Primary Seminoma in the Middle Mediastinum

Hiroyuki NAKAMURA, Toshio HASHIMOTO**, Hiroshi KUSAMA*, Akihiko SUDO, Hideki ADACHI, Hisanaga YAGYU, Koji KISHI, Shuji OH-ISHI and Takeshi MATSUOKA

Abstract

Primary mediastinal seminoma is a relatively rare tumor usually located in the anterior mediastinum. We report here an extremely rare case of a 66-year-old man with primary seminoma in the middle mediastinum. A physical examination showed lymphadenopathy in the right supraclavicular area. A chest CT confirmed the presence of a tumor occupying the retrotracheal space. A histological examination demonstrated metastatic seminoma from the open biopsy of the lymph node. Abdominal, pelvic, and cerebral CT scan and testicular ultrasound were negative. Thus, primary mediastinal seminoma in the middle mediastinum with supraclavicular lymph node metastasis was diagnosed.

Key words: mediastinal seminoma, middle mediastinum, extragonadal

Introduction

The anterior mediastinum is the most common primary extragonadal site for germinal neoplasm in adults. The incidence of primary mediastinal seminoma has been estimated at 25% of that of primary mediastinal germ cell tumors and is usually located in the anterior mediastinum (1, 2). Furthermore, these tumors primarily affect men in their third decade. We report here an exceptionally rare case of a 66-year-old man with primary seminoma in the middle mediastinum.

Case Report

A 66-year-old man was admitted with complaints of dull retrosternal chest pain. A physical examination revealed the right supraclavicular lymph node to be about 2 cm in diameter. A chest X-ray film showed a mass in the mediastinum (Fig. 1). A chest CT confirmed the presence of a tumor occupying the retrotracheal space (Fig. 2). Serum beta-human chorionic gonadotropin (HCG) and alpha-fetoprotein (AFP) levels were normal.

An open biopsy of the lymph node showed neoplastic cellular proliferation composed of round-to-polygonal tumor cells showing clear cytoplasm with distinct cell borders and prominent nucleoli (Fig. 3). Histochemical periodic acid-Schiff (PAS) stains showed large amounts of glycogen within the tumor. Furthermore, immunohistochemical studies showed cytoplasmic staining with placental-like alkaline phosphatase (Fig. 4), but not with AFP and HCG. Since there were no non-seminomatosus components in the tumor, it was diagnosed as metastatic seminoma. The abdomen, pelvis, and brain were scanned by CT to determine whether there was a primary tumor that could not be detected by physical examination. However, no abnormality was found in these areas. A gallium scan showed marked uptake only in the mediastinum at the site corresponding to the mediastinal tumor.

Furthermore, a careful clinical and ultrasonography examination showed the testicles to be normal. In view of the above findings, a diagnosis of malignant seminoma arising from the middle mediastinum with supraclavicular lymph node metastasis was made.

The patient received three cycles of the standard BEP chemotherapy regimen (30 mg of bleomycin 1 day every week, 100 mg/m²/day of etoposide and 20 mg/m²/day of cisplatin from day 1 to day 5 every 3 weeks) followed by radiotherapy to the mediastinum and supraclavicular regions, with a total dose of 40 Gy. A chest CT after the treatment clearly showed the middle mediastinum tumor to be decreasing, indicating a...
partial response to the treatment. At the 6-month follow up, the patient was well.

Discussion

Mediastinal seminoma is a rare neoplasm primarily affecting men in their third decade of life, although they can also occur in younger or older individuals (1, 2). The incidence of mediastinal seminoma has been estimated to be a quarter of that of primary mediastinal germ cell tumors (GCTs) (1, 2). Primary mediastinal seminoma is usually located in the anterior mediastinum. There are several classification methods of dividing the mediastinum. We adopted the Felson method to diagnose this case and judged that the patient’s primary seminoma originated from the middle mediastinum (3). A search through the PubMed system showed that only two cases of primary seminoma originating from the middle of the mediastinum (4, 5) and two cases from the posterior mediastinum (6, 7) have been reported in the literature. As already mentioned, however, several classification methods of dividing the mediastinum exist. Moreover, when seminoma gets larger, it sometimes becomes difficult to identify in what part of the mediastinum the seminoma initially developed. It is assumed that these factors pose certain search limitations.

Some investigators have hypothesized that extragonadal GCTs arise as a consequence of germ cell mismigration during embryogenesis (8). Others have suggested that germ cells are widely distributed during normal embryogenesis and that these cells convey genetic information or provide regulating...
functions for somatic cells (9). However, the exact pathogenesis of GCTs in the mediastinum is still uncertain.

Because of the unusual location of the tumor and the age of the patient in this case, the differential diagnosis of mediastinal seminoma includes a variety of metastatic as well as primary malignant mediastinal neoplasma, especially thymic carcinoid tumor, clear cell thymic carcinoma and primary large B cell lymphoma. In this case, some features commonly associated with seminoma such as epithelioid granuloma, cystic changes and lymphocytic infiltration were not prominent, but the application of immunohistochemical studies showed cytoplasmic staining with placental-like alkaline phosphatase. The application of immunohistochemical studies for placent-like alkaline phosphatase may be of discriminatory value in equivocal case (10). The possibility of a metastasis from a testicular primary should always be considered in the evaluation of a mediastinal seminoma. However, abdominal, pelvic and cerebral CT scan and testicular ultrasound were carefully examined and the results were negative. Furthermore, a gallium scan showed a marked uptake only in the mediastinum. Furthermore, Moran and Suster reported that although testicular GCTs frequently metastasize to the retroperitoneum, isolated mediastinal metastases are rare, being observed in less than 1% of patients (11). It is therefore accepted that a routine biopsy or orchietomy is not needed in extragonadal GCTs if there is no evidence of retroperitoneal involvement and no testicular abnormality (1, 12). Therefore, this case was diagnosed as primary seminoma originating from the middle mediastinum.

The analysis of treatment strategies revealed a lower probability for progression-free survival for patients treated with radiotherapy compared with those receiving chemotherapy (13–15). Therefore, primary chemotherapy has widely replaced radiotherapy as the initial treatment in patients with mediastinal seminoma. Bokemeyer et al reported that the prognosis of primary mediastinal and retroperitoneal seminomatous GCTs is equivalent to that of their primary gonadal counterpart, with a 5-year survival of 88% in a meta-analysis of 104 patients (13). Schmoll recommended that patients with seminomatous extragonadal GCTs should be treated according to their prognostic classification, with three cycles of cisplatin, etoposide and bleomycin (PEB) for the good prognosis patients, and four cycles of PEB for the intermediate prognosis patients (16). However, no consensus exists regarding the optimal regimen. A randomized study is required for definitive conclusions, but it is very unlikely that such a study will be performed due to the rarity of this neoplasm.

Regarding the overall prognosis and factors influencing survival in patients with extragonadal seminoma, the presence of nonpulmonary visceral metastases was identified as a factor that indicated a worse overall survival (14, 17). Furthermore, Moran and Suster suggested that patients older than 37 have worse outcomes than younger individuals, but the full impact of modern polyagent chemotherapy on survival in this group has not been fully examined (11).

In conclusion, primary mediastinal seminoma usually originates from the anterior mediastinum, but it is important that seminoma be included in the differential diagnosis of middle mediastinal lesions.

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References