Papillary thyroid cancer with para-aortic lymph node metastasis discovered incidentally during work-up of metastatic colon cancer: a case report

Yi Wang

Hangzhou Cancer Hospital <https://orcid.org/0000-0002-2474-9708>

Rongjing Zhou

Hangzhou Cancer Hospital

Shangnao Xie (✉ xieshangnao@126.com)

Case Report

Keywords: Papillary thyroid cancer, Lymph node, Metastasis

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Abstract

Background: Papillary thyroid cancer usually manifests an indolent behavior and infrequently causes rare distant metastases, with the exclusion of lung and bone metastases. Metastasis to the para-aortic lymph node from papillary thyroid cancer is extremely rare.

Case presentation: The present study reports a case of a 71-year-old Chinese female with para-aortic lymph node metastasis from papillary thyroid cancer 12 months following total thyroidectomy, and synchronous intra-abdominal metastasis from colon cancer 18 months following right hemicolectomy. The patient was administered chemotherapy combined with targeted therapy post-operation. She developed lung metastasis and intra-abdominal relapse 6 months after the operation, and died of progressive disease 12 months after presentation.

Conclusion: This study is the first to report a case of para-aortic lymph node metastasis from papillary thyroid cancer. **Keywords:** Papillary thyroid cancer, Lymph node, Metastasis

Background

Papillary thyroid cancer (PTC), the most common type of thyroid cancer, contributes to 80% of all thyroid malignancies¹. Generally, PTC is indolent and usually remains localized to the thyroid gland, with a 10-year survival rate of over 90%². The reported risk factors for poorer prognosis includes distant metastases, certain histological variants, extracapsular extension, larger primary tumor size, older age, and stage of disease, often with a cumulative effect³. Of them, the most significant factor is the presence of distant metastases, with only 50% metastatic patients surviving after 10 years⁴. It is reported that 4–15% of patients with thyroid cancer develop distant metastases⁴, with lung and bone the most common sites⁵. Other uncommon sites of distant metastases involving the brain, liver, breast, kidney, skin and muscle have also been reported anecdotally in the literature. Intra-abdominal lymph nodes are scarcely mentioned as sites of thyroid cancer metastases, and we here present a case of PTC with para-aortic lymph node metastasis discovered incidentally during work-up of metastatic colon cancer.

Case Presentation

A 71-year-old Chinese female with a history of colon cancer, thyroid cancer and hypertension referred to our hospital for a two-month history of recurrent abdominal discomfort in December 2018. She had received treatment for colon cancer (pT4N1M0), right hemicolectomy with D3 lymph node dissection on the right midline of the superior mesenteric artery in June 2017. Pathology revealed ulcerative adenocarcinoma of medium-low differentiation, infiltrating into extra-intestinal adipose tissue, with vessels and nerves invaded and 1 of 12 positive lymph nodes. 4 cycles of Xelox chemotherapy (oxaliplatin and capecitabine) and 4 cycles of oral Capecitabine chemotherapy were administered post-operation during a period of 6 months. In December 2017, she received total thyroidectomy with left-sided cervical lymphadenectomy and central neck dissection. Histologic evaluation of the thyroid tumor

(pT1N1M0) showed a classic variant of papillary thyroid cancer of the left thyroid lobe measuring 2*2 cm and a right mini-papillary thyroid cancer measuring 0.3 cm (Fig. 1). There was no tall cell, columnar, or diffuse sclerosing variant to suggest aggressive tumor biology. There was vascular and capsular invasion, and 3 of 6 lymph nodes contained metastatic papillary thyroid cancer (Fig. 1). The patient refused further ¹³¹I radiotherapy and was given thyroid-stimulating hormone (TSH) suppression therapy.

Thorough examination was performed after admission. Physical examination exhibited an enlarged uterus with obscure boundary and signs of subxiphoid tenderness. A computed tomography (CT) scan of the abdomen revealed a uterus mass invading the right ureter, leading to ureterectasia and pyelectasis (Fig. 2). Ultrasonography of the thyroid bed and cervical node compartments showed no sign of recurrent tumor or locoregional metastases (Fig. 3). Cranial and chest CT, whole-body bone scans did not reveal further pathology. Laboratory test results revealed elevated carcinoembryonic antigen (CEA) 207.76 ng/ml (0.00–5.00), carbohydrate antigen 199 (CA199) 810.23 U/ml (0.00–37.00) and carbohydrate antigen 242(CA242) > 200 IU/ml (0.00–20.00) levels, normal T4, T3, thyroglobulin (TG) 0.129 ng/ml (1.400–78.000) and TSH 0.593 IU/L (< 1.750) levels.

On the patient's symptom, medical history and examination results, the diagnosis of colon cancer metastases was established. Cytoreductive surgery was performed in January 2019 to rescue the right kidney from dysfunction. During the operation, hysterectomy, bilateral salpingo-oophorectomy and omentectomy were performed, with all other visible tumors including para-aortic lymph nodes, masses located on the abdominal wall, pelvic floor, diaphragmatic dome and ligamenta teres hepatis resected. Pathology revealed papillary thyroid cancer metastatic to one of the four para-aortic lymph nodes, with tumor cells that were positive for a panel of thyroid markers, including TG (Fig. 4), the rest three normal and metastatic colon cancer in the remaining resected tissues including uterus and accessories (Fig. 5). The patient recovered well post-operation and was administered 6 cycles of Folfiri chemotherapy (irinotecan, leucovorin and 5-fluorouracil) combined with bevacizumab. She developed lung metastasis and intra-abdominal relapse in July 2019. She was then treated with regorafenib, but died of progressive disease in December 2019.

Discussion

PTC accounts for 80% of all thyroid cancer with a 10-year survival rate of more than 90%, causing over 50% mortality due to thyroid cancer^{1, 6}. The leading cause of thyroid cancer-related death is distant metastatic spread. The incidence of distant metastases from thyroid cancer is reported to be 4–15%, the majority occurring within 5 years of initial diagnosis⁴. Unconventional sites of distant metastases in PTC involving the brain, liver, breast and kidney have been reported in many case series and case reports. Yet, they are prone to being overlooked due to their rarities and uncommon clinical presentations, resulting in delayed diagnosis and management. In our case, the para-aortic lymph node metastasis from PTC was discovered incidentally during work-up of metastatic colon cancer.

Our case is unique in that there was a solely para-aortic lymph node metastasis from thyroid cancer while all other intra-abdominal metastases were from colon cancer. This is in accordance with the fact that colon cancer has a disposition to invade blood vessels and metastasize by hematogenous spread while PTC is more likely to spread through the lymphatics. Till today, it remains elusive the pathophysiology of PTC metastatic to the distant lymph nodes. The proposed mechanisms for tumor dissemination from the cervical nodal basin to the abdominal nodal basin includes retrograde dissemination through the lymphatic channels and hematogenous dissemination. Lymphatic drainage of the lower thyroid follows the inferior thyroid artery, the blood vessel that feed the lower gland. The lymph channels pass through the paratracheal lymph node basin and continue posterior to the carotid sheath, toward the venous angle at the junction of the internal jugular and subclavian veins⁷. Thyroid gland is located at a specific position in lymphatics, i.e. an area free of lymph-nodal filtration⁸. It is found lymphatic drainage of the thyroid can empty directly into jugular veins or lymphatic vessels such as thoracic duct without nodal relay⁹. Thoracic duct is formed by the confluence of one intestinal and two lumbar lymphatic trunks in the abdomen, and it transports up to 1–2 liters of lymph a day towards the venous system¹⁰. Lymphatic drainage of some upper abdominal organs usually converges to the intestinal lymphatic trunk with a relay in para-aortic nodes⁸. However, under certain circumstances this centripetal flow can be changed, such as when lymphatic flow is blocked due to surgical manipulation, radiotherapy or tumor invasion. Then, a retrograde flow from the thoracic duct to the para-aortic nodes is formed. Due to previous left-sided cervical and central neck dissection and D3 lymph node dissection on the right midline of the superior mesenteric artery, the natural route of lymphatic drainage of this patient was disrupted, leading to para-aortic lymph node metastasis from PTC.

Conclusions

PTC ordinarily behaves indolently, but can also have highly variable and unusual clinical features. PTC metastasizing to distant lymph nodes is exceedingly rare. This case adds to the rare reports in the literature of para-aortic lymph node metastasis from PTC. Clinicians should be aware of the possibility of unique metastatic deposits of PTC at unexpected sites during surveillance of these patients.

Abbreviations

PTC: Papillary thyroid cancer; TSH: Thyroid-stimulating hormone; CT: Computed tomography; CEA: Carcinoembryonic antigen; CA199: Carbohydrate antigen 199; CA242: Carbohydrate antigen 242; TG: Thyroglobulin

Declarations

Ethics approval and consent to participate

After ethical review, this study was approved by the Ethics Committee of Hangzhou Cancer Hospital. Written informed consent was obtained from the patient's daughter for publication of this case report and

any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Consent for publication

The patient's daughter has given consent for publication.

Availability of data and materials

All data generated or analyzed during this study are included in this published article.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

WY is the first author of this report and performed the surgery in this case. She also analyzed the data and wrote the manuscript. ZRJ performed imaging, as well as pathological diagnoses. XSN have read and approved the final manuscript.

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Not applicable.

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Figures

Figure 1

Histological illustrations of the case. a H&E staining of the thyroid tissue sections identifying the presence of a focus typical of papillary cancer (×200 magnification). b Representative focus depicting vessel invasion (×100 magnification). c Representative focus depicting capsular invasion (×100 magnification). d H&E staining of the cervical lymph node sections showing features of thyroid cancer metastasis (×200 magnification).

Figure 2

Abdominal CT. a Axial CT image demonstrating an enhancing mass in the pelvis (red arrow), and invasion of the right ureter (yellow arrow). b Axial CT image demonstrating right ureterectasis and hydronephrosis.

Figure 3

Ultrasonography of the thyroid bed and cervical node compartments showing no sign of recurrent tumor or locoregional metastases.

Figure 4

Microscopic examination and immunohistochemical stains of the para-aortic lymph node sections. a b H&E staining of the para-aortic lymph node sections showing features of thyroid cancer metastasis. ×40 magnification (a), ×100 magnification (b). c d TG cytoplasmic stain. ×40 magnification (c), ×100 magnification (d).

Figure 5

Microscopic examination and immunohistochemical stains of the myometrial tissue sections. a b H&E staining of the myometrial tissue sections showing features of colonic adenocarcinoma metastasis. ×40 magnification (a), ×100 magnification (b). c d CEA cytoplasmic stain. ×40 magnification (c), ×100 magnification (d). e f CDX2 nuclear stain. ×40 magnification (e), ×100 magnification (f).

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