A case of primary lung cancer producing alpha-fetoprotein

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A case of lung carcinoid showing elevated plasma alpha-fetoprotein (AFP) level is reported. A 44-year-old man who complained of the development of bloody sputum had a left hilar lung mass on chest radiograph. The serum level of AFP was markedly increased to 8438 ng/mL. After resection, it was diagnosed as an atypical carcinoid, and the tumour cells were positive for cytoplasmic AFP. AFP is one of the most useful tumour markers for the diagnosis of hepatic cell carcinoma or germ cell tumours. It has also been reported that some primary lung tumours produce AFP. However, these tumours are mainly poorly differentiated adenocarcinomas or large cell carcinomas. A lung carcinoid that produces AFP is extremely rare.

Key Words: *Alpha-fetoprotein; Atypical carcinoid; Lung tumour*

Alpha-fetoprotein (AFP) is one of the most useful tumour markers for the diagnosis of hepatic cell carcinomas (HCC) or germ cell tumours (1). Therefore, if an elevation of serum AFP levels is found with a lung tumour, it is likely to be a metastatic lung tumour due to HCC. Although it has been previously reported (2-5), a primary lung tumour that produces AFP is quite rare. To our knowledge, there has only been one case of a lung carcinoid producing AFP reported in the literature (6). We report a case of lung atypical carcinoid that produced AFP and had a good clinical course after operative resection.

CASE PRESENTATION

A 44-year-old man who complained of the development of bloody sputum had a left hilar mass on chest radiograph (Figure 1). He lost 11 kg of weight in one month. He had a history of smoking (20 cigarettes/day for 25 years).

On physical examination, there were no apparent abnormal findings. No abnormalities indicating liver disease were apparent in hematology or blood chemistry. Serological tests for hepatitis B and C were negative. Among the various tumour markers, only AFP was markedly increased to 8438 ng/mL (normal values less than 3.5 ng/mL). No other tumour markers, such as carcinoembryonic antigen, squamous cell carcinoma associated antigen, cytokeratin-19 fragments, neuron-specific enolase or progastrin releasing peptide, were elevated. In addition, the lens culinaris agglutinin A-reactive fraction of alpha-fetoprotein, usually a useful marker for HCC, was 86.5%.

In a chest computed tomography scan, the mass was located just behind the descending aorta (Figure 2). There was no hilar

Un cas de cancer pulmonaire primaire produisant des alpha-fœtoprotéines

Un cas de carcinoïde pulmonaire associé à un taux élevé d'alpha-fœtoprotéines (AFP) plasmatique est déclaré. Un homme de 44 ans qui se plaignait d'expectorations hémoptoïques présentait une masse pulmonaire hilare gauche à la radiographie thoracique. Le taux sérique d'AFP était beaucoup plus élevé qu'à l'habitude, à 8 438 ng/mL. Après la résection, on a diagnostiqué un carcinoïde atypique, et les cellules tumorales étaient positives à l'AFP cytoplasmique. L'AFP est l'un des marqueurs tumoraux les plus utiles pour diagnostiquer un carcinome des cellules hépatiques ou des tumeurs des cellules germinales. Il a déjà été déclaré que certaines tumeurs pulmonaires primaires produisent de l'AFP. Cependant, ces tumeurs sont surtout des adénocarcinomes mal différenciés ou des carcinomes à grandes cellules. Il est d'une extrême rareté qu'un carcinoïde pulmonaire produise de l'AFP.

Figure 1) A chest radiograph showing the mass at the left hilum of the lung

or mediastinal lymphadenopathy. On fiberoptic bronchofiberscopy, the left upper lobe bronchus was almost obstructed by a dark red polypoid tumour. The mass was diagnosed as non-small cell carcinoma by transbronchial biopsy. There was no

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Figure 2) In a chest computed tomography scan, the mass was approximately 3 cm in diameter and rather heterogeneous, located just behind the descending aorta. There was no swelling of hilar or mediastinal lymph nodes

evidence of HCC, liver cirrhosis or any other liver disorder on the abdominal computed tomography scan or ultrasonograph. On the TNM (T tumour; N regional lymph nodes; and M distant metastasis) staging system, the patient was classified as being clinical T2N0M0 and at stage IB.

The patient underwent a successful left upper lobectomy. The resected tumour was 3.5 cm × 3.3 cm in size. Histopathologically, the resected lung mass showed infiltration of round uniform tumour cells with partial formation of rosettes and pseudoglandular ducts. No tumour cells were detected in any resected lymph nodes. Necrosis of tumour cells in a punctuate distribution was also seen (Figure 3). Tumour cells had round and various sized nuclei with the chromatin forming small clumps. There was increased nuclear division with seven to eight mitoses per 10 high-power fields. There were also prominent nucleoli. Immunohistochemically, these tumour cells were positive for AFP in the cytoplasm (Figure 4). Tumour cells were also positive for chromogranin A, a useful immunohistochemical marker for carcinoids, glucagon and vasoactive intestinal polypeptides, and negative for synaptophysin, serotonin, gastrin, adrenocorticotrophic hormone and insulin. From these findings, the present case was diagnosed as a lung atypical carcinoid producing AFP. The serum level of AFP markedly decreased to 61.8 ng/mL and then to the normal range (3.3 ng/mL) at one month and three months after resection, respectively. The patient has been symptom free for over two years and no elevation of serum level of AFP has been observed.

DISCUSSION

AFP was first reported in 1965 (7) and is one of the most useful tumour markers for the diagnosis of HCCs or germ cell tumours. This tumour marker has been a reliable diagnostic tool for these tumours. However, the report of a case of primary lung cancer producing AFP is quite rare. Naturally, it is sometimes seen that a metastatic lung tumour from HCC can produce AFP. Therefore, elevation of the serum level of AFP would first lead to suspected HCC or germ cell tumour metastasis rather than primary lung cancer. However, there have been several cases of primary lung cancer producing AFP reported previously. The first case reported in the literature was in 1972 (2). Subsequently, there have been several case reports (primarily reported by Japanese clinicians). Okunaka et al (3) have reported only

Figure 3) Histopathologically, the resected tumour showed punctate necrosis and infiltration of round uniform tumour cells

Figure 4) Immunohistochemically, these tumour cells were positive for alpha-fetoprotein in the cytoplasm. Tumour cells had round and various sized nuclei. An increase in nuclear division was detected

24 cases of AFP-producing lung cancer without liver metastasis. Although some other cases have been described (5), primary lung cancer producing AFP is still quite rare.

Histologically, AFP-producing lung cancer mostly shows adenocarcinoma occurring in approximately 65% of cases, followed by large cell carcinoma (25% of cases). A few cases of small cell carcinoma or squamous cell carcinoma have also been reported (8). In adenocarcinoma, over one-half of the cases are poorly differentiated carcinoma. These findings suggest that cancer cells producing AFP have a higher degree of undifferentiation, which suggests these cells may be derived from primitive fetal tissue.

Lung carcinoid is a relatively rare, primary lung tumour comprising approximately 5% of all lung tumours (9). Lung carcinoids often secrete several tumour markers, such as carcinoembryonic antigen and neuron-specific enolase (10). However, production of AFP is quite rare, with only one case reported thus far in the literature (6).

In the present case, the serum level of AFP increased to over 8000 ng/mL, with no elevation of other tumour markers. In addition, AFP in the tumour cells was observed with

immunohistochemical staining of the resected lung tissue. Thus, the present case was diagnosed as a very rare case of atypical AFP-producing lung carcinoid. AFP is largely produced and secreted by the cells in the liver and the yolk sac during the embryonic period. Therefore, there is the possibility that ectopic liver or germ cells in the lung might have been the source of the AFP (11). It is also possible that respiratory epithelium per se might produce AFP (11). Because most lung tumours producing AFP are poorly differentiated adenocarcinoma and large cell carcinoma, it may be that these undifferentiated cells of several derivations have the potential to produce AFP.

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