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# Thyroid Metastasis Revealing Prostatic Adenocarcinoma

**Warou Dolou[1*], Ablavi Adani-Ifè[2], Stephen L. A. Lawson[1], Essodina Padja[3], Kwamé Doh[4]**

[1]Department of Oto-Rhino-Laryngology, University Teaching Hospital of Kara, Kara, Togo
[2]Department of Oncology, University Teaching Hospital of Lomé, Lomé, Togo
[3]Department of Urology, University Teaching Hospital of Lomé, Lomé, Togo
[4]Department of Pathology, University Teaching Hospital of Lomé, Lomé, Togo
Email: *disamueli@live.fr

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## Abstract

**Introduction:** Metastasis to the thyroid gland is rarely encountered and usually detected after the diagnosis of the primary tumor. The most common sites of primary are breast, kidney, and lung. Prostate has been rarely reported as primary site. Here is reported a case of thyroid metastasis revealing prostate adenocarcinoma. **Case summary:** A 59-year-old man was admitted for pulmonary embolism. CT scan showed a hypertrophy of left thyroid lobe, and ultrasonography of the neck revealed cervical nodes. Thyroid function tests were within normal limits. Total thyroidectomy associated to cervical nodes dissection was done. There was no postoperative complication. Histopathological examination of the surgical specimen concluded to a papillary carcinoma. Then, immunohistochemistry examination revealed prostatic metastatic adenocarcinoma to lymph node and thyroid gland. The patient was treated by androgen deprivation therapy. After thirty three months of follow-up, he is still in good condition with stable disease. **Conclusion:** This case suggests thyroid cancer might be metastasis, and more frequent than known. Surgical specimen of thyroidectomy requires further histological examination such as immunohistochemistry to document primary tumor. Prostate is one of the primary, despite not the most common.

## Keywords

Thyroid Metastasis, Prostatic Adenocarcinoma, Immunohistochemistry

## 1. Introduction

Since 1990s, reported cases of thyroid cancer have increased; the estimated incidence in the United States of America was 53,990 cases by the year 2018 [1]. This

cancer is considered as the most common endocrine neoplasm and represents about 3% of all malignant tumors in humans, with 75% of cases occurring in women [1] [2], and two-thirds of cases occurring in people under 55 years [1]. In the vast majority of cases, thyroid cancer is discovered incidentally during imaging studies (computed tomography, positron emission tomography, magnetic resonance imaging or ultrasonography) performed for reasons unrelated to the thyroid [3].

The detection and diagnosis of differentiated thyroid cancer have evolved over the years with increased use of high-resolution neck and thyroid ultrasound, fine needle aspiration biopsy (FNAB), molecular tests, and thyroglobulin as a serum marker. About 90% of thyroid tumors are papillary, follicular, oxyntic, medullary, and anaplastic thyroid cancer; the remaining proportion represented by lymphoma, squamous cell carcinoma, sarcoma, melanoma or metastatic disease [4].

Metastasis to thyroid accounts for 1.4% to 2.5% of malignant thyroid tumors. They are usually detected after the diagnosis of the primary tumor (more often breast cancer, renal cell cancer, lung cancer, colon/rectal cancer, and gastric carcinomas) [5]. Unusual are tumors revealed by thyroid metastasis, especially prostatic adenocarcinoma. We report a case of metastasis to thyroid revealing prostatic adenocarcinoma.

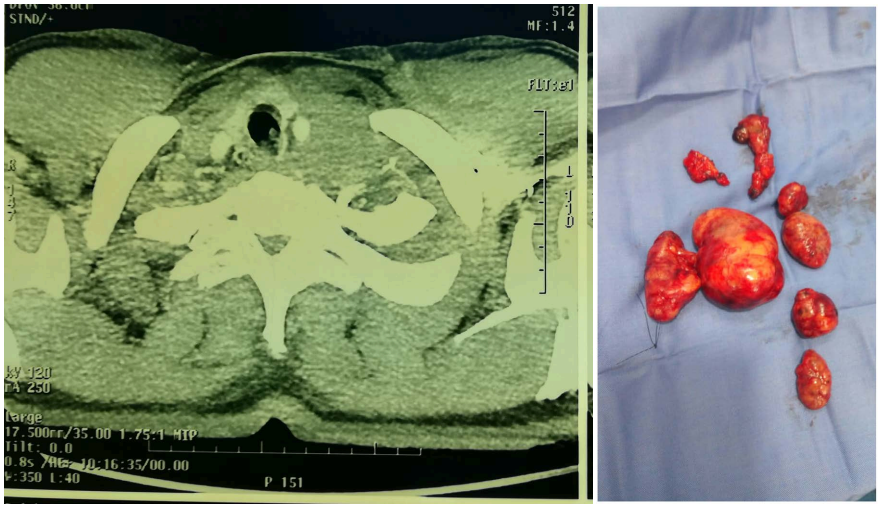
## 2. Case Presentation

A 59-year-old male was admitted to cardiology for acute chest pain and dyspnea. His medical history included high blood pressure controlled by perindopril and Amlodipine, and diabetes managed by Insulin and Metformin. Thoracic Computed Tomography (CT) scan confirmed pulmonary embolism and showed a mass in the left thyroid lobe plunging into the mediastinum, measuring 75 mm × 56 mm, with tracheal compression and his deviation (**Figure 1(A)**). Ultrasonography of the cervical region showed left cervical lymph nodes but the thyroid appeared normal. Thyroid hormones were normal.

The patient was referred in otolaryngology. On examination, a left neck mass was noted, measuring about 11 × 6 cm, elastic, mobile and painless. No vocal fold motion impairment was noted during laryngoscopy.

After stabilization of the cardiac issue, he underwent a surgical exploration under general anesthesia. The thyroid gland was hypertrophic, measuring 90 × 60 × 40 mm for left lobe and 60 × 40 × 30 mm for the right lobe. There were left jugular and carotid nodes contiguous to the left lobe. Jugular vein was dilated. The surgical procedure consisted in a total thyroidectomy, associated with dissection of the central (II, III) and lateral (IV, V, VI) zones lymph nodes (**Figure 1(B)**), and careful dissection and preservation of the parathyroid glands and the two recurrent laryngeal nerves. The postoperative course was uneventful. The patient was discharged on the 5$^{th}$ postoperative day and was ordered to complete 10 days of oral antibiotic therapy with amoxicilline + clavulanic acid.

On histopathological examination of the surgical specimen, the aspect had a pattern of a tall-cell variant of papillary carcinoma occupying both lobes of the thyroid and involvement of the five lymph nodes. An extension assessment was



(A) (B)

**Figure 1.** (A) axial CT scan showing hypertrophy of left thyroid lobe plunging to the mediastinum with tracheal compression and deviation. (B) surgical specimen: thyroid gland and nodes.

carried out. The thoracic abdominal and pelvic CT scan showed numerous lymphadenopathy (mediastinal, lumbo-aortic, aortic-cave, lateral aortic, pelvic) and heterogeneous enlarged prostatic gland (**Figure 2**).

The Prostate-Specific Antigen (PSA) rate was increased to 8251 ng/ml. Pathological examination of prostatic biopsy revealed acinar adenocarcinoma of the prostate (Gleason score 4 + 5). Surgical specimen was carried out in France for review. Immunohistochemical study revealed a positive immunostaining showed positive staining of PSA on thyroid tumor cells and lymph nodes pointing to a prostate origin (**Figure 3**).

Based on these histological and immunohistochemical findings, the diagnosis of prostatic adenocarcinoma metastatic to thyroid gland and lymph cervical nodes was made.

Hormone replacement therapy was started one week after surgery with 100 µg/day of levothyroxine. After the final diagnosis, the patient could undertake specific treatment. It started by combining antiandrogen therapy with Gonadothrophin-Releasing Hormone Analogue (leuprolide acetate 3.75 mg/4weeks), to Cyproterone 50 mg twice daily.

The follow-up CT scan performed 6 months after surgery showed regression in size and number of lymphadenopathy and the appearance of osteo-condensing bone metastases. Four mg of zoledronic acid quarterly intravenous administration was associated to the treatment.

The course was marked by a gradual decrease in the level of PSA, to 47.60 ng/ml at third month of the treatment, 23.22 ng/ml 9 months later and 11.21 ng/ml at the last control (32$^{th}$ month). The patient is still in good condition, 33 months after diagnosis. He has no recurrence to date. The treatment with combined androgen blockage and zoledronic acid is still going on.

(A) (B)

**Figure 2.** Sagittal (A) and axial slices (B) on pelvic CT scan showing heterogenous enlarged prostatic gland measuring 58 mm × 76 mm × 65 mm (149 $cm^3$ in volume).

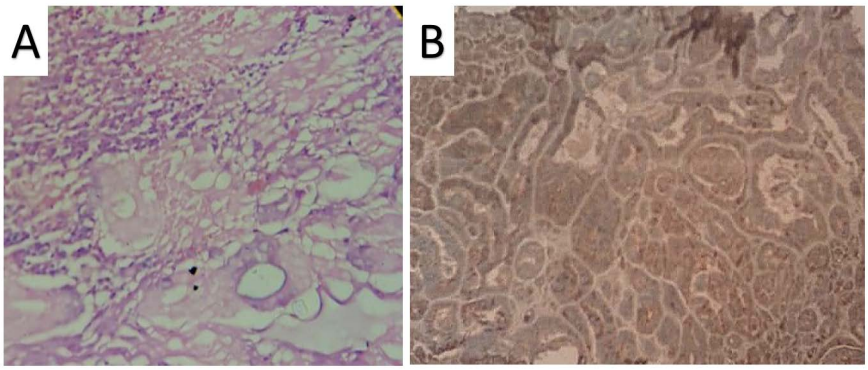



**Figure 3.** histopathology pictures. (A) hematoxylin and eosin (HE) staining, magnification ×40: infiltration of thyroid by prostatic adenocarcinoma; (B) Diffuse, strong PSA positivity.

## 3. Discussion

Metastases to the thyroid gland are usually considered rare, but the incidence in autopsy series varies from 1.25% in unselected autopsy studies to 24% in patients with widespread malignant neoplasm [5]. The largest study on metastasis to the thyroid gland done by Hegerova included 97 cases over 30 years [6]. The most common primary sites included kidney (22%), lung (22%) and head and neck (12%). There is a peak incidence during the sixth decade of life [6] [7] [8] [9], as with the reported patient.

Occasional reports have been documented concerning metastasis from prostate cancer to the thyroid gland, in patients with long-standing prostate cancer [7] [8] [9]. Prostate cancer arises two [7] or seven years [8] after the diagnosis of the primary tumor. In our case, thyroid metastasis was synchronous and revealed underlying prostate cancer. Unusual are reported cases like this one [10] [11].

The symptoms of metastasis to thyroid are unspecific [9] [11]. The revelation

modes may be unifocal or multifocal lesion of the thyroid [6]. Rare cases of thyroid dysfunction have been reported [12]. The reported patient was revealed by multifocal involvement of thyroid and pulmonary embolism which may have been caused by tumor thrombus.

Diagnosis of metastasis to thyroid may be difficult, as not only is it uneasy to distinguish between metastasis and second primary cancer, but also because most patients are asymptomatic. Fine-needle aspiration is a sensitive method to detect metastasis as proved by Heregova [6]. In our patient, diagnostic was done by histologic examination of surgical specimen. The reported patient was not evaluated with thyroid FNAB. Surgery was planned because of the controversy in imaging results and of the hypertrophic and compressive thyroid with lymph nodes, suggestive of thyroid cancer.

In our patient, thyroid metastases were associated with several lymph node involvements. Yamamoto reported a similar case [11]. Hegerova reported that 79% of their patients had evidence of other metastases at the time of diagnosis of thyroid metastases [6]. Immunohistochemical study may help in distinguishing between a primary thyroid cancer that stains positively for thyroglobulin and a metastatic lesion that does not [9]. The diagnosis of thyroid metastasis was established after surgery by histopathology and immunohistochemistry stains. Positive PSA staining is highly specific for cells of prostate origin.

After thyroidectomy, the reported patient underwent successful antiandrogen therapy as indicated for metastatic hormone-sensitive prostatic cancer. Due to the relatively low incidence of thyroid metastasis, there is no adequate consensus regarding the treatment of these patients [13]. Expert opinion expressed agrees that thyroid metastasis should be surgically treated if that is the only detectable metastasis and the tumor can be safely resected [13]. Chemotherapy and radiotherapy could be used according to the type of primary cancer that metastases to the thyroid.

Our patient continues a normal life 33 months after surgery. The patient with prostatic adenocarcinoma metastasis in the thyroid reported by Bayram was alive one year after diagnosis [7]. The overall survival of a patient with metastatic thyroid disease depends on the site of primary tumors ranging from 21 to 66 months [14].

## 4. Conclusion

Metastasis to thyroid from prostatic adenocarcinoma is uncommon. In this reported case, the thyroid metastasis was the revealing sign of an unknown prostatic adenocarcinoma which was subsequently diagnosed and treated. Careful histological examination and essential immunohistochemistry helped in attaining the correct diagnosis.

## Consent

Informed consent from the patient was obtained for this publication.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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