A Rare Cause of Chylothorax and Lymph Edema

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Abstract: Chylothorax is a form of pleural effusion rarely caused by metastasis of solid tumors. Because chylothorax causes complaints by local compression of the lung, as well as weight loss resulting from loss of triglycerides, it needs thorough investigation. We present the case of gastric carcinoma presenting with a chylothorax and unilateral lymph edema. Although rare, the differential diagnosis of chylothorax should include gastric cancer even in the absence of upper abdominal complaints.

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Chylothorax is a rare form of pleural effusion caused by a disruption of the thoracic duct. It is most often caused by either a traumatic cause or a lymphoma. It is rarely caused by metastasis. Because chylothorax causes complaints by local compression of the lung, as well as weight loss resulting from loss of triglycerides, it needs thorough investigation. We present the rare case of a patient with gastric cancer that presented with a chylothorax and lymph edema.

CASE REPORT

A 64-year-old man with chylothorax of unknown etiology was referred to our hospital for evaluation and treatment. Three months earlier, he had visited his referring pulmonologist. He was short of breath, complained of right-sided, dull chest pain associated with inspiration, and he had a weight loss of 10 kg. Physical examination showed dull percussion of his right thorax with reduced chest sounds and edema of his left arm and left leg. No lymph nodes were palpable or observed with ultrasound. Chest radiograph showed a right pleural effusion. Thoracocentesis showed a milky fluid with cholesterol 6.3 mmol/L, triglycerides 38.2 mmol/L, glucose 5.7 mmol/L, total protein 31.4 g/L, lactate dehydrogenase 122 U/L, and leukocytes 0.60 $\times$ 10^9/L, indicating a chylous effusion. Cytology and immunophenotyping were negative for malignancy or lymphoma, and cultures were sterile. Abdominal and thoracic computed tomographic scans showed no other abnormalities. The patient was put on a medium chain triglyceride diet. A thoracic duct ligation was scheduled, but the patient developed a *Streptococcus erysipelas* infection of his left leg and was treated for 10 days with penicillin. He was then sent home to regain strength. In the meantime, he was seen twice for pleural fluid drainage; analysis of the fluid was sterile and negative for malignancy.

One month later—4 months after the initial diagnosis of chylothorax—repeat cytological examination of the pleural fluid showed clusters of atypical foamy cells that resembled signet ring cells (Figure 1A). These cells showed positive mucin vacuoles in the cytoplasm with mucin staining. With immunophenotyping, the atypical cells stained positive with monoclonal antibodies cytokeratin 7, cytokeratin 20, carcinoembryonic antigen (Figure 1B), CA 19.9, and Cam 5.2. The final cytological diagnosis was a mucin-producing adenocarcinoma that likely originated in the upper digestive tract. Two days later, the patient developed meleana, and endoscopy showed a bleeding gastric ulcer suspected for malignancy. Biopsies confirmed a poorly differentiated gastric adenocarcinoma. He received palliative therapy and went home. He died 6 months after his initial presentation.

DISCUSSION

Chylothorax is defined by the occurrence of chylus, lymph fluid mainly from the gastrointestinal tract, in the pleural space with high levels of triglycerides and the presence of chylomicrons. Hillerdal[1] divided the etiology of chylothorax into traumatic, non-traumatic, and idiopathic causes. Traumatic causes are subdivided into surgical and non-surgical. Non-traumatic chylothorax is subdivided into benign and malignant etiologies. Most non-traumatic etiologies of chylothorax are caused by lymphoma and, less often, by metastases of other malignancies (Table 1).[1,2] When no explanation for the chylothorax is found after repeated pleural aspirations, thoracoscopic exploration of the pleural cavity, including pleural biopsy, is indicated. When possible, this can be performed during either medical thoracoscopy or video-assisted thoracoscopic surgery.

Of the 14 case reports of a gastric carcinoma and chylothorax described in the literature, 4 are in English.[3–6] Six case reports also describe a chyloascites. Chyloascites is usually caused by disruption below the diaphragm. In this situation, the chylothorax is likely the result of an overflow of the chyloascites into the pleural cavity. Six case reports describe a signet ring cell carcinoma of gastric origin, and

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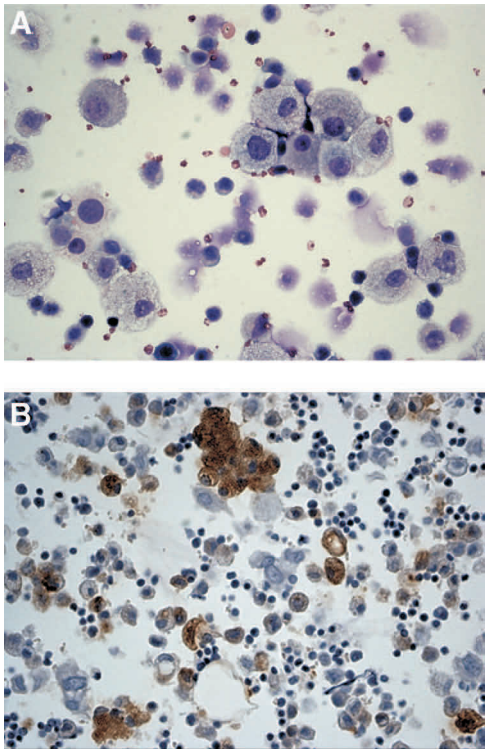

FIGURE 1. (*A*) Clusters of atypical foamy cells that resembled signet-ring cells (Giemsa staining). (*B*) Atypical cells stained positive for immunophenotypic marker carcinoembryonic antigen.

TABLE 1. Etiology of Chylothorax

Causes	Total Causes (%)
Traumatic	28
Surgical	25
Non-surgical	3
Non-traumatic	72
Malignant	45
Lymphomatous	37
Nonlymphomatous	8
Benign	13
Idiopathic	14

Modified after Valentine et al.[2]

three others describe an adenocarcinoma of the stomach. In the other five case reports, we could not determine the pathologic type of gastric cancer.

The English-language case reports describe signet ring cell carcinoma, with a fulminant course in three patients. Signet ring cell carcinoma is an adenocarcinoma with more than 50% mucus-producing cells. It causes a diffuse type of gastric cancer that sometimes invades the whole stomach (i.e., linitis plastica). It is known to be aggressive and invades lymph vessels very early in the course of the disease. Patients with these diseases usually either have no gastric complaints or present with nausea, vomiting, vague abdominal fullness, dysphagia, or anorexia and weight loss.

Our patient had both unilateral lymph edema and a chylothorax. This combination was reported by Mogulkuc et al. in 1999.[3] They described a young Turkish woman with overt lymph edema in all limbs, a chylothorax, and chylopericardium invaded with malignant cells. Endoscopic examination of the gastrointestinal tract was performed but did not show any abnormalities.[3] Two months after presentation of the chylothorax, a signet ring cell carcinoma of gastric origin was found in a cervical lymph node biopsy.

The lymph edema in our patient could have been the result of lymph node metastasis or infiltration of the lymph vessels by carcinoma. Computed tomography scanning of our patient did not show any enlarged lymph nodes in the inguinal or axillary region, making an infiltration of lymph vessels a likely explanation for the presence of lymph edema. This was also shown in the cases presented by Shibata et al. in a postmortem skin biopsy, showing lymphatic invasion of skin and lymph vessels,[4] and by Mogulkuc et al. using lymphoscintygraphy of the right leg, showing an obstructed lymph flow and no uptake in the inguinal lymph nodes.[3] We believe that, in these case reports[3–6] and in our patient, the chylothorax was caused by invasion of the thoracic duct by the carcinoma rather than by an obstruction of a lymph node compressing the duct, as in all case reports lymph nodes were absent in the radiologic evaluation.

In summary, we describe a rare cause of chylothorax and lymph edema. A gastric cancer was found after repetitive cytological investigation of the chylous pleural fluid. This underlines the need for repetitive investigation of pleural exudates of unknown origin, including repeated cytological evaluation and immunocytochemistry, or thoracoscopic biopsies. The differential diagnosis of chylothorax should include gastric cancer regardless of the presence or absence of upper abdominal complaints.

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