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Case Report

Primary lung seminoma in a 76-year-old man: a case report

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Abstract: Background: Seminoma is a rare event in old male population. In this report, we present a rare case of primary seminoma in the lung of a 76-years-old man. Case presentation: The patient was a 76-year-old man admitted with respiratory tract symptom and hemoptysis. The Chest Routine Scan and CT showed there was a consolidation area in the basal segments at the lower lobe of left lung. Bronchoscope also exhibited a neoplasm in left lung. During left lower lobectomy, we found that adherence occurred widely in left thoracic wall, and the pleural membrane was shrinkage. No chemotherapy or radiotherapy was given. Patient was died at 140 days after the surgery mainly due to the dyscrasia and secondary seminoma in left 7th to 9th ribs. Placental alkaline phosphatase (PLAP) and CD117 were found to be positive with immunohistochemical studies. Along with other evidences, this case was identified as the manifestations of seminoma. Conclusion: Although primary seminoma of the lung is rare in old male population, the diagnosis should be taken into serious consideration in order to improve the treatment. And in this case, primary lung seminoma is associated with high degree of malignancy and metastasis.

Keywords: Seminoma, lung, immunohistochemistry

Introduction

Seminoma is one of the types of germ cell tumor (GCT), representing 46-55% of all the cases [1-3]. While in the elderly patients, 82% of the GCTs were seminomas [4]. The cure rate of GCT is between 90 to 95% [5]. GCT is the most common solid tumor in man aged between 15 and 34 years. However, this disease is uncommon in aged man. Less than 4% of patients with GCTs are aged 65 years or older [5,7]. Multimodality therapy, including surgery, radiotherapy and especially cisplatin based chemotherapy has been widely used to treat the GCT patients with high successful rate [5,6].

Seminoma are divided into two types, one type occurs in the gonad including testicle, prostate gland [15] and so on; The other type occurs outside of the gonad including mediastinum [8], central nervous system [9], retroperitoneal [10] and so on, possibly from the gonad spermatogonia, which dystopia outside the gonad in the embryo time. The incidence varies among races and geographic locations. Seminoma is five times more frequent in white men as compared with African American men [11].

Despite several recognized risk factors in the development of GCTs (eg, cryptorchidism or a prior history of GCT), the pathogenesis of germ cell neoplasms including the contributing roles of environmental factors or genetic susceptibility remains unknown [12]. Reports from the epidemiologic studies in the United States and Europe have revealed an increase in the incidence of GCTs during the past several decades [13,14], but the reason for such a trend is unclear.

In this report, we present the clinicopathological and immunohistochemical findings of a case of primary lung seminoma. Different established markers of seminoma were detected to confirm the type of tissues. When the diagnosis of seminoma was established from the histological study of the neoplasm tissue, we checked mediastinum, testicle and other systems. There was no tumor was found in any sites. In the patient's chief complaint, there is

no complaint or clear tumor in the testicle. We think the tumor is origin from lung tissues, but not a metastasis focus. To our knowledge, it is the first report that describes a seminoma with high degree of malignancy originated from lung tissues, but not due to metastasis.

Case presentation

Clinical summary

A 76 years old male was admitted to our hospital for a medical examination because of hemoptysis and chest ache. Hemoptysis was not found with physical examinations. However, a consolidation area in the basal segments of lower lobe of left lung with lobe atrophy was found with Chest Routine Scan and CT (**Figure 1**). The diagnosis is doubted for the periphery lung cancer. An obviously new neoplasm in the basal segments of left lower lobe was observed with bronchoscope and the neoplasm blocked the way of the bronchus. During left lower lobectomy, it was found that the left thoracic wall was adhered widely and the pleural membrane was shrinked. The diagnosis of seminoma was established from the histological study of the neoplasm tissue. However, no tumor was found in any other sites, including mediastinum, testicle and other systems. The serum markers results showed: AFP (alpha-fetoprotein) = 0.99ng/ml (normal), HCG (Human chorionic gonadotropin) = 667 U/L (high). There were no other symptoms found except of the chest ache during hospitalization. Conditions of patient were normal after surgery. Now and then the patient felt chest ache. After surgery, no chemotherapy or radiotherapy was given to the patient. Two months later, he losses of appetite and becomes more serious. He was emaciated at last and at 140 days after the surgery, patient died of dyscrasia and secondary seminoma in left 7th to 9th ribs.

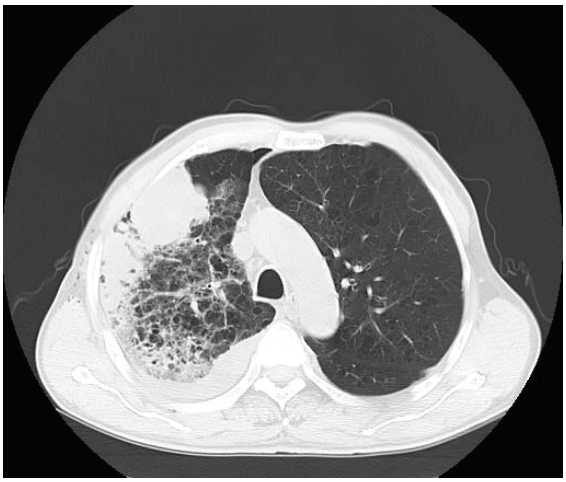

Figure 1. Chest Routine Scan and CT examination of the patient. A consolidation area in the basal segments of lower lobe of left lung with lobe atrophy was found in it. The diagnosis is doubted for the periphery lung cancer. The CT result showed there was no tumor in other part of the body.

Methods

The tissues were fixed in formalin solution and embedded in paraffin for histologic processing. Tissue sections were stained with hematoxylin and eosin for conventional histology diagnosis.

The paraffin-embedded tissues were cut at 4μm intervals and then deparaffinized with xylene and rehydrated for further peroxidase (DAB) immunohistochemistry staining using the MaxVision TMHRP-Polymer anti mouse/Rabbit IHC kit (Fuzhou Maxim, China). Primary antibodies: CD45RO, CD3, CD20, CK, CK-LMW, HCG, AFP, CD117, PLAP, NSE, Syn, CgA, HMβ45, MelanA, S-100, Vimentin and EMA were bought from Fuzhou Maxim. Normal rabbit serum instead of the primary antibodies was used as a negative control. Deparaffinized sections were treated with methanol with 3% hydrogen peroxide for 12 min. After washing with PBS, blocking serum was applied for 30 min. The sections were incubated with antibodies overnight at 4°C, separately. After washing in PBS, a biotin-marked secondary antibody was applied for 20 min at 37°C followed by a peroxidase-marked streptavidin for an additional 20 min. After washing, substrate-chromogen was then used in order to visualize the staining of the interested proteins targeted. The nuclei were counterstained with hematoxylin. Positive and negative immunohistochemistry controls were routinely used. These slides were examined systematically using an image analyzer system (Olympus BH-2 microscope; Japan).

Pathological findings

Gross examination revealed a mass 3cm away from the stump of the bronchial of the lung. The size of the tumor was 4.5×4×4 cm with an anabrosis on the surface. It was solid, homoge-

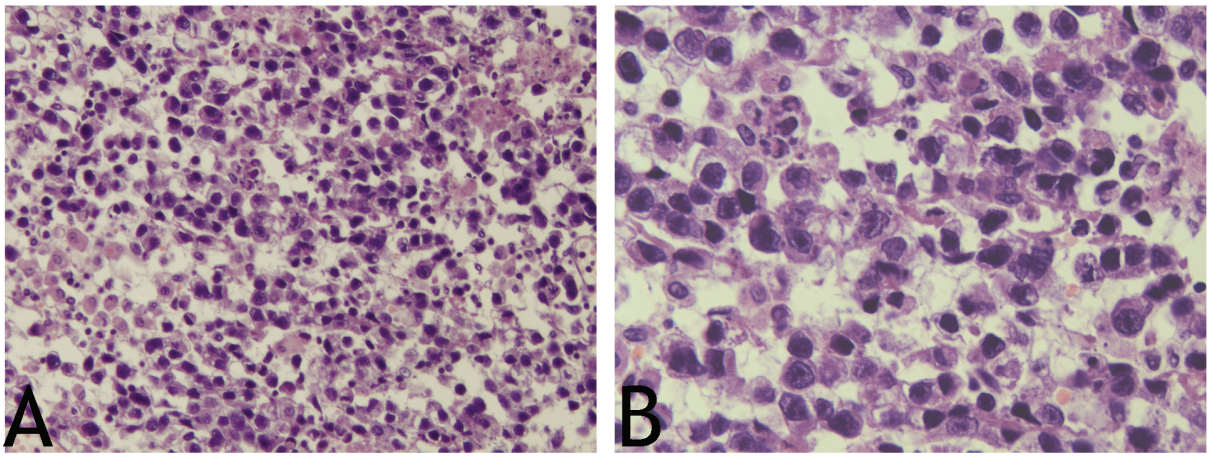

Figure 2. Microscopic examination of seminoma. The individual tumor cell was uniform, with abundant clear cytoplasm, sharply outlined cell membranes, a large centrally located nucleus. The nucleolus had a characteristic appearance because of its prominence. The tumor cells were typically arranged in nests outlined by fibrous bands. In this case, these bands were infiltrated by lymphocytes, plasma cells and histiocytes., A: HE 200x; B: HE 400x.

neous, light red and white, and contained sharply circumscribed zones of necrosis. There were three enlarged lymph nodes around the bronchi of the left lower lobe, and the sizes of them were between 0.5 - 1 cm.

Microscope examination was carried out on the tumor tissue. The individual tumor cells were uniform, with abundant clear cytoplasm, sharply outlined cell membranes, a large centrally located nucleus. The nucleolus has a characteristic appearance because of its prominence. The tumor cells were typically arranged in nests outlined by fibrous bands (**Figure 2A and B**). In this case, these bands are infiltrated by lymphocytes, plasma cells and histiocytes, the evidences of a host reaction to the tumor. Necrosis was also found in the center of the tumor.

Immunohistochemically, the tumor was positive for placental alkaline phosphatase (PLAP) (+), CD117(+), vimentin(+++) (**Figure 3A**), but negative for high-molecular-weight keratin, wide-spectrum keratin CK, CK-LMW, CD20, EMA, Syn, CgA, HMβ45, MelanA, HCG, AFP, CD45RO, CD3 (**Figure 3B**). The lymphocytes around tumor were positive for CD45RO and CD3 to indicate T -cell type (**Figure 3A** and **Figure 4**).

Conclusion

The most common seminoma is testicular, while seminoma is also found in mediastinum [8], central nervous system [9] and retroperitoneum [10]. In this report, the seminoma was only found in the lung. The CT result showed there was no tumor in other part of the body. These results proved that the tumor was originated from lung tissues. The tumor was mainly solid and gray, with foci of hemorrhage and necrosis. The tumor cells were more anaplasitic with numerous mitoses. The nucleolus has a characteristic appearance because of its prominence. Lymphocytes around the tumor were positive for CD45RO and CD3. These characteristics supported the appearances of seminoma.

Firstly, Vimentin and EMA were identified to confirm that the type of the tumor was sarcoma. Secondly, NSE, Syn and CgA were detected. This excluded the possibility that the tumor was originated from neuroendocrine cells. Thirdly, to differentiate this tumor from malignant melanoma, HMβ45, MelanA and S-100 were stained. Lastly, corresponding specificity related positive tracers CD117 and PLAP (placenta alkalinity phosphatase) and negative makers CK, CK-LMW, AFP and HCG were tested with the tissue sample. The results further proved that this tumor was originated from seminoma. The clinical symptoms and the histology of carcinoids tumor, small cell carcinoma and lymphadenoma of lung are similar with seminoma, but they show no reactivity for CD117 and PLAP with immunohistochemistry staining.

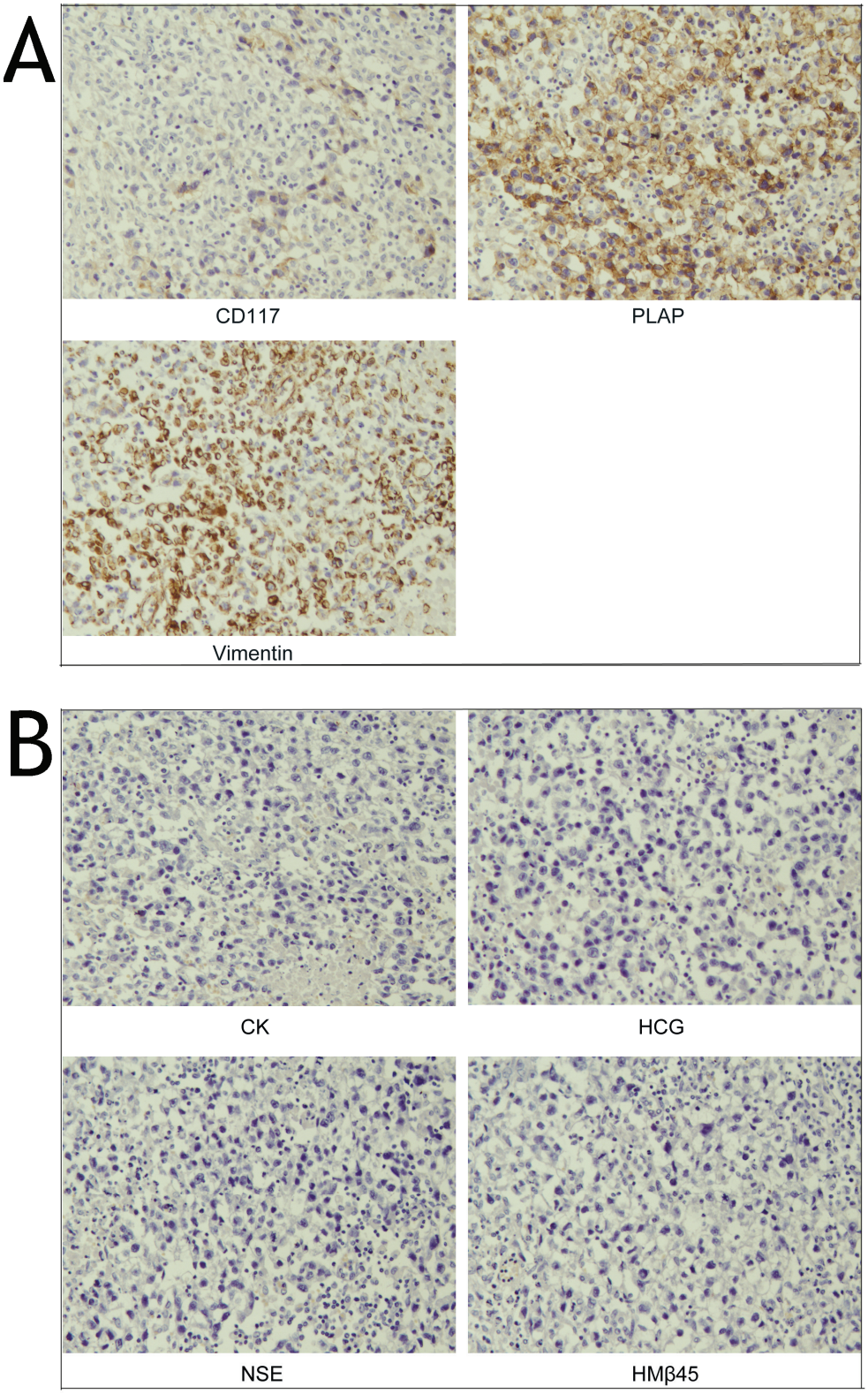

Figure 3. Immunohistochemistry of seminoma. (A). The tumor was positive for placental alkaline phosphatase (PLAP) (+), CD117(+), vimentin(+++); (B). but negative for high-molecular-weight keratin, wide-spectrum keratin CK, CK-LMW, CD20, EMA, Syn, CgA, HMβ45, MelanA, HCG, AFP, CD45RO, CD3.

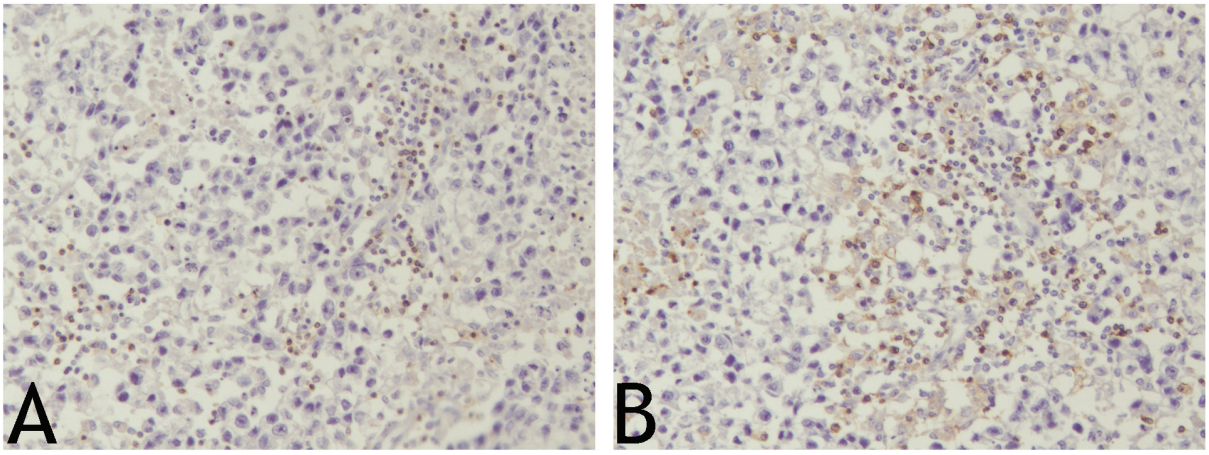

Figure 4. Immunohistochemistry of lymphocytes infiltrating seminoma. The lymphocytes around tumor were positive for CD3 (A) and CD45RO (B), indicating T-cell type.

In this case, the diagnosis was difficult prior to surgery. There was no symptom in the early stage of this tumor. Only when the tumor grew large and affected the surrounding tissues and organs, symptoms appeared. We made a follow-up for this case, but the patient died soon. The age and the physical status of the patient were not suitable for surgery and radiotherapy. Seminoma is generally sensitive to radiotherapy. If the patient underwent radiotherapy after surgery, the prognosis would be favorable.

In conclusion, although primary seminoma of the lung is rare, it should be taken into consideration in diagnosis to improve the treatment. In this case, primary lung seminoma showed high degree of malignancy and metastasis.

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Abbreviations: GCT: germ cell tumor; PLAP: placental alkaline phosphatase

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References

[1] Krag Jacobsen G, Barlebo H, Olsen J, Schultz HP, Starklint H, Søgaard H, Vaeth M. Testicular germ cell tumours in Denmark 1976-1980. Pathology of 1058 consecutive cases. Acta Radiol Oncol 1984; 23: 239-247.

[2] von Hochstetter AR, Hedinger CE. The differential diagnosis of testicular germ cell tumors in theory and practice. A critical analysis of two major systems of classification and review of 389 cases. Virchows Arch A Pathol Anat Histol 1982; 396: 247-277.

[3] Teppo L.Malignant testicular tumours in Finland. Acta Pathol Microbiol Scand 1969; 75: 18-26.

[4] Berney DM, Warren AY, Verma M, Kudahetti S, Robson JM, Williams MW, Neal DE, Powles T, Shamash J, Oliver RT. Malignant germ cell tumours in the elderly: a histopathological review of 50 cases in men aged 60 years or over. Mod Pathol 2008; 21: 54-59.

[5] Singh V, Srivastava A, Srivastava A, Kumar A, Kapoor R, Mandhani A. Management of testicular tumors- SGPGIMS experience. Indian J Urol 2004; 20: 160-163.

[6] Einhorn LH, Donohue JP. Improved chemotherapy in disseminated testicular cancer. J Urol 1977; 117: 65-69.

[7] Foell K, Martens M, Izawa JI. A rare case of classic testicular seminoma in an 86-year-old shows similar proliferation rate as in younger men. Urology 2007; 70: 1007.e7-9.

[8] Pugliese C, Michetti G, Villa R, Bamberga M, Alesina R, Cottini M, Pezzica E, Motta T. Primary mediastinal seminoma. Monaldi Arch Chest Dis 1994; 49: 475-479.

[9] Hsu YJ, Pai L, Chen YC, Ho CL, Kao WY, Chao TY. Extragonadal germ cell tumors in Taiwan: an analysis of treatment results of 59 patients.

Cancer 2002; 95: 766-774..
[10] Bokemeyer C, Droz JP, Horwich A, Gerl A, Fossa SD, Beyer J, Pont J, Schmoll HJ, Kanz L, Einhorn L, Nichols CR, Hartmann JT. Extragonadal seminoma: an international multicenter analysis of prognostic factors and long term treatment outcome. Cancer 2001; 91: 1394-1401.
[11] McGlynn KA, Devesa SS, Sigurdson AJ, Brown LM, Tsao L, Tarone RE. Trends in the incidence of testicular germ cell tumors in the United States. Cancer 2003; 97: 63-70.
[12] Bahrami A, Ro JY, Ayala AG. An overview of testicular germ cell tumors. Arch Pathol Lab Med 2007; 31: 1267-1280.
[13] Zheng T, Holford TR, Ma Z, Ward BA, Flannery J, Boyle P. Continuing increase in incidence of germ-cell testis cancer in young adults: experience from Connecticut, USA, 1935–1992. Int J Cancer 1996; 65: 723-729.
[14] Bergström R, Adami HO, Möhner M, Zatonski W, Storm H, Ekbom A, Tretli S, Teppo L, Akre O, Hakulinen T. Increase in testicular cancer incidence in six European countries: a birth cohort phenomenon. J Natl Cancer Inst 1996; 88: 727-733.
[15] Kimura F, Watanabe S, Shimizu S, Nakajima F, Hayakawa M, Nakamura H. Primary seminoma of the prostate and embryonal cell carcinoma of the left testis in one patient: a case report. Nippon Hinyokika Gakkai Zasshi 1995; 86: 1497-1500.