To the Editor: Intravascular and intraatrial invasion of thyroid cancer is not a frequently encountered finding. To our knowledge there are 46 cases [1-14] in the literature reporting tumour thrombus in the mediastinal great veins and/or right atrium due to thyroid cancer. When there is involvement of the superior vena cava and the right atrium, we usually have superior vena cava syndrome (SVCS). Fluoro-18 fluoro deoxyglucose positron emission tomography/computerized tomography ($^{18}$F-FDG PET/CT) is useful in detecting tumor thrombus and discriminating it from clot of other aetiology. There are two papers reporting the usefulness of $^{18}$F-FDG PET/CT in visualization of thrombus from thyroid cancer [2, 4]. It is important to detect the disease early, since thrombectomy can prevent sudden death due to tumor embolism or obstruction of the tricuspid valve.

We report a case of tumor thrombus in the left brachiocephalic vein (LBCV), the superior vena cava (SVC) and the right atrium (RA), in a 45 years old male patient with metastatic follicular thyroid cancer.

A 45 years old male patient underwent total thyroidectomy five months ago and histopathological examination showed follicular type thyroid carcinoma (Fig. 1). Since the remnant thyroid tissue was large and the primary tumor was 4 cm in diameter showing vascular invasion together with multifocality, a second operation was carried out two months later and the patient was treated with 5625MBq of iodine-131 ($^{131}$I) for thyroid remnant ablation. Post radioiodine ablation scan showed $^{131}$I uptake only at the thyroid remnant tissue (Fig. 2A). He then suffered from hoarseness, dysphagia, swelling at the upper chest, face and in both upper extremities for a period of 2 months. His serum thyroglobulin levels were as high as 464ng/dl, while was on suppression treatment with levothyroxine. A magnetic resonance imaging (MRI) of the neck and thorax, detected increased signal at the superior vena cava (SVC), creating suspicion for tumor thrombi.

The patient was referred to our unit for an $^{18}$F-FDG PET/CT scan for restaging. After ten hours of fasting and having serum glucose 105mg/dl, the patient was injected with 577.5MBq of $^{18}$F-FDG intravenously (i.v.). After 55min of waiting in a semireclined relaxed chair, the patient was imaged using an integrated PET/CT scanner which consisted of a full-ring high resolution (HI-REZ) PET with lutetium oxy-orthosilicate (LSO) crystal and a 6-slice CT (Siemens Biograph 6, Chicago, USA). The CT portion of the study was done without an i.v. contrast medium, just for defining anatomical landmarks and making attenuation correction on PET images. Strongly increased $^{18}$F-FDG accumulation was detected beginning from LBCV, extending through SVC and ending in the RA (Fig. 4). Maximum standard uptake values (SUVmax) for the LBCV, SVC and RA were 7.0, 7.1 and 6.0 respectively. These findings were interpreted as intravascular involvement of primary thyroid cancer. There were also multiple pulmonary nodules showing moderately increased $^{18}$F-FDG accumulation in the parenchyma of both lungs, suggestive of metastases. The patient received external beam radiation treatment (EBRT) to the mediastinum consist-
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Patients may benefit from \(^{18}\text{F}-\text{FDG}\) PET/CT when tumor thrombus cannot be diagnosed exactly by other conventional imaging modalities and may also be helpful in discriminating between benign and malignant thrombus. \(^{18}\text{F}-\text{FDG}\) uptake in the tumor thrombus results from the increased glycolytic rate of the malignant cells in the thrombus [2]. There are two other cases reported up to now in which \(^{18}\text{F}-\text{FDG}\) PET/CT detected malignant tumor thrombi from thyroid cancer [2, 4].

Because of the relatively good prognosis of the majority of thyroid cancers and the high possibility of sudden death from tumor embolism or obstruction of the right atrium, it is generally thought that aggressive surgery would be curative or at least prolong survival in patients with tumor thrombosis of the great veins of the mediastinum. Without surgery the patient’s quality of life will also decline significantly. In our case the patient rejected operation. Venous obstruction by thyroid cancer may respond dramatically to EBRT and our patient got some symptomatic relief from radiotherapy.

Bibliography


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