Case report

Unusual intrathoracic location of a primary germ cell tumour

Erdal Okura,*, Semih Halezeroglu, Adnan Somay, Ali Atasalihi

Thoracic Surgery Clinic, SSK Sureyyapasa Thoracic and Cardiovascular Diseases Teaching Hospital, Istanbul, Turkey
Pathology Division, SSK Bezm-i Alem Vakıf Gureba Hospital, Istanbul, Turkey

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Abstract

The primary location of non-metastatic germ cell tumours of the chest is the anterior mediastinal compartment. Germ cell tumour arising from lung parenchyma is one of the rarest conditions in human and only a few cases of choriocarcinomas and yolk sac tumour have been reported to date. Here we report a case of intrapulmonary mixed type germ cell tumour, containing embryonal carcinoma, choriocarcinoma and yolk sac tumour elements. Diagnosis of the lesion was achieved by open thoracotomy and bulk of the tumour was resected by right upper lobectomy.

Keywords: Intrapulmonary germ cell tumour; Embryonal carcinoma; Yolk-sac tumour; Choriocarcinoma

1. Case report

A previously healthy 46-year-old male farmer presented with history of weight loss, dyspnoea and non-productive cough for 2 months and chest pain for 15 days. He had a smoking history of 60-pack-years. On physical examination, the volume of his right hemithorax was found to be enlarged and the breath sounds were decreased in right chest. No other systems abnormalities were present. Chest X-ray showed giant mass, occupying most of the right hemithorax and computerized tomography (CT) of the chest revealed 15 x 18 cm mass in right hemithorax, invading the lateral chest wall and causing anterior displacement of right main bronchus. A clear border was seen between the tumour and the mediastinal pleura (Fig. 1). On fibre-optic bronchoscopic examination, posterior external compression to the right upper lobe bronchus was seen, but biopsies taken (punch biopsy, needle aspiration and bronchial washing material) could not reveal the pathology. Transbronchic fine needle aspiration biopsy, which was performed twice, was unable to reveal pathology too. Lateral thoracotomy was performed and chest was opened via fifth intercostals space. Soft jelly-like lesion, originating from right upper lobe, filling most of right hemithorax and invading the upper, lateral and posterior chest wall was seen. Mediastinal pleural site was intact. Frozen section analysis of the tumour resulted as malignant tumour but tumour type was not certain. Upper lobe of the right lung was resected but there still was residual tumour mass on the chest wall. Since too wide resection of the chest wall was needed in order to achieve ‘a complete resection’, we decided not to resect the chest wall. For debulking purpose, only residual tumour on the chest wall was stripped extrapleurally. No postoperative complication was seen.

Microscopic specimens, stained by haematoxylin and eosin (Fig. 2) showed that the tumour infiltrated the lung parenchyma. There was extensive necrosis and haemorrhage. The tumour cells were pleomorphic, had large eosinophilic cytoplasm, round, oval vesicular nucleus and prominent nucleoli were organized as solid and disorderly trabecular pattern in embryonal carcinoma areas. Mitosis was frequent. In choriocarcinoma areas, which were visible perivascular viable tissue areas, syncytiotrophoblastic and cytotrophoblastic cells and some multinuclear giant cells were seen. There were also some yolk sac tumour components in focal areas. Immunohistochemical staining was done for alpha-fetoprotein (AFP) and human chorionic gonadotropin (HCG). There was diffuse cytoplasmic staining for AFP in the mononuclear embryonal carcinoma cells. Syncytiotrophoblastic giant cells and occasional mononuclear cells are immunoreactive for HCG.

In the postoperative period, abdomen and pelvis were screened by CT to search whether there was a primary tumour that could not be detected by physical examination. No abnormality was found in these areas. Then, the lesion resected was called as ‘a primary pulmonary germ cell

* Corresponding author. Kardelen 4-1 D.34 Atasehir, Istanbul 81120, Turkey. Tel.: +90-216-455-3538; fax: +90-212-296-1005.
E-mail address: erdalokur@turk.net (E. Okur).
tumour of mixed type'. The hormone levels were not measured before the operation but done 1 week after resection: AFP level in blood was high (164 IU/ml) but HCG level was normal (0.1 IU/ml). Patient was referred to oncology department for chemotherapy. He is still alive at 6th month postoperatively.

2. Discussion

The commonest site for location of extragonadal germ cell tumours is mediastinum, yet only 5–10% of all germ cell tumours locate in mediastinum, typically in anterior compartment [1].

Primary pulmonary location of germ cell tumour is extremely rare and only few cases of choriocarcinomas [2–4] and teratoma with yolk sac elements [5] have been reported in the literature. To our knowledge, germ cell tumour containing embryonal carcinoma elements has not been reported before.

It is believed that primary pulmonary choriocarcinoma in women may be originate from throphoblastic cells after abortion or delivery. Tanimura et al. reported that there were trophoblasts in the pulmonary arteries in nine out of ten autopsies of female patients who died after delivery or abortion [4]. Trenbach et al. reported a case of primary choriocarcinoma of the pulmonary artery mimicking...
pulmonary embolism [6]. This explanation fails in male patients. Pushchak and Farhi proposed that primary pulmonary choriocarcinoma arises from epithelial cells, which may undergo metaplasia or divergent differentiation, and such differentiation may occur in visceral carcinomas as a focal change [7]. On the other hand, Ikura et al. proposed that distinction between primary choriocarcinoma and human chorionic gonadotropin-producing giant cell carcinoma of the lung is difficult for pathologists [8].

Intrapulmonary teratomas are rare and one-half of these may be malignant. Kakkar et al. described a pulmonary teratoma with a yolk sac tumour [5]. Microscopically, the tumour showed benign elements from all the germ layers. It also contained malignant glands and areas of yolk sac tumour.

Diagnosis of such a rare tumour of the lung can be difficult preoperatively. Bronchoscopy and fine needle biopsy may not be diagnostic although malignant cells can be detected. As in our case, even intra-operative frozen section pathologic examination may not reach definitive diagnosis. We considered the tumour as a sarcoma and aimed ‘debulking surgery’. Because the chest wall was widely invaded by the tumour, a ‘complete resection’ was not possible, so we resected as much tumour tissue as possible.

Germ cell tumours are classically treated by chemotherapy. Since primary pulmonary location is extremely rare, there is no standardised treatment yet. Zapatero proposed that oncologically these tumours should be managed as bronchopulmonary carcinoma [2]. Our patient took adjuvant chemotherapy with the drugs combination of cisplatin, bleomycin and etoposide.

To the best of our knowledge, this is the first report in English literature defining primary pulmonary germ cell tumour containing embryonal carcinoma, choriocarcinoma and yolk sac tumour elements.

References