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An Unusual Case of Isolated Peritoneal Metastases from Lung Adenocarcinoma

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Key Words

Peritoneum · Metastasis · Lung cancer

Abstract

Introduction: Peritoneal metastases from lung cancer are a rare event. In this paper, we report the case of a patient with adenocarcinoma of the lungs who had isolated peritoneal metastases at the time of diagnosis. **Case Report:** We report a 55-year-old female who presented with shortness of breath, decreased effort tolerance, cough, and weight loss. Her initial chest X-ray and subsequent chest CT showed a 12 × 9 × 8 cm mass in the middle lobe of the right lung. The histopathological examination of her biopsy material was consistent with a thyroid transcription factor-1 positive lung adenocarcinoma. In the abdomen, a 5.3-cm mass was identified. A biopsy and immunohistochemistry revealed a lung adenocarcinoma. The patient was administered chemotherapy based on carboplatin-paclitaxel-bevacizumab, but only with a partial response. Six months later, the patient showed brain metastases. Therefore, a second-line treatment based on pemetrexed was administered for 9 courses, and a clinical and radiological response was observed. The chemotherapy was stopped and the patient did not exhibit any symptoms of progression while waiting for a new evaluation.

Discussion: The incidence of peritoneal involvement of lung cancer without metastases in other parts of the body is scarcely encountered in clinical practice. Out of the different types of lung cancers, adenocarcinoma and large cell carcinoma are most likely to metastasize in the peritoneum. Immunohistochemical staining patterns were important in the differential diagnosis with the other etiologies for peritoneal metastasis and the mesothelioma. Peritoneal metastases are indicative of a disseminated disease and prognosis is extremely poor.

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Introduction

Lung cancer represents one of the most common malignant diseases worldwide and the major cause of cancer-related deaths, accounting for 25% of all cancer deaths, and with a 5-year-survival rate of 10–20%. Approximately 40–50% of the patients with lung cancer manifest metastases at the time of diagnosis [1]. The most common regions of metastases are the pleura, lung parenchyma, skeletal system, liver, brain, and the adrenal glands [2]. Metastases in unusual locations like the small intestine and the colon have been reported; however, peritoneal metastases are a rare event [3]. We report the case of a patient with adenocarcinoma of the lungs who had isolated peritoneal metastases at the time of diagnosis.

Case Report

Our patient was a 55-year-old female, who manifested shortness of breath, decreased effort tolerance, cough, and weight loss that began a few months earlier. She did not experience any fever, night sweats or other constitutional symptoms. She had no significant past medical history and never smoked or abused alcohol. On physical examination, she had stable vital signs and had no cyanosis, edema or lymphadenopathy. She had an increased air entry, dullness to percussion, and a reduced tactile vocal fremitus on the right side. The remainder of the examination was normal. She also had a normal blood count, basic metabolic panel, liver function tests, and coagulation profile. Her initial chest X-ray showed a large opacity in the right hemithorax. A subsequent chest CT demonstrated a 12 × 9 × 8 cm mass in the middle lobe of the right lung (fig. 1). Based on the above findings, malignancy was suspected and bronchoscopy was performed, which showed a blunting at the carina, mucosal tram lines in both bronchi, and an external compression of the right lung, but endobronchial lesions were not observed. The histopathological examination of CT-guided transthoracic biopsy material was consistent with the thyroid transcription factor-1 (TTF-1) positive lung adenocarcinoma, and no epidermal growth factor receptor-activating mutations or echinoderm microtubule-associated protein like 4-anaplastic lymphoma kinase translocations were detected. Then, the patient was transferred to our department.

Distal organ metastases were not detected with whole-body bone scintigraphy and cranial CT; in the abdomen, a 5.3 cm mass was identified (fig. 2). An exploratory laparotomy was performed which demonstrated several nodules in the greater omentum and the peritoneum (the largest lesion was 0.5 cm in diameter). A biopsy of the omental tumor revealed adenocarcinoma. The immunophenotype demonstrated positive TTF-1 and cytokeratin (CK) 7 staining (fig. 3) and was negative for CK20. Those histologic findings corresponded with the primary lung cancer diagnosis and yielded an additional diagnosis of peritoneal metastases.

The patient was administered a chemotherapy based on carboplatin (AUC 6), paclitaxel (200 mg/m²) and bevacizumab (15 mg/kg) every 3 weeks. Following 6 courses of this treatment, a radiological evaluation was scheduled. A partial response was obtained and maintenance with bevacizumab was initiated. At 6 months after treatment, the patient presented brain metastases and received 30 Gy of palliative whole-brain radiotherapy. Therefore, a second line of chemotherapy based on pemetrexed (500 mg/m²) was administered every 3 weeks. Following 9 courses of chemotherapy, a clinical and radiological response was observed. Today, the patient is no longer undergoing chemotherapy and has not shown any symptoms of progression while waiting for a new evaluation.

Discussion

The common sites of distant metastases in patients with lung cancer have been reported to be in the brain, the bones, the liver, and the adrenal glands. Occasionally, lung cancer spreads to the stomach, the small and large intestines, pancreas, eye, skin, and even the breasts, but the incidence of peritoneal involvement without metastases in other parts of the body is hardly encountered in clinical practice [2, 4]. Although the frequency of peritoneal metastases in the autopsy series is 2.7–16%, we are talking about 1–2% in clinical studies [5, 6]. Out of the different types of lung cancers, adenocarcinoma and large cell carcinoma are more likely to metastasize to the peritoneum and account for more than 80% of the cases with peritoneal metastases [2, 4, 6].

Clinically, peritoneal carcinomatosis is usually asymptomatic in the early stages, making early detection less likely. In recent years and with the increasing availability of novel technologies like CT scans, PET scans and ultrasonographies, peritoneal carcinomatosis can be diagnosed more accurately (our patient was diagnosed using an abdomen CT). However, signs and symptoms including abdominal distress, distension pain together with respiratory distress, ileus, ascite, peripheral edema, nausea, and vomiting were described during the late stages of the disease [2, 5]. Despite the fact that lung cancer can be diagnosed before the peritoneal metastases become symptomatic, the symptomatic metastases may be the first clinical presentation of an unknown lung cancer. Asymptomatic metastases may even be the first manifestation if incidentally discovered during exploratory laparotomy for another reason [1].

The other most common etiologies for peritoneal metastasis are pelvic or abdominal malignancies while primary tumors are rare. Peritoneal metastases in male patients are usually caused by cancers of the gastrointestinal tract, including the stomach, colon and pancreas, while in females, the most common metastases are caused by ovarian carcinomas. As such, immunohistochemical staining patterns are important in the differential diagnosis. For this, the most commonly accepted immunohistochemical markers are reported to be CK5/6, CK7, CK20 and TTF-1. As in the current case, the immunophenotype demonstrated to be positive for TTF-1 and CK7 staining, but negative for CK20 [1, 3]. Furthermore, the distinction between epithelioid mesothelioma and lung adenocarcinoma remains a significant diagnostic challenge. In a patient with peritoneal metastases and primary lung adenocarcinoma, a possible metastatic pleural mesothelioma must first be ruled out by checking the immunohistochemical pattern of the antibodies that are used in the pathological examination. Thus, the combination of carcinoembryonic antigen, calretinin, each Wilms' tumor 1 or thrombomodulin was suggested to be the best panel of immunohistochemical markers [7].

The histology of the lung cancer, the molecular pathology, age, performance status, comorbidities and the patient's preferences should be taken into account when deciding on the treatment strategy. For peritoneal metastases of non-small cell lung cancer (NSCLC), platinum-based combination chemotherapy prolongs survival, improves quality of life, and controls symptoms in patients with a PS 0–1. Pemetrexed and bevacizumab use should be restricted to non-squamous NSCLC. Treatment with a tyrosine kinase inhibitor (erlotinib or gefitinib) should be prescribed to patients with tumors bearing an activating epidermal growth factor receptor mutation. Patients with NSCLC harboring an ALK rearrangement should be considered for crizotinib, a dual ALK and MET tyrosine kinase inhibitor. For patients who present metastatic small-cell lung cancer, 4–6 cycles of etoposide plus cisplatin or carboplatin are recommended [8, 9]. Peritoneal metastases are indicative of disseminated

disease, and prognosis is extremely poor. The median survival following peritoneal carcinomatosis ranges from 15 days to 2 months [5, 6].

In conclusion, metastases to the peritoneum are rarely encountered during the clinical course of lung cancer and they are usually accompanied by other systemic metastases. The case presented here is unusual, as the patient developed isolated peritoneal involvement without distant metastases. Radiological investigations, followed by biopsy and immunohistochemistry, are the best diagnostic tools for confirming and identifying the primary lung cancer diagnosis.

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Fig. 1. Adenocarcinoma of the lung.



Fig. 2. Peritoneal metastasis of a lung adenocarcinoma.

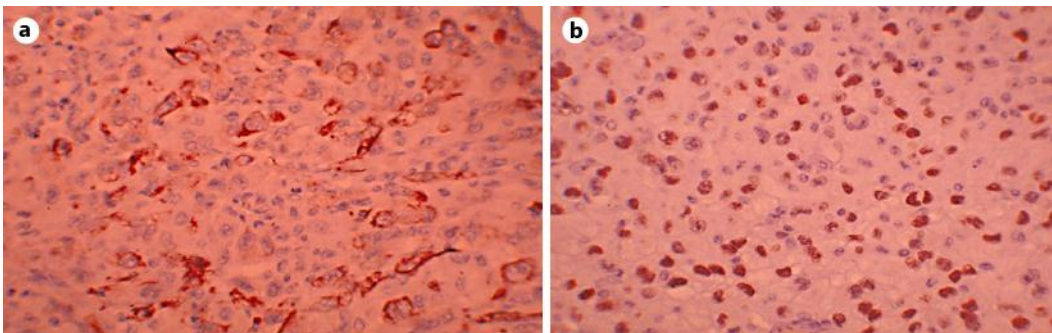


Fig. 3. Immunohistochemical examinations for peritoneal metastasis of an adenocarcinoma are positive for CK7 (a) and TTF-1 (b).