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Case Report

The Clinical Importance of Tumor Thrombus in Internal Jugular Vein Related to Papillary Thyroid Cancer

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ABSTRACT

Objective: We aimed to present a case with a previous thyroid surgery, who developed an internal jugular vein thrombus due to papillary thyroid cancer (PTC) in the remnant tissue.

Case: A 54-year-old female patient, with a previous subtotal thyroidectomy, presented with a mass on the left side of her neck. Thyroid ultrasound disclosed a heterogeneous nodule of 67x48x32 mm in the left thyroid lobe. An isoechoic tumor thrombus was observed extending intraluminally from the middle thyroid vein to the internal jugular vein. No lymph node or solid organ invasion were detected in the neck. Fine needle aspiration biopsy revealed cytological findings consistent with PTC. Total thyroidectomy, left sided central neck dissection and partial left jugular vein resection was performed. The pathologic examination revealed mid-differentiated unifocal encapsulated follicular variant of PTC. The whole-body scan performed after the postoperative treatment of 150 mCi of radioactive iodine, revealed multiple lung metastases.

Conclusion: The presence of a tumor thrombus in the thyroid vein or internal jugular vein is strongly suspicious for malignancy even in the absence of malignant findings on cytology. It is an important finding that is highly suspicious for distant metastasis in the cytologically diagnosed patients.

Introduction

Thyroid cancer can develop up to 10 %, after partial surgery for initially benign lesions [1]. Papillary thyroid cancer (PTC) is the most common type of thyroid malignancies and generally metastasizes to cervical lymph nodes. Extrathyroidal extension of the tumor with the invasion of the adjacent structures such as the muscles, upper aerodigestive tract, nerves, and vessels is less common than cervical lymph node metastases and distant metastases is present only in 1 % of patients at diagnosis [2, 3]. However, macroscopic invasion and/or intraluminal tumor thrombus in the great cervical veins related to the PTC is extremely rare [4]. We aimed to present a case with a history of previous thyroid surgery who developed papillary thyroid cancer in the remnant tissue and an internal jugular vein (IJV) occlusion by a tumor thrombus detected by preoperative ultrasound.

Case

A 54-year-old female patient, who has undergone subtotal thyroidectomy for benign multinodular goitre 20 years ago, presented with a 3-month history of an expanding mass on the left side of the neck without any other symptoms. Physical examination revealed a solid mass of 6 cm in size, extending under the sternocleidomastoid muscle (SCM) from the inferomedial border of the previous thyroidectomy incision. The patient was euthyroid clinically and biochemically (fT3:2.48pg/mL, fT4: 0.85ng/dL, TSH:1.72 uIU/mL). Thyroid ultrasound disclosed a heterogeneous nodule of 67x48x32 mm in size, almost filling up the whole left thyroid lobe. An isoechoic tumor thrombus was observed extending intraluminally from the middle thyroid vein on the anterosuperior side of the left lobe to the internal jugular vein (IJV) (Figure 1). Color Doppler ultrasound revealed that the left internal jugular vein was blocked up by 50 % with a hypervascular tumor

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thrombus of 22x4 mm size in the longitudinal plan. The left thyroid lobe was observed to surround the common carotid artery with an angle of 135 degrees and the echogenic fatty plan was disrupted between these two structures. No pathologic cervical lymph node was detected in the neck. Magnetic resonance imaging (MRI) of the neck showed a heterogeneously enhancing mass with a low signal intensity on T1-weighted images and a high signal intensity on T2-weighted images arising from the left thyroid lobe, compressing and deviating the trachea to the right side (Figure 2). None of the tracheolaryngeal structures and other adjacent organs were invaded which was confirmed by MRI. Fine needle aspiration biopsy (FNAB) of the nodule revealed papillary cancer. The patient underwent preoperative fluorine-18 fluorodeoxyglucose positron emission tomography/computed tomography (18F-FDG PET CT) for the detection of any distant metastases due to the tumor thrombus. No additional focus of metastasis was detected except the moderate uptake with low- level metabolism, Standardized Uptake Values (SUV) max measuring up to 2.0, in the mass located in the left thyroid lobe.

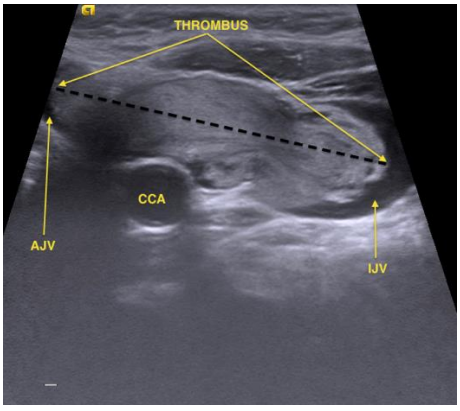

Figure 1: The tumor thrombus extending intraluminally from the anterior jugular vein to the internal jugular vein (AJV: Anterior Jugular Vein, IJV: Internal Jugular Vein, CCA: Common Carotid Artery)

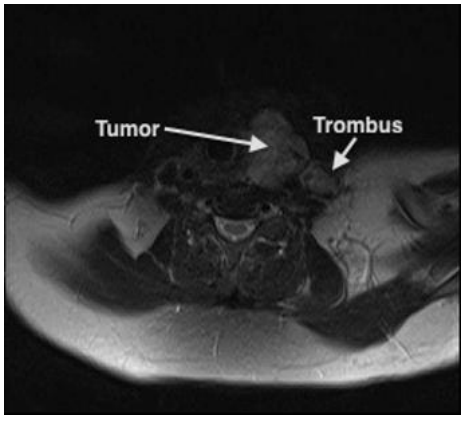

Figure 2: Cervical MR showing the nodule with papillary thyroid cancer and tumor thrombus in the internal jugular vein.

The treatment of the patient was managed with surgery. The skin was reincised for 10 cm upon the previous Kocher incision. The IJV was identified between the left strap and SCM muscles. Total thyroidectomy and left sided central neck dissection were performed via dissection medially from the lateral side with the partial resection of the IJV including the tumor thrombus. The segmental resection of the IJV was carried out between the upper border of thyroid cartilage and 2 cm above the clavicle. A tumor thrombus was observed in the lumen of the IJV. The postoperative course was uneventful, and the patient was discharged on the third postoperative day.

Figure 3: The whole-body scanning of the patient showed bilateral multiple lung metastases on the seventh day after the radioactive iodine therapy with 150 mCi of I-131.

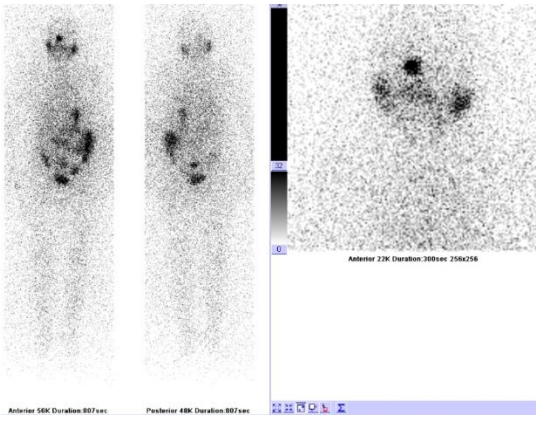

Figure 4: The whole-body scanning of the patient with 5 mCi of radioiodine I-131 demonstrated no metastatic focus on the first postoperative year.

The pathological examination revealed a nodule of 6x4,5x4,5 cm in size, having mid-differantiated, unifocal folicular variant papillary thyroid carcinoma. The tumor was encapsulated and the capsula was invaded in a focal area. Vascular invasion was also present. No extrathyroidal extension of the tumor was detected and the surgical margins were intact. No lymph node metastasis was also determined in any of the 10 lymph nodes resected from the left sided central neck area. The patient was given a treatment dose of 150 mCi of radioiodine I-131 postoperatively. The whole-body scan performed on the seventh day after the radioactive iodine therapy, revealed bilateral multiple lung metastases (Figure 3). However, the whole-body scanning of the patient with 5 mCi of radioiodine I-131 demonstrated no metastatic focus on the first postoperative year (Figure 4). Postoperative first year laboratory

findings were as; TSH: 45 uIU/mL, thyroglobulin (Tg): 0.79ng/mL, Anti-Tg: (-). No locoregional recurrence was found via the neck ultrasound. The postoperative second year laboratory findings showed suppressed Tg:<0.04 ng/mL (TSH: 0.064 uIU/mL), stimulated Tg:0.22 ng/ml (TSH: 37uIU/mL), and negative Anti-Tg. The neck ultrasound also showed no locoregional recurrence on the second postoperative year.

Discussion

Thyroid cancer with macroscopic invasion and/or thrombus in the great vascular structures have been rarely reported [4]. The invasion rate of the venous system was reported as 1.3 % [5]. Histologically, the most common type of thyroid cancer with tumor thrombus is FTC, but a few cases of PTC have been reported [4, 6]. Follicular thyroid cancer primarily tends to spread haematogenously leading to distant organ metastasis. In contrast to FTCs, PTC demonstrate a strong propensity for regional nodal involvement and its haematogenous spread is rare [3]. Macroscopic tumor thrombus in the great vein associated with thyroid cancer can occur either through tumor invasion of the venous wall or disease extending along intraluminal pathways from the draining veins of the thyroid [7, 8]. Intravascular tumor spread generally starts at the thyroid veins with intraluminal invasion by malignant cells and deposition of fibrin, leading to continued growth [9]. A tumor thrombus in the IJV is thought to be a macroscopic form of the vascular invasion of FTC occured via the malignant cells extending through the vessels [4]. The clinical scenario for PTC is that it often presents with jugular vein involvement from a metastatic node with extracapsular extension [3]. Encapsulated tumor bulk prevents the tumor cells from invading the adjacent vascular structures in PTC and thus, direct extraluminal invasion of the venous wall with PTC is very rare. However, the intravascular extension of tumor cells by direct intraluminal spread of PTC, is an extremely uncommon phenomenon as it occurred in our case. Malignant cells within the tumor thrombus can spread from the thyroid veins up to the right atrium. Clinical presentation of a tumor thrombus in great cervical veins can vary from asymptomatic presentation to serious superior vena cava syndrome, depending on the degree of the obstruction. In our case the thrombus was asymptomatic depending on both being limited in the IJV and not blocking the blood flow completely. Thyroid cancer vascular thrombi can be detected by ultrasonography [4, 10]. It is rather simple to detect a tumor thrombus in the internal jugular vein by ultrasonography. It is, however, very difficult to show a tumor thrombus when it is limited to the thyroid vein [4]. Color Doppler ultrasound is able to show flow absence in veins or even detect partial thrombosis. Tumor thrombus can increase the risk of distant metastatic disease, which can alter the clinical course of the patient. Kobayashi et al. assessed approximately 5500 patients and detected pulmonary metastases in 1 % without tumor thrombus, and in 50 % with tumor thrombus [4]. Although the prevalence of tumor thrombi in patients with PTC is lower than FTC, the clinical significance of a tumor thrombus is similar in patients with FTC. They suggested that this is likely because there is direct exposure of malignant cells to circulatory blood flow [4]. In our case the misdetection of metastatic disease may be related with differentiated thyroid cancer, iodine-avid pulmonary metastases and multiple micronodular metastases in the lungs. FDG-avid metastatic lesions that are detected on PET scanning are usually refractory to radioactive iodine therapy [11]. The most effective treatment of aggressive thyroid cancers is total surgical resection of the cervical disease followed by TSH-suppression and radioactive iodine ablation therapy. Tumor thrombus is not a contraindication for performing aggressive surgery in well-differentiated thyroid cancers. Surgery may prevent the patient from the risk of superior vena cava obstruction, airway obstruction, tumor embolism or fatal right atrial obstruction [12]. Resection of the IJV can be safely performed provided that the cancer does not involve both IJVs [3].

As a conclusion; Although invasion of IJV due to papillary cancer is a rare condition, radiologists should keep in mind to check the neck via ultrasonography for signs of tumor thrombus in each patient with a thyroid mass. The presence of a tumor thrombus in the thyroid vein or internal jugular vein is an alarming finding for malignancy even if there is no sign confirming malignancy on cytology. Thus, the presence of a tumor thrombus is an important finding that has to alert the clinician for distant metastasis in the cytologically diagnosed patients.

Authorship

Concept – NA, MU
Design – NA, AO, MU
Analysis &/or Interpretation – NA, AO, MU
Literature Search – NA, AO
Drafting article – NA, MU
Critical Reviews – MU

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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