Interesting Image
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^{18}F-FDG PET/CT Showing Rare Mediastinal Growing Teratoma Syndrome Following Chemotherapy

Kemoterapi Sonrası Nadir Mediastinal Büyüyen Teratom Sendromu Gösteren ^{18}F-FDG PET/BT Uygulaması

Mihoko Sasahara[1], Takashi Abe[2], Yoichi Otomi[1], Yumi Abe[2], Hiroaki Toba[3], Takayoshi Shinya[1], Hideki Otsuka[1], Masafumi Harada[1]

[1]*Tokushima University, Department of Radiology, Tokushima, Japan*
[2]*Nagoya University Hospital, Department of Radiology, Nagoya, Japan*
[3]*Tokushima University, Department of Thoracic and Endocrine Surgery and Oncology, Tokushima, Japan*

Abstract

Growing teratoma syndrome (GTS) is a condition in which poorly differentiated cells in a mixed-germ cell tumor (GCT) regress after chemotherapy, and the number of well-differentiated components increases. A 60-year-old man had an 8.0 cm mediastinal tumor with strong ^{18}F-fluorodeoxyglucose (FDG) uptake [maximum standardized uptake value (SUV_{max}): 9.2], which was diagnosed as a GCT. After chemotherapy, serum alpha fetoprotein, beta-human chorionic gonadotropin, and tumor ^{18}F-FDG uptake decreased (SUV_{max}: 3.9), but the tumor volume increased. The tumor was completely resected, and pathology confirmed the diagnosis of GTS. ^{18}F-FDG positron emission tomography after chemotherapy reflects the proliferation of highly differentiated tumor components with poor ^{18}F-FDG uptake.

Keywords: Growing teratoma syndrome, ^{18}F-FDG PET, mediastinum, germ cell tumor

Öz

Büyüyen teratom sendromu (GTS), mikst germ hücreli tümörde (GCT) kötü diferansiye hücrelerin kemoterapiden sonra gerilediği ve iyi diferansiye komponentlerin sayısının arttığı bir durumdur. Altmış yaşındaki bir erkek hastada, yüksek ^{18}F-florodeoksiglukoz (FDG) tutulumu [maksimum standartlaştırılmış tutulum değeri (SUV_{maks}): 9,2] olan 8,0 cm'lik ve GCT tanısı konulan bir mediastinal tümör vardı. Kemoterapiden sonra serum alfa fetoprotein, beta-insan koryonik gonadotropin ve tümör ^{18}F-FDG tutulumu azaldı (SUV_{maks}: 3,9), ancak tümör hacmi arttı. Tümör tamamen rezeke edildi ve patoloji sonucu GTS tanısını doğruladı. Kemoterapi sonrası uygulanan ^{18}F-FDG pozitron emisyon tomografisi, zayıf ^{18}F-FDG tutulumu ile oldukça diferansiye tümör komponentlerinin proliferasyonunu yansıtır.

Anahtar kelimeler: Büyüyen teratom sendromu, ^{18}F-FDG PET, mediasten, germ hücreli tümör

Address for Correspondence: Mihoko Sasahara MD, Tokushima University, Department of Radiology, Tokushima, Japan
Phone: +81-88-633-7173 **E-mail:** k.mihoko.928@gmail.com ORCID ID: orcid.org/0000-0001-6855-7030
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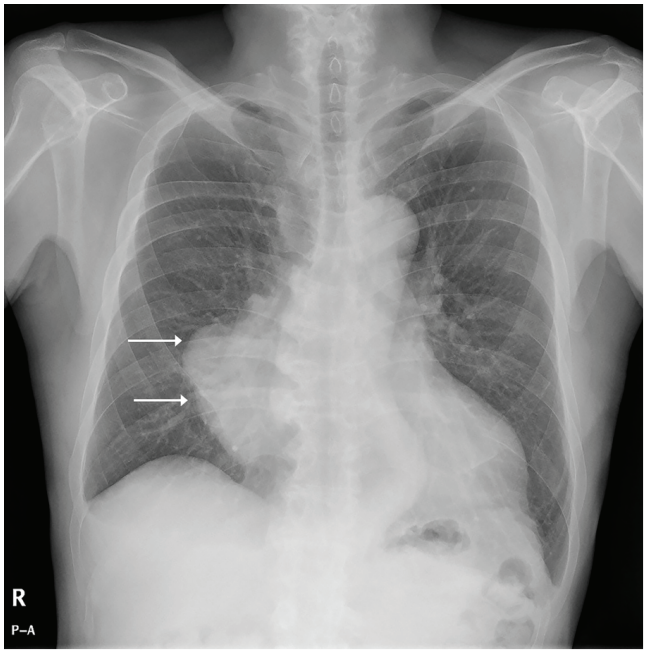

Figure 1. Chest X-ray image of an asymptomatic 60-year-old male during a routine medical check-up. A large mass was found in the right mediastinum (arrows).

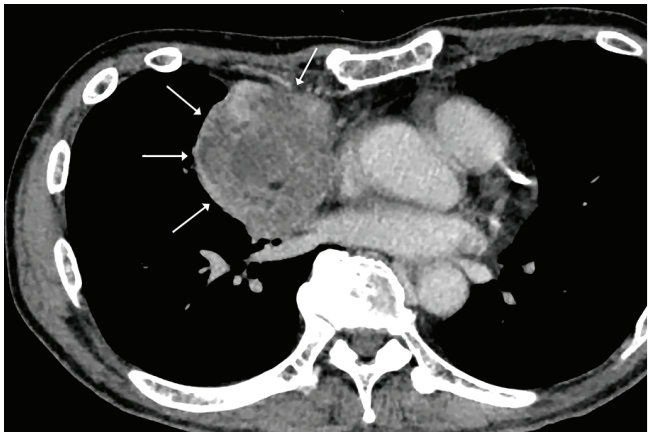

Figure 2. Contrast-enhanced computed tomography (CT) showed a mass, 8.0 cm in diameter, in the right anterior mediastinum (arrows).

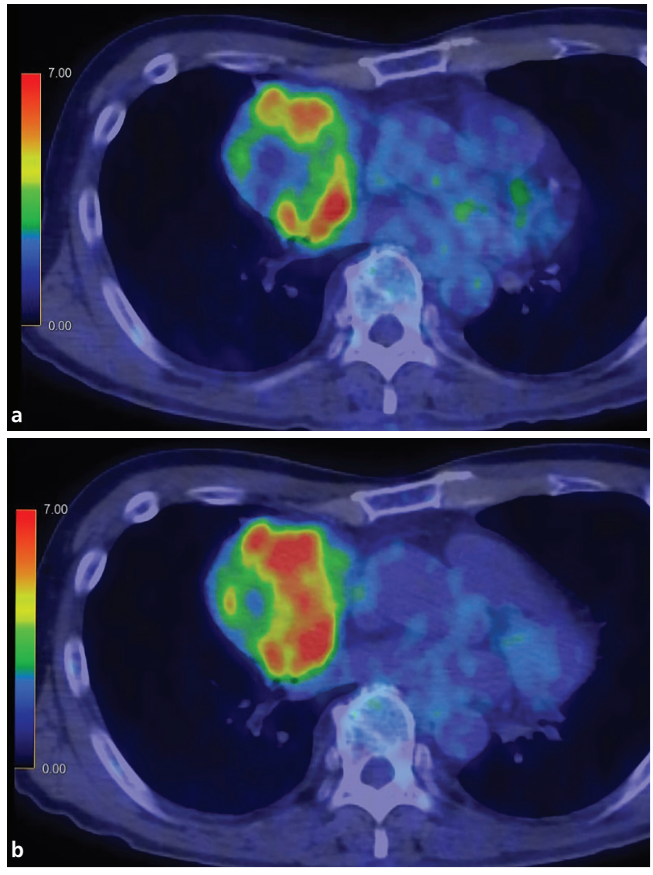

Figure 3. ^{18}F-fluorodeoxyglucose (FDG) positron emission tomography (PET)/CT fusion images at initial diagnosis. In the solid part of the tumor, the uptake of ^{18}F-FDG was strong with a maximum standardized uptake value (SUV_{max}): 9.2 in the early phase (a: 1 h after ^{18}F-FDG injection) and 10.4 in the delayed phase (b: 2 h after ^{18}F-FDG injection). Both serum alpha fetoprotein (971 ng/mL) and beta-human chorionic gonadotropin (3.8 mIU/mL) levels were increased. Percutaneous needle biopsy showed undifferentiated tumor cells, which were considered to be part of a non-seminomatous germ cell tumor (GCT).

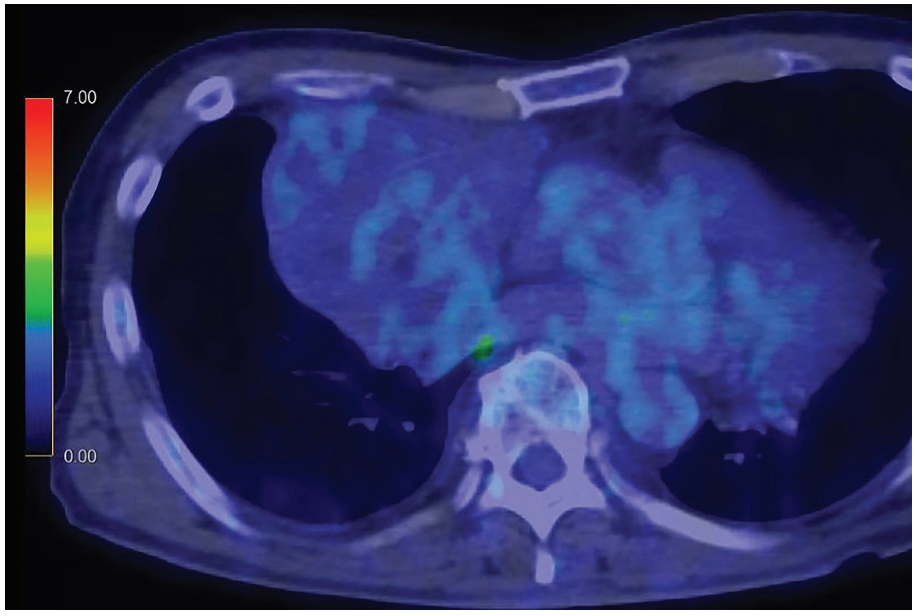

Figure 4. ^{18}F-FDG PET/CT fusion image after chemotherapy. After two courses of chemotherapy with bleomycin, etoposide, and cisplatin, the tumor size increased. Meanwhile, tumor marker levels decreased (alpha fetoprotein 230 ng/mL, beta-human chorionic gonadotropin 2.7 mIU/mL), and ^{18}F-FDG uptake decreased to a SUV_{max} of 3.9. The tumor was completely resected and histologically diagnosed as mature teratomas (MT) with growing teratoma syndrome (GTS). GCTs of the mediastinum occur mostly during the third to fourth decade of life (1). Chemotherapy is generally effective for GCTs, but the tumor may become unresponsive to treatment, which is a sign of poor prognosis. However, chemotherapy may reduce the malignant component of the tumor, resulting in an increased benign component. This phenomenon, called GTS, is defined as an increase in tumor size in a patient with a GCT, either during or after chemotherapy, while the initial tumor markers are normal and histology shows only MT (2,3). The treatment for GTS is the complete removal of the mass (4). To the best of our knowledge, this is the first report showing a decrease in ^{18}F-FDG uptake of mediastinal GTS after chemotherapy. In past reports of GTS, ^{18}F-FDG SUV_{max} was 4.9 in mediastinal tumors and 4.0, 4.1 and 8.1 in ovarian tumors (5,6). Hariprasad et al. (7) reported one patient with GTS in an ovary that showed positive ^{18}F-FDG uptake. The mature components of the teratoma in the specimen that they resected were brain, thyroid, hair follicle, cartilage, and adipose tissue. They suspected that the brain tissue components had a high rate of glucose metabolism that might be the main reason for ^{18}F-FDG uptake. Our case also included brain tissue, but the proportion was not high; so it is possible that the post-chemotherapeutic tumor uptake was not particularly high. It is not easy to diagnose GTS in such cases with strong ^{18}F-FDG uptake; however, the diagnosis of GTS can be made more reliably when the ^{18}F-FDG uptake decreases after treatment, as in our case, even if conventional imaging techniques, such as CT and magnetic resonance imaging, show tumor growth.

Ethics

Informed Consent: Written informed consent of the patient was obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Y.O., Y.A., H.T., T.S., H.O., Concept: T.A., T.S., Design: M.S., T.A., Data Collection or Processing: M.S., Y.O., M.H., Analysis or Interpretation: M.S., M.H., Literature Search: M.S., T.A., Writing: M.S., T.A., Y.O.

Conflict of Interest: No conflict of interest is declared by the authors.

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