



Thyroid Metastasis from Colorectal Cancer: A Case Report and Review of Literature

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Abstract

Introduction: The most common locations of primary tumors of thyroid metastasis are breast and lung, renal cell carcinoma and less frequent melanoma, Merckel cell carcinoma, seminoma. The rate of thyroid metastases from colorectal cancer occurring is < 0.1% of all colorectal cancer cases.

Methods: We report a 68-years-old patient diagnosed of metastatic adenocarcinoma to the thyroid gland based on the imagery of the follow up after sigmoid adenocarcinoma.

Discussion: The diagnosis is difficult and no consensus exists about their management. The options of a surgical approach alone or in combination with radiation therapy or chemo-radiation can be discussed.

Conclusion: Thyroid metastasis from colon cancer is extremely rare and the prognosis is poor. The occurrence of such metastases could be increasing and diagnosed late after the primary tumor along with the generalized use of advanced follow-up imaging techniques.

Keywords

Adenocarcinoma, Colorectal metastasis, Thyroidectomy

Introduction

Liver and lungs are the most common metastatic sites of colorectal cancer. However, in few cases, colorectal cancer can metastasize to unusual sites including the thyroid gland. The prognosis of metastatic thyroid tumors from a primary colorectal cancer is very poor [1]. Thyroidectomy is controversial and may not improve survival. We present here a rare case of metastatic colon adenocarcinoma to the thyroid gland.

Case Report

A 68-year-old man with sigmoid carcinoma was initially treated by surgical resection and adjuvant chemotherapy. Two years later, he was admitted to the hospital for recurrence of his disease with iliac parietal nodules and nodules in the recto-vesical pouch. Follow-up imaging with 18-Fluoro-2-Deoxy-D-Glucose Positron Emission Tomography (18-FDG PET) showed a focal increased uptake in the left side of the neck at the level of the thyroid gland and the absence of lung or liver metastases.

A cytoreductive surgery and hyperthermic intraperitoneal chemotherapy was performed. The patient was euthyroid and had no history of previous thyroid disease except a multinodular goiter.

Laboratory thyroid function test including TSH and free T4 were in a normal range. Calcium levels were normal. Tumor markers Thyrocalcitonin and CEA were negative. No fine-needle aspiration was realized. No other primary cancer was suspected.

The patient underwent a left thyroidectomy. Gross examination of the left thyroid lobe was unremarkable. Extemporaneous histological examination showed a malignant tumor necrosis (suggesting a secondary origin). The primary or secondary origin could not be ascertained so a total thyroidectomy with central cervical lymph node dissection was performed. The final histological examination of the thyroid specimen identified a metastatic localization to the left thyroid gland of a moderately differentiated mucosecretant adenocarcinoma with necrosis. Immunostaining of the tumor was positive for cytokeratin (CK) 20, but negative for CK7. The histology and immunohistochemical-staining pattern were consistent with the colon primary tumor [2,3].

Discussion

The incidence of thyroid metastasis from all tumor types ranges between 1.2% and 24% [4-10]. This rate is rather based on autopsy studies and uncommonly diagnosed clinically [11]. Colorectal origin has been rarely reported and the incidence is unclear. Thyroid metastasis is often undetected although these lesions are present in some patients. Nevertheless, the rate of thyroid metastases from colorectal cancer occurring is < 0.1% of all colorectal cancer cases [1,12,13]. The most common sites producing thyroid metastases are kidney, lung and breast, followed by melanomas and lymphomas [7,11,14,15].

The median interval from colorectal cancer to thyroid metastasis was 4 years (range 0-9 years) [1,12,16,17]. But, reports of detection of thyroid metastases 24 years after primary tumor diagnosis have been made in the case of breast and renal cell carcinoma [15].

A few hypotheses have been proposed to explain the rarity of such metastases. Lung and liver would have an evident filter role in metastatic emboli that is not present in the thyroid gland. The neoplastic invasion of thyroid gland is blood-borne [18,19]. Thyroid

is a highly vascularized organ (20 times more than liver when considering equivalent volumes) [20] and receives an abundant supply of arterial blood. However, it has been postulated that there is a failure of neoplastic cellular adhesion within the thyroid gland because of rapid arterial blood flow. Another hypothesis suggests that tumor cell growth is inhibited by high iodine concentrations and high oxygen saturation and that thyroid hormones may have a cytostatic effect under metastatic cells [21,22].

Abnormal thyroid gland (goiter, adenoma) could be the soil for metastatic seed because of deceleration of arterial blood flow, low oxygen or low iodine content [5,10,23,24]. Smith, *et al.* examined metastatic thyroid tumors and reported that 11 of 19 patients had adenomatous multinodular goiter [25].

Metastasis to the thyroid glands can be asymptomatic [26-29], or present with palpitation, dyspnea, dysphagia [16,30,31], discomfort [32], hoarseness [1], neck swelling or cervical pain [33]. Papi, *et al.* [34] reported that a palpable thyroid nodule was found in 72% of patients with metastasis to the thyroid gland. Metastatic thyroid cancers can be found with 18 FDG-PET [35-38].

Laboratory thyroid function tests are often normal, however hypothyroidism [33,39] and hyperthyroidism have been reported [12,40]. Miyakawa, *et al.* [41] report that thyroid metastasis of lung adenocarcinoma induced severe thyrotoxicosis.

In 90% of cases, fine-needle aspiration (FNA) established the diagnostic of malignancy [42]. But FNA has a low specificity and it is difficult to distinguish metastasis and primary poorly differentiated thyroid cancer [43].

Increased of isolated carcinoembryogenic antigen (CEA) may be the only manifestation of thyroid metastases [16,44]. It is likely that the incidence of thyroid metastasis from colorectal cancer will increase with the wider diffusion of 18-FDG PET and with recent advances in imaging techniques. Isolated thyroid metastasis from colorectal carcinoma cancer without lung or liver metastasis is possible [16,45]. The « vertebral venous system » of Batson [46] can explain direct metastasis of the colorectal cancer without liver metastasis.

The common treatment for thyroid metastasis from colorectal cancer is surgical resection. Even if there were extensive metastatic disease, it is essential to treat thyroid metastasis because of rapid growth of metastatic lesions with airway compressions. However the indication of thyroidectomy is controversial because the prognosis is poor. The extent of surgical resection (total thyroidectomy versus less radical operation) does not have an impact on survival [47]. Total thyroidectomy should be recommended if a curative strategy is aimed.

Radioactive iodine therapy is not considered because colorectal metastases to the thyroid do not uptake radioactive iodine. Radiotherapy efficacy is inconstant [7,48]. Lievre, *et al.* [13] and Wood, *et al.* use of 5-FU alone for thyroid metastases with bad results (survival, 1-6 months). But, recently, Cheung, *et al.* [49] suggested that first line systemic therapy can be a good option for selected patients with colorectal thyroid metastases, either alone or in combination with surgery and/or radiation therapy. No data in literature is found to recommend aggressive chemotherapy approach. But, shorter mean survival in patients who were treated non surgically (25 months), compared to patients who benefited of thyroidectomy alone or with adjuvant chemotherapy (34 months) was reported by Nakhjavani [15]. Moreover, overall survival with metastatic colorectal cancer is increasing with new effective chemotherapy and with targeted therapy (cetuximab or bevacizumab) and this may favor the occurrence of metastases in unusual sites.

The prognosis depends on the grade of the primary lesion and the presence of metastasis in other organs than thyroid gland. In most cases, the presence of isolated metastasis to this unusual site was associated with an overall poor prognosis. Lievre, *et al.* showed that median overall survival after the diagnosis of thyroid metastasis was 12 months [13] which is lower than that observed after resection of

lung or liver metastases. The average survival after the diagnosis of metastatic thyroid carcinoma with thyroid dysfunction was much shorter (3 to 6 months) [33,41]. Patients with a single metastatic lesion within the gland had a significantly better survival than those with multiple foci [47].

Conclusion

Thyroid metastasis from colon cancer is extremely rare and the prognosis is poor. The occurrence of such metastases could be increasing and diagnosed late after the primary tumor along with the generalized use of advanced follow-up imaging techniques. Total thyroidectomy can be attempted in selected patients.

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