INTERNAL MEDICINE

□ CASE REPORT □

Mediastinal Growing Teratoma Syndrome Succesfully Treated by Multiple Modality Therapies

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Abstract

A 43-year-old-man was diagnosed as having primary mediastinal nonseminomatous germ cell tumor based on pericutaneous biopsy and an elevated serum concentration of alpha-fetoprotein (AFP). Although AFP decreased after chemotherapy, the mass size grew and developed tracheal compression by the tumor. The patient was treated with mechanical ventilation and subsequent stent implantation for keeping airway patency. After three cycles of chemotherapy and normalization of AFP, the increased mass was successfully resected and the pathological examination demonstrated a mature teratoma. This case showed a rare clinical manifestation of mediastinal growing teratoma syndrome and successful outcome by multimodal therapies.

Key words: germ cell tumor, BEP chemotherapy, anterior mediastinal tumor, Dumon stent

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Introduction

It has been reported that enlargement of tumor masses is sometimes observed in nonseminomatous germ cell tumors (NSGCT) during or after chemotherapy. “Growing teratoma syndrome” is a term applied to an enlarging tumor mass despite normalization of tumor markers during or after chemotherapy and histologically containing mature teratoma at resection. Growing teratoma syndrome occurs in approximately 2-7% of NSGCT (1-4). However, only a few cases of growing teratoma syndrome have been reported in primary mediastinal NSGCT (5-7). Here, we report a patient with growing teratoma syndrome in the mediastinum that developed tracheal stenosis due to mass suppression after initiation of chemotherapy, resulting in the requirement of mechanical ventilation and stent implantation. However, after normalization of tumor markers, the patient underwent successful surgical resection. Here, we report a rare clinical manifestation.

Case Report

A 43-year-old man was admitted to our hospital because of an anterior neck mass, neck pain, and cough in August 2008. He showed a subcutaneous hard mass measuring 4×4 cm in the anterior neck ranging from the suprasternal notch to the cricoid cartilage. Rhonchi throughout respiration were audible in both lung fields. Chest computed tomography (CT) scan showed a huge anterior mediastinal mass (Fig. 1A, B, C). The tumor compressed the trachea to a diameter of 7 mm at its narrowest point, and involved the left brachiocephalic vein. No abnormalities were detected in the abdomen and testis. The serum concentration of alpha-fetoprotein (AFP) and chorionic gonadotropin (hCG) were increased to 2,749 ng/mL and 43.9 mIU/mL, respectively. Pericutaneous biopsy was performed on admission and pathological examination revealed predominantly yolk sac tumor mixed teratoma with a positive stain for anti-AFP by immunohistochemical examination. The patient immediately received chemotherapy with bleomycin, etoposide, and cisplatin (BEP) from the day after admission. On hospitalization day 16, he developed respiratory distress, and chest CT

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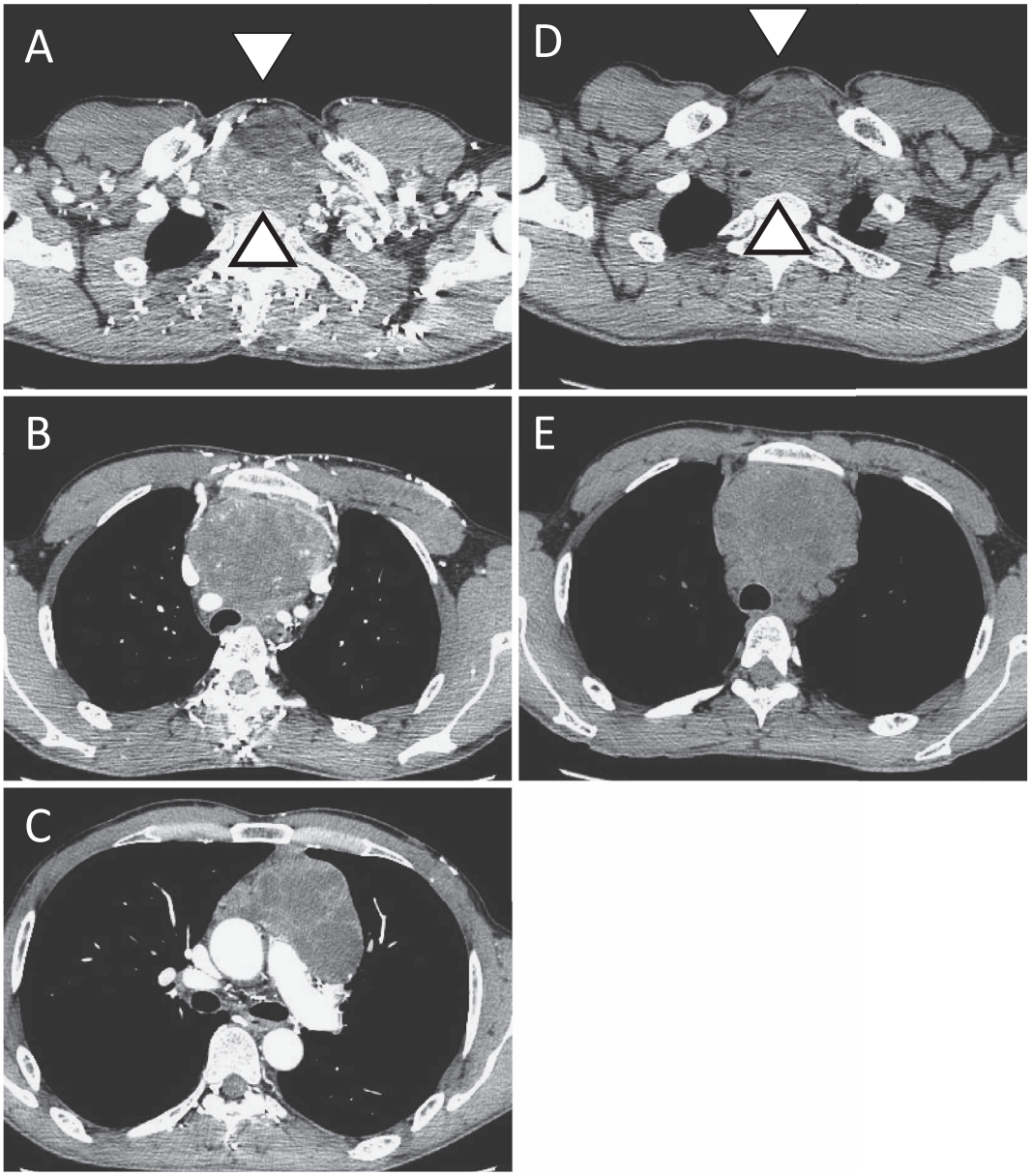

Figure 1. **Chest computed tomography (CT) scan on admission (A, B, and C) and on hospitalization day 16 during chemotherapy (D, E). Chest CT scan showed an anterior mediastinal tumor, which expanded to the anterior neck and compressed the trachea and the major blood vessels on admission (A, B, and C). The enlargement of tumor was predominant in the upper part of the tumor and deterioration of tracheal stenosis on hospitalization day 16 in spite of an initiation of chemotherapy (Fig. 1D, E). The diameter from the top of vertebra (△) to the surface (▽) was increased from 55 mm (A) to 65 mm (D).**

scan revealed a slight enlargement of the upper part of the tumor and deterioration of tracheal stenosis (Fig. 1D, E). He was intubated and salvage radiotherapy (20 Gy/5 fractions) for the area of tracheal stenosis was added. Two cycles of BEP therapy during intubation failed to reduce the tumor size despite a downward tendency in serum AFP level (149.9 ng/mL). On hospitalization day 44, a silicon stent (Dumon stent®; Novatech, La Ciotat, France) was inserted into the trachea to preserve airway patency (Fig. 2A). Although the tumor size remained unchanged even after 3 cycles of BEP therapy (Fig. 2B, C), the serum concentrations of AFP and hCG were normalized. Surgical tumor resection and extraction of the silicon stent were performed on hospitalization day 99. The tumor was tightly adherent to the pericardium and mediastinal pleura, but blunt detachment was successful. There was no invasion into adjacent structures except for involvement of the left brachiocephalic vein, which was removed with the tumor. A mass measuring 15.0×8.8×5.5 cm was completely resected. On pathological examination, marked hemorrhage and necrosis were observed in the central area of the tumor. Duct-like structures, cartilage, smooth muscle, and stromal cells were observed in the margins of the tumor, considered to be mature teratomatous components and degenerative changes after chemora-

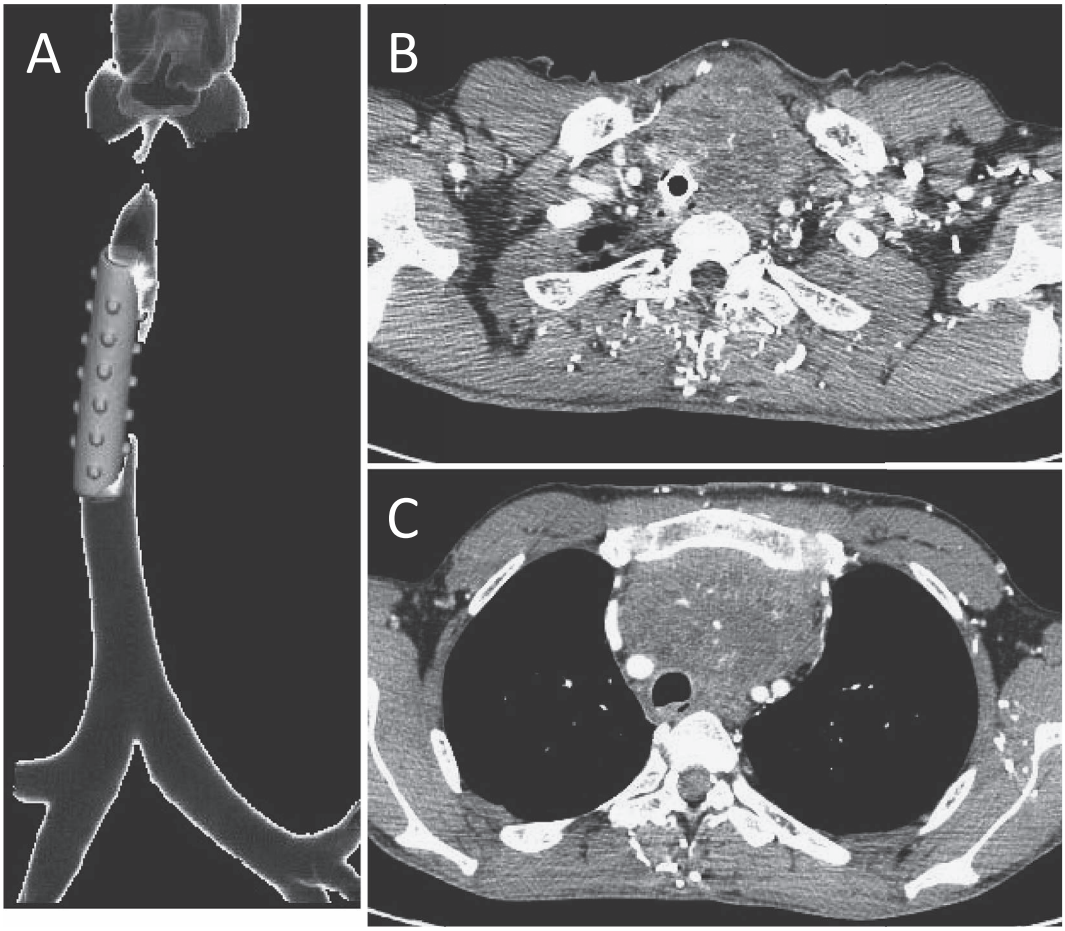

Figure 2. **Chest CT on hospitalization day 94. Three-dimensional image processed from CT scan showed a silicon stent placed in the narrowest site of the trachea (A). No significant changes in tumor size were observed throughout three courses of chemotherapy (B and C).**

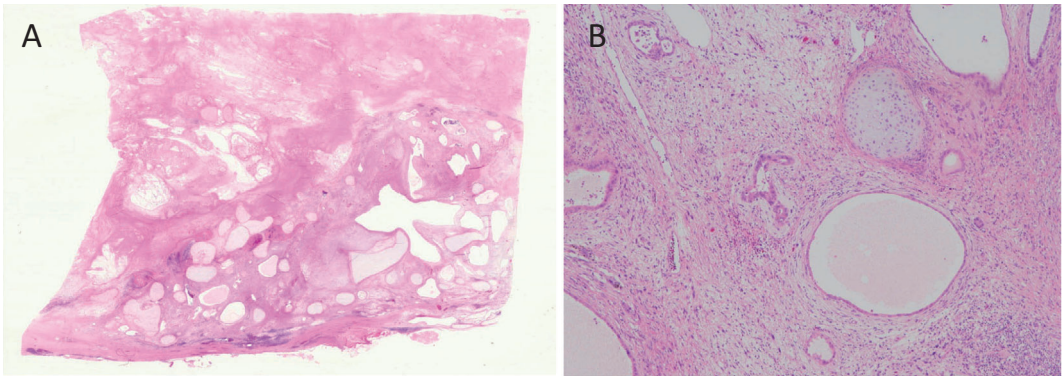

Figure 3. **Pathological findings of the resected specimen (Hematoxylin and Eosin staining). Marked hemorrhage and necrosis were observed in the central area of the tumor (A, ×4). Duct-like structures, cartilage, and stromal cells were observed in the margin of the tumor (B, ×40).**

diotherapy (Fig. 3). Immunohistochemical examination showed that the tumor cells were negative for immunostaining with anti-AFP. The patient is alive and well without recurrence 1.8 years after the operation.

Discussion

In previous reports regarding growing teratoma syndrome, most cases were observed in the retroperitoneum or lung (1-4). To our knowledge, there have been a few cases of growing teratoma syndrome in primary mediastinal NSGCT (5-7). In addition, the median time from the end of chemotherapy to the diagnosis of growing teratoma syndrome was 20 months (range 5-66 months) (1-4). However, in mediastinal growing teratoma syndrome, the growth developed during chemotherapy. Afifi et al (5) and Chen et

al (6) described cases of primary mediastinal growing teratoma syndrome occurring during 4 cycles of chemotherapy and emergency surgical resection was performed in both cases. Thus, growing teratoma syndrome in the mediastinum is a very rare clinical manifestation and it may develop during chemotherapy. It should be noted that, in cases of mediastinal growing teratoma syndrome, unexpected or emergency clinical complications due to adjoining organ compression by the enlarged mass, such as cardio-respiratory distress, may develop after initiation of systemic chemotherapy.

The etiology of growing teratoma syndrome remains unclear. However, the pathological findings of the residual mass revealed a viable mature teratoma in 20-30% and surrounded by massive hemorrhage and necrotic tissues. We speculated that the hemorrhage and necrosis induced by chemotherapy were responsible for tracheal compression in the present case.

With regard to the treatment of mediastinal NSGCT, the current consensus is that initial systemic chemotherapy should be followed by aggressive complete resection. In cases of mediastinal growing teratoma syndrome, complete resection was possible in a high proportion of cases reported in the literature (5-7). However, patients with preoperative normal tumor marker levels had a significantly better survival than those in whom tumor marker levels are elevated preoperatively (8). In the present case, two cycles of chemotherapy failed to normalize the tumor markers to within the normal range. As tumor size remained unchanged after two cycles of chemotherapy, stent implantation for trachea stenosis was performed to avoid prolonged mechanical ventilation. Subsequent chemotherapy was successfully continued without respiratory disturbance or infection, and tumor markers were normalized. Thus, transient silicon stent implantation was useful to maintain airway patency associated with good tolerance and infrequent complications. We speculated that surgical resection after normalization of tumor markers after total three cycles of chemotherapy performed under mechanical ventilation and subsequent tracheal stent implantation contributed to the good outcome in the present case.

In summary, we presented a rare case of mediastinal growing teratoma syndrome after initiation of chemotherapy in which multimodal therapies, including chemotherapy, radiotherapy, mechanical ventilation, stent implantation, and surgical resection, resulted in a successful clinical outcome.

The authors state that they have no Conflict of Interest (COI).

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