Papillary Thyroid Carcinoma Presenting with Chronic Cough and Hemoptysis in Primary Care: A Case Report

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Patient: Female, 54-year-old
Final Diagnosis: Papillary thyroid carcinoma
Symptoms: Cough • hemoptysis
Clinical Procedure: —
Specialty: Family Medicine

Objective: Unusual clinical course
Background: The article discusses an unusual case of papillary thyroid carcinoma in which chronic cough and hemoptysis were the predominant symptoms. While the more common causes of hemoptysis are pulmonary in origin, extrapulmonary etiologies have been reported, including thyroid carcinoma. The clinical presentation of thyroid malignancy in this case mimics many other common disorders, such as pulmonary tuberculosis, bronchogenic carcinoma, bronchiectasis, and chronic obstructive pulmonary disease. Hence, making it challenging to suspect early when patients present to primary care.

Case Report: A 54-year-old woman presented with a chronic cough and hemoptysis in our Primary Care Medicine Clinic. While initial assessments in the primary care medicine clinic yielded no remarkable findings, a subsequent high-resolution computed tomography scan of the thorax uncovered a thyroid lesion. Subsequent evaluation in the hospital setting included an ultrasound examination, revealing multiple thyroid nodules, and fine needle aspiration that confirmed papillary thyroid carcinoma. She underwent total thyroidectomy with central and left lateral neck dissection, complicated by left vocal cord palsy. She received 2 cycles of periodic radioactive iodine therapy and injection laryngoplasty postoperatively. There was no evidence of iodin avid disease and recurrence of hemoptysis after surgery.

Conclusions: This case report emphasizes the significance of considering papillary thyroid carcinoma when assessing hemoptysis in the primary care setting, as early detection and treatment of it would result in a better outcome.

Keywords: Asians • Hemoptysis • Physicians, Primary Care • Thyroid Cancer, Papillary

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Background

Hemoptysis is common and a warning sign for lung pathologies. Pulmonary tuberculosis, bronchogenic carcinoma, bronchiectasis, and chronic obstructive pulmonary disease are common causes. Occasionally, the cause is idiopathic [1-3]. Extrapulmonary causes of hemoptysis include autoimmune or hematological disorders, drugs, and malignancies [4]. Thyroid malignancies are infrequently associated with hemoptysis. However, when thyroid malignancy is the etiology, it is usually caused by tracheal invasion or lung metastases [4].

In primary care settings, the annual incidence of hemoptysis is 1 in every 1000 cases [5]. The initial assessments are focused on investigating the common etiologies [3,4]. However, this report illustrates a case of chronic hemoptysis in a middle-aged woman, which is an uncommon presentation of papillary thyroid cancer in primary care settings and requires a high index of suspicion and comprehensive assessment in arriving to the final diagnosis.

Case Report

A 54-year-old woman with diabetes and hypertension reported having a 6-month persistent cough at a routine appointment for diabetic and hypertensive follow-up in our Primary Care Medicine Clinic. The cough was accompanied by occasional instances of coughing up blood-stained sputum. There was no fever, shortness of breath, or any constitutional symptoms. She did not smoke or drink alcohol and had no history of childhood radiation exposure, family history of thyroid cancer, or thyroid cancer syndrome in her first-degree relatives.

On physical examination, she was a well-built middle-aged woman and did not appear to be cachexic. Her body mass index was 22 kg/m². Her vital signs were stable. She was not tachypnoeic, and there was no stridor or noisy breathing. There was no neck swelling or nodule found. The trachea was central, and the regional lymph nodes were not palpable. Clinically, she was euthyroid. The respiratory system examination was unremarkable. Other system examinations revealed no abnormalities. Initial laboratory investigations did not show evidence of acute or chronic infection; all parameters in the full blood count, C-reactive protein, and erythrocyte sedimentation rate were in the reference ranges. The test for active pulmonary tuberculosis was negative, as her sputum for acid-fast bacilli was negative. Her thyroid function test was normal. The chest X-ray showed no obvious cavitation, consolidation, or pleural effusion.

The high-resolution computed tomography of the thorax, which was done to look for the cause of hemoptysis, revealed an enlarged left thyroid with nodules and calcifications, partially compressing onto the adjacent trachea (Figure 1). The airways were patent, and the findings in both lungs showed no lung mass, consolidation, cavitation, tree-in-bud changes, or pleural effusion. There was also no significant mediastinal or hilar lymphadenopathy.

Ultrasound of the thyroid revealed an enlarged left thyroid gland, with thyroid nodules in bilateral lobes. As shown in Figure 2, there was a TR 4 nodule over the upper pole of the right thyroid lobe with the size of 0.5×0.7×0.85 cm (anterior-posterior×width×cranio-caudal) and a TR 5 nodule over the left interpolar to lower pole of left thyroid lobe with the size of 2.1×2.62×3.67 cm (anterior-posterior×width×cranio-caudal). The presence of bilateral sub-centimeter cervical lymph nodes was reported, with the largest on the left cervical region measuring 0.8 cm in the short axis.

Owing to the incidental findings from the high-resolution computed tomography and ultrasound, further evaluation of the clinical history and physical examination was performed.
However, the patient did not report any hyperthyroid or hypothyroid symptoms, nor was there any evidence suggestive of compression effects on adjacent structures. She was referred to the endocrine surgery unit for further evaluation of the findings.

Ultrasound-guided and fine needle aspiration was done at the left TR5 thyroid nodule, and the cytological examination showed a papillary thyroid carcinoma, categorized as Bethesda category 6. Subsequently, a bronchoscopy examination found a tiny ulcer at the left tracheal wall, about 3.5 cm from the vocal cord, which bled on contact. There was an external compression that started at 2 cm below the vocal cord and ended at 6 cm from the carina, without compromising the tracheal airway (Figure 3).

The patient underwent total thyroidectomy with central and left lateral neck dissection, given the large tumor size and suspicion of lymphatic spread. Intraoperatively, the tumor appeared to invade the adjacent strap muscles and the trachea. Thus, R0 resection (complete excision to no residual tumor) was not possible. R2 resection (excision to the macroscopic residual tumor) was done with the destruction of the tracheal ring, and the surgery was complicated with postoperative left vocal cord palsy. The analysis of the histopathological section of the left thyroid lobe reported a solitary tumor at the upper and middle lobe, measuring 30×23×15 mm, revealing a papillary thyroid carcinoma (Figures 4, 5). It infiltrated beyond the anterior and posterior thyroid capsular surface into the surrounding soft tissue, signifying local invasiveness. Notably, there was the absence of lymph node metastases. Based on the findings, the tumor, node, and metastasis (TNM) staging was consistent with T4a(s)N0M0. She received 2 cycles of periodic radioactive iodine therapy from the Oncology Unit as adjuvant therapy. An I-131 post-ablation whole body scan was done 15 months after surgery and showed no evidence of iodine avid disease. The patient was given thyroid-stimulating hormone suppression therapy. In addition, she underwent injection laryngoplasty as a treatment for left vocal cord palsy. The hoarseness of voice has improved significantly from the treatment. Apart from that, she recovered well with no recurrence of hemoptysis.

Discussion

Hemoptysis is described as the expectoration of blood from the respiratory tract below a glottis, which can range from sputum blood streaking to coughing up a massive amount of blood [6]. It is a common presenting symptom in primary care settings, with an annual incidence of 1 in every 1000 cases [5].
In this case report, we describe a case of a chronic cough associated with hemoptysis for 6 months. The source of hemoptysis can be attributed either to underlying lung or endobronchial tree pathology. The low-pressure pulmonary artery circulation supplies the lung parenchyma. Any insults in this area can result in more common bleeding episodes that are trivial and non-life threatening [4]. In primary care settings, this is more commonly encountered, namely in acute and chronic bronchitis, tuberculosis, lung cancer, pneumonia, and bronchiectasis [5,7]. While the high-pressure bronchial artery circulation supplies the endobronchial tree, any pathology in this area can result in massive fatal hemorrhage, such as bronchogenic carcinoma with bronchial artery involvement [4].

There is also significant geographical diversity in the etiology of hemoptysis worldwide. In developing countries, tuberculosis remains the most common cause of hemoptysis, whereas, in Western countries, chronic inflammatory lung diseases are more common. This is consistent with several studies in Kuwait and Singapore, which reported that pulmonary tuberculosis is the leading cause of hemoptysis in most developing countries, where the disease is endemic [8,9]. In Malaysia, lung cancer, rather than bronchiectasis, was found to be the leading cause of hemoptysis [1,10].

Less commonly, hemoptysis can be caused by pathology originating from extrapulmonary organs, as in the case of our patient. Some literature has mentioned papillary thyroid carcinoma as one of the rare causes of hemoptysis through either tracheal invasion or lung metastases [11,12]. There are also documented cases in which hemoptysis was caused by endobronchial metastases of thyroid carcinoma [13,14]. In our case, hemoptysis was thought to be caused by the tracheal invasion. This was supported by the bronchoscopy examination and intraoperative findings.

Beyond papillary thyroid cancer, hemoptysis can occasionally stem from rare and unexpected sources. One such example is Goodpasture syndrome, an autoimmune disorder characterized by antibodies that attack the lungs and kidneys [4]. This condition can lead to bleeding in the lungs, resulting in hemoptysis. Another unusual cause could be Osler-Weber-Rendu syndrome, which causes abnormal blood vessel formation [4]. These fragile vessels can rupture and cause bleeding, including hemoptysis. Additionally, Wegener granulomatosis, now called granulomatosis with polyangiitis, is a rare autoimmune disease that can inflame blood vessels, leading to hemoptysis, among other symptoms [15]. These infrequent cases highlight the complexity of evaluating hemoptysis, necessitating thorough investigation to uncover even the most uncommon underlying conditions.

Thyroid malignancies themselves are relatively uncommon and make up only 1% of all cancers in adults [16]. The most common type of thyroid malignancy is papillary. In Malaysia, nearly a third of thyroid malignancies are found to be papillary [17]. Generally, papillary thyroid carcinoma is known to be curable and is associated with a favorable prognosis, with an estimated mortality rate between 11% and 17% [12]. However, papillary thyroid carcinoma with extrathyroidal extension, especially involving the erodigestive tract, would have higher morbidity and mortality. In cases in which the papillary thyroid carcinoma invades the trachea, airway obstruction and bleeding can lead to a fatal outcome [18]. Previous literature reported that hemoptysis and neck mass were the most frequent symptoms of papillary thyroid carcinoma with tracheal invasion. Only a small portion of cases (0.5-1.5%) reported upper airway obstruction features such as dyspnea and stridor, where an endoluminal mass was present [13,18]. In our case, the patient presented only with chronic hemoptysis without other associated symptoms. The thyroid mass in our patient was discovered incidentally during the high-resolution computed tomography scan of the thorax that was performed to rule out any lung pathologies that could be causing the chronic hemoptysis.

While thyroid lesions are infrequently associated with hemoptysis [4], this rarity can present a challenge for primary care physicians who prioritize more common etiologies during their initial assessment. Although 7% to 34% of hemoptysis cases have no visible cause [3], comprehensive diagnostic efforts remain essential for every doctor to eliminate all potential causes before considering the possibility of idiopathic hemoptysis. When patients present with active but non-life-threatening hemoptysis without an evident benign cause and with a normal chest radiograph, proceeding to other radiological investigations is prudent [19]. This approach helps exclude lung-related diagnoses and offers insights into potential sources beyond the lungs, including rare causes, such as thyroid lesions. Ultimately, a thorough investigation of hemoptysis is indispensable for accurate diagnosis and the subsequent administration of tailored treatments.

Common diagnostic imaging examinations in assessing thyroid cancer with tracheal invasion are ultrasound, computed tomography scan, and magnetic resonance imaging. Ultrasonography examination can show the extension of any thyroid tumor and simultaneously visualize any cervical lymph node involvement [18]. Neck ultrasonography of our patient revealed a suspicious nodule within the enlarged left thyroid gland with multiple sub-centimeter lymphadenopathies.

Based on similar cases reported previously, the tracheal invasion or lung metastases were usually apparent during computed tomography, explaining the cause of hemoptysis in their patients. Computed tomography has an accuracy of 83.2% to 98.8% and a specificity of 89.8% to 99.4% in assessing thyroid tumors with surrounding structure invasion [18]. However, in
the present case, there was neither radiological evidence of tracheal invasion or endoluminal extension of the mass nor features of lung metastases reported from the high-resolution computed tomography.

The presence of tracheal compression in our case was discovered upon bronchoscopy examination, which also revealed multiple ulcers that bled on touch. This has raised suspicion of possible malignant infiltration of the adjacent thyroid tumor. According to Zhang et al, bronchoscopy examination is important, as it depicts the subsequent surgical management by evaluating the extent of the intraluminal tumor invasion. It also allows direct visualization of bronchial mucosa changes for treatment monitoring purposes [18]. Correlating with the bronchoscopy finding, there was evidence of gross invasion of the trachea and strap muscles during total thyroidectomy surgery in our case. Histologically, the tumor had infiltrated beyond the anterior and posterior thyroid capsular surface into the surrounding soft tissue and was seen at the posterior or surgical margin as well.

Surgical resection is the mainstay of treatment for thyroid carcinoma with tracheal invasion. Complete resection is an essential prognostic factor, as the chances of local recurrence are exceedingly high if the entire gross tumor is not eliminated [20]. In addition, depending on the extent of the disease and any associated illnesses, postoperative radioactive iodine and radiotherapy are important therapeutic options [11]. Most reports in the literature recommend radioactive iodine and radiotherapy as adjuvant treatment for a patient with a tracheal invasion-complicated disease [18].

Papillary thyroid carcinoma is curable in approximately 85% of cases. However, there is still a risk of recurrence after initial surgery, as recorded in 8% to 23% of cases. Male sex, extra-thyroidal extension, lymph node metastases, tumor size greater than 2 cm, distant metastasis, and subtotal thyroidectomy are recognized risk factors for papillary thyroid carcinoma recurrence [21]. Long-term surveillance and follow-up are crucial because current modalities, such as high-resolution ultrasound, recombinant thyroid-stimulating hormone, and highly sensitive thyroglobulin, are available to detect the recurrence of papillary thyroid carcinoma even if it is subclinical [22].

Conclusions

We report a case of chronic hemoptysis due to papillary thyroid cancer. It is worth noting that while the most common cause of hemoptysis is pulmonary in origin, hemoptysis is the most common presentation of papillary thyroid cancer with tracheal invasion [13]. In these cases, even though the stage of papillary thyroid carcinoma carries an increased risk of mortality, the overall prognosis is still good, with a 99% 5-year relative survival rate [23]. The prognosis also depends on the patient’s age, the surgery’s completeness, and the response to radioactive iodine therapy [24]. Thus, papillary thyroid cancer should be considered one of the essential diagnoses and should not be missed when handling chronic hemoptysis cases in a primary care setting, as it carries a good prognosis if treated promptly and accordingly [11]. Thorough history taking, physical examinations, and a systematic approach in patients presenting with hemoptysis are the key to identifying a possible uncommon cause for this common presentation in primary care.

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