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Original Article

Synchronous primary lung sarcomatous carcinoma and lung squamous cell carcinoma: a case report

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Abstract: Sarcomatoid carcinoma (SC) is a rare primary malignant tumor, which seldom occurs in the lung, let alone as synchronous primary lung sarcomatous carcinoma and lung squamous cell carcinoma. We present a case of a 65-year-old Chinese man with a three-month history of cough and expectoration. The diagnosis was a combination of poorly differentiated synchronous central type primary lung sarcomatous carcinoma and lung squamous cell carcinoma with approximately 50% proportion of each, and the TNM classification was pT2aN1M0, at least AJCC Stage IIA. The purpose of the case report is to present the imaging, pathologic features, and treatment.

Keywords: Lung sarcomatoid carcinoma, lung squamous cell carcinoma, diagnosis, treatment

Introduction

Lung cancer is the single deadliest cancer globally. Compared with adenocarcinoma, lung squamous cell carcinoma results in worse prognosis and shorter survival time [1]. Sarcomatoid carcinoma (SC) is a kind of rare primary malignant tumor, which seldom occurs in lung [2-4]. This case was a synchronous primary lung sarcomatous carcinoma and lung squamous cell carcinoma in the same tissue, which was also different from cases reported before. We propose to describe and discuss the clinical, imaging, and pathologic features of this rare type of lung cancer.

Case report

A 65-year-old man had cough and expectoration in September 2014. He was not concerned by the hemoptysis until after 3 months. He visited our hospital for medical advice in December 2014. Computed tomography (CT) revealed a lesion with soft tissue density of approximately 3.4×2.6 cm in the basal segment of the lower lobe of the right lung and enlarged right hilar lymph nodes (**Figure 1**). Malignant cells were identified by fiberoptic bronchoscopy. Positron emission tomography (PET) and single-photon emission computed tomography (SPECT) failed to show evidence of distant metastasis. Surgeons conducted a thoracotomy with right lower lobectomy and systematic lymph node dissection in January 2015.

Intra-operative findings were as follows: 200 ml light yellow clear liquid in the right pleural cavity; multiple peanut-sized masses on the surface of right interlobar oblique fissure segment; a 4 cm mass obstructing bronchi leading to consolidation in the lower lobe of the right lung. The bronchial lumen was filled with yellowish purulent secretions; the dorsal segment of the lower lobe and posterior segment of upper lobe had inflammatory adhesions; there were several black and hard soy bean-sized lymph nodes in right upper mediastinum, carina, and hilum of right lung.

Hematoxylin and eosin staining indicated squamous cell carcinoma and sarcomatoid carcinoma in approximately equal proportions (**Figure 2**). The following results were revealed by immunohistochemical staining: negative for thyroid

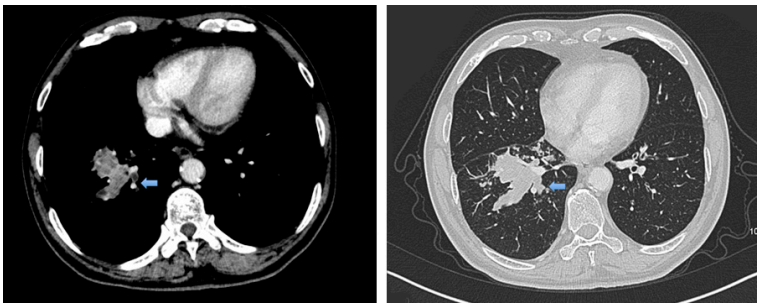

Figure 1. Thorax CT showed a lesion with a soft tissue density of approximately 3.4×2.6 cm in the basal segment of the lower lobe of the right lung.

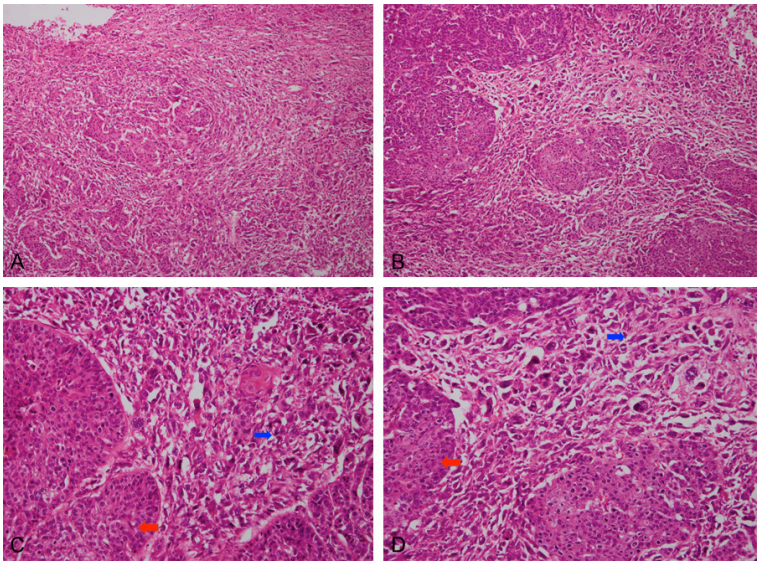

Figure 2. Postoperative hematoxylin and eosin staining showed squamous cell carcinoma and sarcomatoid carcinoma, each comprising approximately 50%. A, ×100; B, ×200; C, D ×400. The red arrows and the blue arrows indicate sarcomatous carcinoma and squamous cell carcinoma, respectively. The transition zones between the two histologic patterns are obvious.

transcription factor-1, p63, napsin A, cytokeratin-5/6, chromogranin A, Syna, and positive for Ki-67 (about 70%), cytokeratin-7 (CK7) (partly), pancytokeratin (partly), reactive oxygen species-1, and vimentin (**Figure 3**). Moreover, the last of ten groups of lymph nodes contained metastases (**Figure 4A-C**) and was positive for pancytokeratin (PCK) (**Figure 4D**) and epithelial membrane antigen (EMA) (**Figure 4E**). The other lymph nodes were normal.

Based on the above results, the final diagnosis was poorly differentiated synchronous central type primary lung sarcomatous carcinoma and lung squamous cell carcinoma in equal proportions, and the tumor node metastasis (TNM) classification was pT2aN1M0, which corresponds to at least American Joint Committee on Cancer (AJCC) Stage IIA. The tumor harbored none of the EGFR, the K-ras, ALK, or ROS-1 mutations.

After surgical wound recovery, the patient required re-hospitalization for further treatment. Imaging of the thorax and head showed normal postoperative changes in the lung. CT scan of the abdomen revealed a mural thrombus at the origin of the superior mesenteric artery. The value of plasma D-dimer was 3.96 mg/L, markedly higher than normal. Warfarin was commenced as a 5 mg dose, four times daily. The patient received four cycles of chemotherapy (TP scheme: paclitaxel 240 mg day 1, cisplatin 40 mg days 1-3, every 3 weeks) from February to June in 2015. After the second cycle of chemotherapy, a routine urine test was positive for occult blood, as was the routine stool. Warfarin was reduced to 2.5 mg four times daily, and consideration was given to long term warfarin. Regular re-examination every three months from June 2015 to the time of writing showed a stable disease. Eastern Cooperative Oncology Group (ECOG) score standard-rated 1 point and numeric rating scales (NRS) rated 0 points.

Discussion

Lung cancer is the most common cancer in the world, accounting for about 17% of cases, and it also has the highest mortality rate (nearly 24%) among all malignant tumors [1]. Of these lung cancer cases, more than 85% are non-small cell lung carcinoma (NSCLC), 30% of which are lung squamous cell carcinoma (LSCC). Pulmonary sarcomatoid carcinoma (PSC) accounts for less than 1% of all lung tumors [2-4]. A study has compared lung resection in 63 sarcomatoid carcinoma patients with

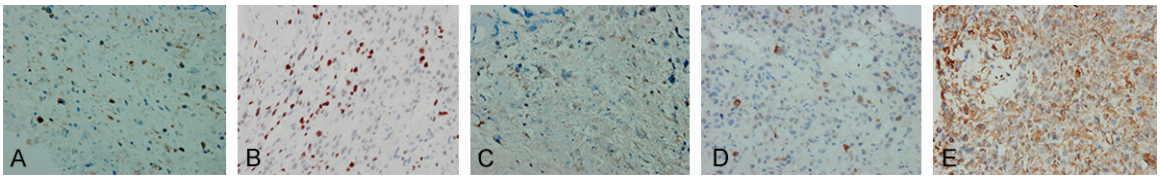

Figure 3. Immunohistochemical staining (original magnification ×400) of CK7 (partly) (A), Ki-67 (about 70%) (B), PCK (partly) (C), reactive oxygen species-1 (D), and vimentin (E), showing positive expression.

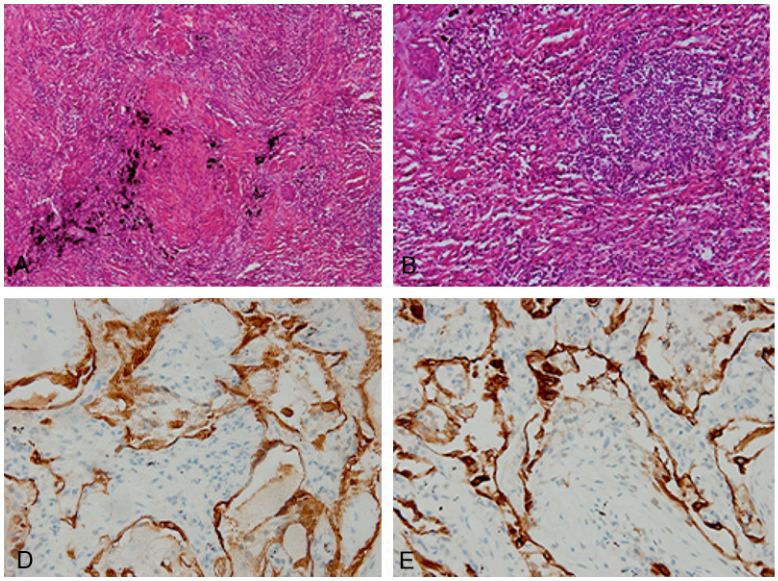

Figure 4. Postoperative hematoxylin and eosin staining (A, ×100; B, ×200; C, ×400) showed anomalous cells in the tenth group of lymph nodes and these were positive for pancytokeratin (PCK) (D) and epithelial membrane antigen (EMA) (E).

the same number of non-small cell lung cancer patients. Five year survival rate was 24.5% and 46.5% (P<0.01) [5]. According to case reports, the combination of primary pulmonary sarcomatoid carcinoma mostly occurs in extrapulmonary organs. Our case was a synchronous primary lung sarcomatous carcinoma and lung squamous cell carcinoma in the same tissue.

Thoracic CT manifestations of PSC are often non-specific early in the disease and may be confused with pulmonary inflammation, tuberculosis, or other lung cancers in the late phase. The main CT manifestations of PSCs have some value in distinguishing the lesions of PSC and other lung cancers if there is linear or patchy enhancement [6-8]. In this case, the chest CT revealed a mass with soft tissue density in the right pulmonary lobe basal segment. Multiple nodules were seen around the dilated right bronchus, and right hilar lymph nodes were enlarged.

However, the final diagnosis depends on histopathological examination. The positive expression of Ki-67 (about 70%), CK7 (partly), PCK (partly), reactive oxygen species-1 and vimentin, in this case, proved the presence of both sarcomatous carcinoma and lung squamous cell carcinoma, which was consistent with the previous literature [9-12].

This tumor, which is asynchronous primary lung sarcomatous carcinoma and lung squamous cell carcinoma, is one of the rare types of lung carcinoma, and the majority of information on outcome and treatments stems from small series and case reports so that recommending an appropriate postoperative therapy for this patient is challenging. Recommendations on clinical management are still lacking. Currently, the National Comprehensive Cancer Network guidelines point out systemic chemotherapy is necessary for Stage IB (peripheral T2a, N0), I (central T1ab-T2a, N0), II (T1ab-T2ab, N1; T2b, N0) and IIB (T3, N0) patients who had surgical exploration and resection with mediastinal lymph node dissection or systematic lymph node sampling [13]. According to the guidelines and much consideration, the patient recom-

mended treatment with four cycles of paclitaxel combined with cisplatin chemotherapy. The mural thrombus on the origin of the superior mesenteric artery in a geriatric patient with no self-symptoms was considered to be caused by atherosclerosis rather than lung cancer.

Both LSCC and PSC are aggressive cancers with poor prognosis and the resultant tumors are locally advanced and have high recurrence rates. At present, we have few treatment options for LSCC with PSC, and therefore, it is still necessary to discover an advanced treatment for this disease.

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Written consent was received from the patient for the publication of this article.

Disclosure of conflict of interest

None.

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