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Solitary thyroid gland metastasis from rectum cancer: A case report and review of literature

Solitary thyroid gland metastasis from rectum cancer

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Abstract

BACKGROUND

Metastatic carcinoma of the thyroid gland is a rare encounter in clinical practice, but autopsy series showed that it is not so rare. Thyroid metastasis from colorectal cancer (CRC) is rare and has a poor prognosis.

CASE SUMMARY

A rare case of solitary thyroid rectal cancer metastasis combined with needle tract implantation after fine-needle aspiration (FNA) of the thyroid nodule was reported. This study aimed to summarize the main points of diagnosis and treatment for this rare case, along with a literature review. A 54-year-old woman with a history of TNM stage III CRC presented a 1.3×1.0-cm mass in the left thyroid gland. FNA and histological examination of the left thyroid lobe surgical specimen confirmed the diagnosis of isolated metastatic adenocarcinoma from the rectum. Needle tract implantation was observed in the neck 11 mo after the FNA examination. The 2.5-cm seeding lesion was successfully removed by surgery, and the patient recovered well. The literature relevant to this clinical condition, the diagnostic workup, spread pathway, and surgical management of these rare lesions were reviewed and discussed.

CONCLUSION

For a patient with a thyroid mass and a history of CRC, metastatic thyroid carcinoma should be considered even if the patient has no evidence of other organ metastasis from CRC. FNA cytological examination of the thyroid mass is useful in the differential diagnosis between primary thyroid disease and metastatic thyroid carcinoma. Thyroid lobectomy of the gland containing the metastatic tumor is suggested in patients with metastatic carcinoma of the thyroid.

Key Words: thyroid mass; rectum cancer; metastatic carcinoma; fine-needle aspiration; needle tract implantation

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Core Tip: A rare case of solitary thyroid rectal cancer metastasis combined with needle tract implantation after fine-needle aspiration (FNA) of the thyroid nodule was reported. The literature relevant to this clinical condition, the diagnostic workup, spread pathway, and surgical management of these rare lesions were reviewed. For a patient with a thyroid mass and a history of CRC, metastatic thyroid carcinoma should be considered. FNA cytological examination is useful in the differential diagnosis between primary thyroid disease and metastatic thyroid carcinoma. Thyroid lobectomy of the gland containing the metastatic tumor is suggested in patients with metastatic carcinoma of the thyroid.

INTRODUCTION

Clinically evident metastases of cancers to the thyroid gland are rarely seen. The rate is around 1.4%-3.0% of all patients who underwent surgery for suspected thyroid cancer [1-4]. Still, the prevalence appears to be up to 24% in autopsy series of patients who died of non-thyroid malignancies [5], suggesting that thyroid metastasis might be more common than is clinically apparent.

The most common colorectal cancer (CRC) metastasis sites are the liver, lung, and peritoneum [6]. CRC metastasis to the thyroid gland is rare, found in only 0.1% of CRC cases [7]. Clinically, only 24 cases of CRC thyroid gland metastases have been reported in the literature [8-26]. CRC with the thyroid gland as the only distant metastatic site is extremely rare. A rare case of solitary thyroid rectal cancer metastasis combined with needle tract implantation after fine needle aspiration (FNA) of the thyroid nodule was reported. This study aimed to summarize the main points of diagnosis and treatment for this rare case, along with a literature review.

CASE PRESENTATION

Chief complaints

A 54-year-old woman presented to our hospital with a left thyroid mass incidentally discovered during a routine health examination.

History of present illness

She has no history of neck irradiation.

History of past illness

One year previously, she had undergone rectectomy and lymph node dissection for moderately differentiated rectal tubular adenocarcinoma (AC). The rectal tumor was 2.5 cm and penetrated the serosa, with lymph node metastasis and without distant metastases. The disease was classified as T3N1M0 (i.e., stage III). The patient did not receive chemotherapy after surgery own to herself reason.

Personal and family history

She has no history of neck irradiation.

Physical examination

No abnormal lymph nodes were detected during the clinical examination. An approximately 1.3×1.0-cm mass was detected in the left thyroid lobe, without abnormal findings on the right side of the neck.

Laboratory examinations

Thyroid function markers, calcitonin, carbohydrate antigen 199, and carcinoembryonic antigen (CEA) levels were normal.

Imaging examinations

Ultrasonography revealed a 1.17×1.25×1.03-cm irregular hypoechoic nodule with a rich peripheral blood supply in the left thyroid lower pole (Figure 1). Ultrasonography did not show enlarged lymph nodes in the bilateral neck.

FNA EXAMINATION

The patient underwent FNA of the hypoechoic nodule in the left thyroid. The procedure was performed under ultrasound guidance, with three sampling passes using a 23-gauge needle. The cytological diagnosis was suspicious for malignancy (Figure 2).

NEEDLE TRACK SEEDING

A 2.5-cm mass was detected by ultrasonography in the neck within the left strap muscles and sternocleidomastoid muscle along the needle track 11 mo after FNA (Figure 5A-B). A CT scan also showed a 2.5-cm mass within the muscles above the internal jugular vein (IJV), with the IJV being depressed (Figure 5C-D). Needle tract implantation was suspected. The mass was excised, and the final histology examination confirmed the diagnosis of metastatic AC. Local recurrence of thyroid metastasis from needle track seeding was confirmed.

FINAL DIAGNOSIS

Histological examination of the resected tissue revealed invasive moderately differentiated AC (Figure 3).Eight lymph nodes from the central compartment were all negative. Immunohistochemistry showed CEA, cytokeratin 20 (CK20), EMA, and Ki67 expression in the thyroid specimen. HBME1, cytokeratin 7 (CK7), thyroglobulin, synaptophysin (Syn), and calcitonin were not expressed (Figure 4). Therefore, the nodule in the left thyroid was considered a metastatic AC from the rectal tubular AC. The patient had no surgical complications. Positron emission tomography (PET)-computed tomography (CT) was performed after thyroid surgery to detect distant

metastasis in other organs, and the results were negative. She received six cycles of single-agent chemotherapy with capecitabine.

TREATMENT

A unilateral lobectomy with central neck dissection on the left side was performed.

OUTCOME AND FOLLOW-UP

A mass in the right lung was detected by a CT scan 5 mo after thyroidectomy. The mass was excised successfully, and the histology examination confirmed the diagnosis of metastatic AC. In the follow-up of 4 years after thyroidectomy, the patient was alive and had no neck recurrence. There were no surgical complications.

DISCUSSION

In the literature review, among the previous 24 cases [8-26], there were 16 females and eight males. The median age was 57.5 (range, 28-82) years. The primary CRC was in the sigmoid in seven patients, rectum in 10, ascending colon in five, descending colon in one, and unspecified in one. All patients had adenocarcinoma. CRC treatment included surgery (n = 23), chemotherapy (n = 9), and chemoradiotherapy (n = 5). The thyroid metastases were bilateral (n = 9) or in the right (n = 4) or left (n = 11) lobe. FNA was performed on 21 patients. The median time from the primary lesion to metastasis was 36 (range, 0-96) months. The finding was incidental in eight patients; the other signs and symptoms included neck mass (n = 11), hoarseness (n = 4), dyspnea (n = 4), dysphagia (n = 3), and dry cough (n = 1). Treatments for thyroid metastases included surgery (n = 17), chemotherapy (n = 15), radiotherapy (n = 3), chemoradiotherapy (n = 1), and bevacizumab (n = 1). The median follow-up was 7 (range, 1-42) months. At the last follow-up, 12 patients were alive with the disease, and eight were dead from the disease.

Metastasis in the thyroid gland is rare in clinical practice because of it is an richly arterialised organ [27]. Next to the adrenal gland, thyroid gland is the most richly

arterialised tissue in the body. Taking the total weights of the liver and thyroid gland to be 1500 and 25 g respectively, the thyroid actually receives approximately one-half the volume of arterial blood received by the entire liver. Yet, while the liver is very frequently the seat of metastases from tumors of diverse kinds distributed in the systemic blood stream, metastatic growths in the thyroid gland are unusual [27]. Such metastases of other primary cancers represent about 1.3%-3% of malignant lesions of the thyroid [5, 28]. In a series of 43 patients with metastatic thyroid tumors, Nakhjvani *et al* [29] reported that CRC cancer metastases were the least frequent. The primary cancers in their series included 14 cases of kidney carcinomas (33%), seven lung carcinomas (16%), seven breast carcinomas (16%), four esophageal carcinomas (9%), three uterine carcinomas (7%), and six of other tumors [29]. CRC metastasis to the thyroid gland is rare, found in only about 0.1% of the patients with CRC, and most cases had concomitant metastases at other sites [7]. Keranmu *et al* [25] reported concomitant lung metastases in 81.0% of patients with CRC thyroid metastases.

The hematogenous spread might be the most important pathway for CRC metastasis to the thyroid [19]. Indeed, in many cases, thyroid metastasis is accompanied by lung and liver metastases [8, 9, 12, 14-21, 23-25]. Furthermore, among 25 cases reported previously and the present case, 72.0% of all patients (18/25) showed concomitant lung metastasis. Therefore, CRC may metastasize to the thyroid *via* the portal vein, vena cava, and pulmonary vein [5, 15, 16, 18, 20, 23]. Still, the case reported here and cases reported by De Ridder *et al*. [13] and Onorati *et al* [22] had isolated thyroid metastasis with no other organs metastasis, which suggests that a circulatory pathway to the thyroid gland bypassing the portal vein, pulmonary vein, and vena cava, through the vertebral venous system, is present [30]. In the case reported here, the thyroid metastasis was the first sign of hematogenous spread 1 year after the primary diagnosis of CRC. In the previously reported 24 cases of metastatic CRC to the thyroid, only two presented thyroid metastases as the first sign of hematogenous spread (Supplemental table 1).

Despite the rare occurrence, the possibility of metastatic carcinoma should be considered in the differential diagnosis for any patient with thyroid nodules and a history of cancer. FNA is recommended and has received great attention in the current literature. The diagnosis of a primary thyroid tumor can often be made by this technique. A thyroid nodule in a patient with a history of cancer is a diagnostic challenge. Such a lesion can be benign, metastatic, or a new primary malignancy of the thyroid gland. In the previously reported 24 cases with metastatic CRC to the thyroid (Supplemental table 1), together with the present case, 21 patients underwent an FNA examination of the thyroid mass. The results of the FNA suggested metastases from CRC in 13 cases and malignancy in seven cases (one case was not diagnostic because of lack of material). These studies showed that CRC metastases to the thyroid could be diagnosed with great accuracy by FNA. Rosen *et al* [31] reported that eight of nine FNA of metastatic thyroid mass were correct for malignancy, for a true positive rate of 90%. In such cases, immunohistochemistry for CK7 and CK20 can be used to differentiate primary thyroid cancers from metastatic CRC. Indeed, thyroid carcinomas are generally positive for CK7 and negative for CK20, while CRCs are generally CK7-negative and CK20-positive. The immunohistochemistry results in the case reported here also showed positive CK20 and negative CK7 expression in the thyroid specimen.

Elevated serum CEA levels can indicate the recurrence of CRC. Therefore, when a patient has a thyroid nodule and a history of CRC, the CEA levels should be checked. In the previously reported 24 cases with metastatic CRC to the thyroid (Supplemental table 1), together with the present case, 11 patients had available CEA data. The serum CEA levels in nine of 11 patients were elevated. In 10 of 25 patients reported previously and the present case, a thyroid mass was detected >5 years after the primary CRC. Therefore, patients with a known history of previous CRC presenting a new thyroid mass should be regarded as potentially metastatic. Such mass should be treated as a metastatic lesion until proven otherwise.

Needle tract implantation can occur after thyroid FNA. Hayashi et al. [32] reported that the cumulative incidence of needle tract implantation was 0.37% and 0.58% at 5 and 10 years after FNA, respectively. Needle track seeding of metastatic CRC after thyroid FNA has not been reported previously. This study reports the first case of CRC metastatic solitary to the thyroid with seeding along the needle tract. Salvage surgery is also adequate for locally controlling needle tract seeding lesions from metastatic CRC. The patient reported here had no recurrence in the neck 3 years after resection of the seeding lesion.

In the case reported here, the NCCN guidelines for metastatic rectal cancer were followed [33]. A thyroid gland metastasis often indicates poor prognosis, and aggressive surgery could help avoid crises such as dyspnea and dysphagia, resulting in better prognosis and quality of life, especially for patients with isolated thyroid metastasis [16, 18, 29]. Nakhjavani et al. [29] reported that in patients with thyroid metastases from malignant disease, the mean survival of all patients who underwent thyroidectomy alone or with adjuvant therapy was 34 mo, compared with 25 mo for patients who were treated non-surgically. Surgical treatment should include a thyroid lobectomy of the gland containing the metastatic tumor. Post-operation radiotherapy is strongly suggested if the tumor has extrathyroidal extension. The patient reported here had no recurrence in the neck and was alive 4 years after the thyroidectomy.

Therefore, based on the literature review and the present case, most patients found the neck mass by themselves, or it was found during a physical examination. Very few patients went to the hospital due to hoarseness or difficulty breathing or swallowing. Ultrasound-guided FNA of the thyroid nodules, combined with a rectal cancer history, CEA, and other indicators, can provide a preliminary indication for a diagnosis. A final diagnosis requires the surgical resection of the thyroid gland and the mass and histopathological examination of the lesion. If the patient can tolerate general anesthesia, surgery to remove one side of the thyroid and the metastatic tumor should be preferred. If a patient cannot tolerate general anesthesia or if the thyroid metastases cannot be surgically removed, chemotherapy, radiation, and targeted drugs can be

considered. If the thyroid metastases can be removed completely, death from thyroid metastases is rare. For example, in the case reported in this study, the thyroid tumor did not recur. If the metastatic thyroid tumor is not completely removed, the patient can die from the pressure of the thyroid tumor on the trachea. As cases of rectal cancer metastasis to the thyroid gland are very rare, the literature review of the 20 cases summarized in this study provides some clinical guidance since there are no specific guidelines for diagnosing and treating CRC thyroid metastasis.

This study is only a single case report, and the recommendations for diagnosis and treatment of CRC thyroid metastases summarized in this study are only empirical summaries that lack the support of stronger evidence-based medical evidence. Future research should summarize more cases of CRC thyroid metastasis, conduct a controlled study on the treatment plan, provide the best treatment plan for thyroid metastasis in CRC, improve the prognosis of patients, and develop relevant guidelines.

CONCLUSION

The present report illustrates two important points that deserve to be emphasized. One, in a patient with a thyroid mass and a history of CRC, metastatic thyroid carcinoma should be considered even if the patient has no evidence of other organ metastasis. Two, an FNA cytological examination of the thyroid mass is suggested to assist in the differential diagnosis between primary thyroid disease and metastatic thyroid carcinoma. If the histological examination confirms the diagnosis of metastatic thyroid carcinoma, the possibility of a needle tract implantation should be kept in mind.

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