the following condition: hypovolemia (in acute or severe cases), nutritional signs (loss of gastrointestinal absorbed fat and necessary vitamins), immunologic signs (loss of lymphocytes), metabolic and electrolyte signs (loss of protein and electrolytes can lead to Hyponatremia, hypocalcemia, and acidosis).

Depending on the cause of thoracic duct damage, chylothorax occurs on the right or the left hemithorax or bilaterally (especially in traumatic causes). Non-traumatic chylothorax, especially after malignancies, occurs on the left side or bilaterally. According to one study, independent of cause, half the cases of all chylothorax were on the right side, one-third on the left side, and the rest were bilateral.

Chest radiographic findings in chylothorax are non-specific and undistinguishable from other pleural effusions although chest or abdomen CT scan may prove useful in non-traumatic chylothorax because of identifying lymph nodes or masses. A definite diagnosis is made by thoracentesis and evaluation of drained pleural fluid. Mostly, the fluid appears milky (in patients who fast or on a low fat diet, the fluid color may not be milky). Serous, bloody, turbid fluids do not exclude chylothorax. Loculated and infectious fluid is rare and this is possibly due to lymphocyte dominancy. Red blood cells are usually seen in traumatic chylothorax. A high level of triglyceride of pleural fluid (more than 110 mg/dL) is diagnostic for chylothorax. A lower quantity is confirmed by lipoprotein electrophoresis, which shows chylomicrons in pleural fluid.

The cholesterol concentration should be evaluated because of pseudochylothorax, which is important in

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<tr>
<td>Pseudochylothorax</td>
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<td>Tuberculosis, rheumatoid arthritis</td>
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Table 1. Classifications of more common causes for chylothorax.
CHYLOTHORAX

the differential diagnosis. Pseudochylothorax, also called cholesterol rich fluid (more than 200 mg/dL). The fluid color is turbid, green or yellow and may be mistaken with real chylothorax or empyema. This condition is usually accompanied with diseases causing chronic pleural effusions like tuberculosis and rheumatoid arthritis. There is a theory that the cholesterol comes from broken inflammatory cells which have remained in the pleural space for a long time.5

The approach to treatment depends on the cause of the chylothorax. When fluid is found in the pleural space, the first step is to perform diagnostic thoracentesis. When the diagnosis is definite and respiratory signs are severe, the priority is fluid evacuation by setting a chest tube or occasionally drainage by thoracentesis. The next step, depending on severity of fluid accumulation, is to decrease lymph production by a low-fat dietary regimen, which contains medium-chain triglyceride (directly absorbed into the blood via the portal system) or to use total parental nutrition (TPN). Somatostatin or octreotide are also reported to have been effective in decreasing lymph production.9-11

Further measures are taken depending on the cause of chylothorax. When the cause is traumatic or congenital,13 the rupture will be closed spontaneously in 50% of cases by conservative treatment (exceptions are the cases that occur after esophagectomy), which has a high mortality rate as well as severe cases where, despite setting a drainage line, immunologic, metabolic and nutritional signs are predominant and the patient needs intensive care for hypovolemia.1 In non-traumatic cases, surgery is usually excluded and conservative or underlying disease treatment should be considered.1,5

Radiotherapy or chemotherapy in cases with malignancies may be useful, but, depending on the severity of underlying disease, the treatment can be disappointing.13,14 If malignancy does not respond to chemotherapy or radiotherapy, pleurodesis is performed using bleomycin, talc or other substances.15 According to the results of one study on 19 patients suffering from refractory chylothorax caused by lymphoma, pleurodesis under thoracoscopy was successful in 100 percent of the cases.26 Time of surgery in chylothorax is still controversial. Surgery recommended as the first measure in severe traumatic cases or chylothorax after surgery, especially esophagectomy.

Surgery is also recommended when the leakage rate of lymph is more than one liter per day in a period of five days or when conservative treatment for 2 weeks fails or there is loculation or fibrin clots with chylothorax.5,17-19 Using lymphangiography or eating fat marked by methylene blue or injection of Evans blue dye into the intratarsal space can be useful for localizing the thoracic duct leakage along surgery.5

Unlike other pleural effusions, chylothorax is a rare complication that needs special attention. The evaluation of pleural fluid triglyceride as a complementary procedure may seem useful in most diagnostic thoracentesis. Determining the chylothorax etiology is an important underlying step in choosing management and treatment. The influence of chylothorax on lymphoma prognosis is uncertain. Although the occurrence of chylothorax suggests poor prognosis,20-22 this was not the case for our patient. Spontaneous recovery of chylothorax, especially in non-traumatic case, is rare, and treatment of underlying disease is usually a necessity. Sometimes the treatment of underlying disease worsens the chylothorax. This often occurs in malignancies where tumor invades the thoracic duct such that a rupture or orifice remains on the duct after the regression of tumor by treatment. In our patient, despite chemotherapy and proper response of underlying disease to treatment, chylothorax remained. However, the rupture recovered and chylothorax disappeared without any food restriction or hospitalization.