

Metastatic papillary thyroid cancer presenting with a recurrent necrotic cystic cervical lymph node

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Summary

We report a case of metastatic papillary thyroid carcinoma presenting with a recurrent right-sided cervical lymph node necrotic cyst. A 55-year-old woman presented with a 3-month history of a right-sided upper neck mass following an upper respiratory tract infection. Past medical history includes a right-sided nephrectomy secondary to a benign renal tumor and hypertension. She was evaluated by Otolaryngology, and fine-needle aspiration was performed. The mass recurred 2 months following aspiration. Ultrasound of the neck showed a 2.2 × 1.4 × 1.9 cm right cervical lymph node with a small fatty hilum but a thickened cortex. Neck computed tomography (CT) scan showed a well-defined 2.3 cm mass in the right upper neck corresponding to a necrotic cervical lymph node at level IIA. It also revealed a 7 mm calcified left thyroid nodule. Cytology revealed a moderate collection of murky fluid with mildly atypical cells presumed to be reactive given the clinical history of infection. The cyst had re-grown 2 months following aspiration. Excisional biopsy was performed and revealed metastatic classic papillary thyroid carcinoma (PTC). Subsequently, a total thyroidectomy and right neck dissection was performed. Pathology confirmed metastatic unifocal classic PTC of the right thyroid lobe and two lymph node metastases out of a total of 17 resected lymph nodes. The patient underwent radioactive iodine ablation. Subsequent I-131 radioiodine whole-body scan showed no evidence of metastases. In conclusion, metastatic PTC should be considered in the differential diagnosis of a recurrent solitary cystic cervical lymph node.

Learning points:

- Metastatic PTC should be considered in the differential diagnosis of a recurrent solitary cystic cervical lymph node.
- A dedicated thyroid ultrasound is the preferred modality for identifying thyroid lesion over computed tomography.
- There is a risk of non-diagnostic cytology following FNA for cystic neck lesions, largely predicted by the cyst content of the nodule.

Background

Cystic neck masses in adults can present a diagnostic challenge as the differential is broad and encompasses both benign and malignant etiologies. In the 1960s, it became evident that papillary thyroid carcinoma (PTC) can, albeit rarely, present as cystic cervical metastasis without obvious thyroid involvement (1). This highlights the importance of considering metastatic thyroid cancer in

the differential diagnosis of recurrent cystic neck masses, even if the thyroid exam is normal and no nodules are detected radiographically (1). In cases when metastases occur, they are generally present at the time of diagnosis of the primary thyroid lesion (2).

PTC is a thyroid follicular epithelial-derived cancer constituting 75–85% of all thyroid cancers (3). It occurs

between 40 and 50 years of age with a female-to-male ratio of 2.5:1 (4). In a report based upon the Surveillance, Epidemiology and End Results (SEER) database from 1975 to 2012, the incidence has increased from 4.8 to 14.9 per 100 000 (4), likely due to increase in detection of micropapillary carcinomas due to widespread use of ultrasound (5). Despite the rising incidence, the mortality has not changed over the last decade (4). The most common presentation is a thyroid nodule; however, rare cases manifesting as a metastatic cystic neck lesion have been reported (3).

We report a case of metastatic PTC presenting as a recurrent necrotic right-sided neck cyst. The rare clinical presentation with an ultrasound-guided FNA cytology results negative for malignancy led to a delay in diagnosis and treatment. The case emphasizes the importance of considering thyroid cancer in the differential diagnosis when evaluating a patient with a recurrent cystic neck mass.

Case presentation

A 55-year-old woman presented with a 3-month history of a sudden-onset right-sided neck lump that was preceded by an upper respiratory tract infection. The mass initially grew quickly and then stabilized over a 2-month period prior to being evaluated by Otolaryngology. It was painless, and she denied dysphagia or dyspnea. She denied hoarseness of voice or any lumps elsewhere. Her past medical history includes a right-sided nephrectomy for a benign renal tumor, hypertension and a prior excision of a left-sided neck epidermal cyst. Medications include telmisartan and amlodipine. She is a lifelong non-smoker with no prior head and neck radiation exposure and no family history of thyroid cancer or familial thyroid cancer syndromes.

Neck examination revealed a visible and palpable 2.5 to 3 cm smooth, mobile and non-tender mass in the right upper neck in the anterior jugular location. The oral cavity, oropharynx, nasopharynx and nasal cavity were normal with no suspicious lesions. There was no other palpable cervical or supraclavicular lymphadenopathy and the thyroid exam was normal in size with no nodules detected.

Investigation

Ultrasound of the neck was performed which revealed a 2.2×1.4×1.9 cm lymph node with a fatty hilum but a thickened cortex in the right anterior neck. There were

no other suspicious lymph nodes. It was initially thought it was a reactive lymph node. Subsequently, a contrast-enhanced CT scan of the neck mass showed a well-defined predominantly hypoattenuating 2.3 cm mass in the right neck just inferior to the posterior belly of the digastric muscle (Fig. 1). There was an associated 'claw sign' involving a level IIA lymph node, with soft tissue density extending from the node along the anterior and superomedial margins of the mass. The findings were reported as most in keeping with a necrotic lymph node. Additionally, a stable 7 mm calcified left thyroid nodule was seen, and there were no detectable nodules in the right lobe.

An FNA of the cystic lymph node was performed, which revealed murky fluid. Cytology was negative for malignancy and showed atypical cells thought to be secondary to infection. Following the aspiration, the mass was nearly nonpalpable on examination. Clinically, it was felt that the most likely diagnosis was a cervical lymph node infection leading to abscess formation, which resolved leaving behind a cystic lymph node. However, the mass recurred 2 weeks after the aspiration although smaller than previously. The lesion was thought to represent a stable benign cystic lymph node and the plan was to monitor.

Two months later, it had increased to the original size. There were no signs of infection and a brachial cleft cyst was the leading diagnosis. For diagnostic and therapeutic

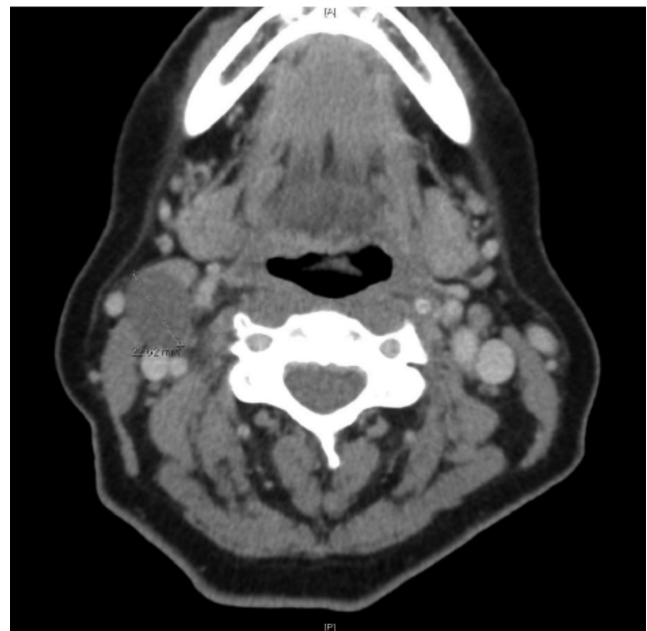


Figure 1
Neck CT showing the necrotic cyst.

purposes, she underwent surgical excision. Fibrofatty tissue with the dimensions 3.5×2×1 cm was excised. Unexpectedly, the pathology revealed metastatic classic PTC (Fig. 2). The cystic tumor was as a result of tumor necrosis and the cyst was lined with papillary carcinoma and associated psammoma bodies.

A contrast-enhanced CT neck was performed to assess for other suspicious lymph nodes and showed a heterogeneously enhancing right level II lymph node measuring 1.2 cm adjacent to the previously resected node that was highly suspicious, but not diagnostic for metastasis. The patient underwent a total thyroidectomy and right central neck dissection. On gross inspection in the operating room, the thyroid appeared normal and no nodules were seen.

On pathologic examination there was a single, firm nodule measuring 1.5×0.9×0.8 cm located in the right superior lobe abutting the thyroid capsule. The pathology showed unifocal classic PTC (Fig. 3). Seventeen lymph nodes were resected and two were positive for metastases; one in the right sub-hypoglossal and the other at level IV.

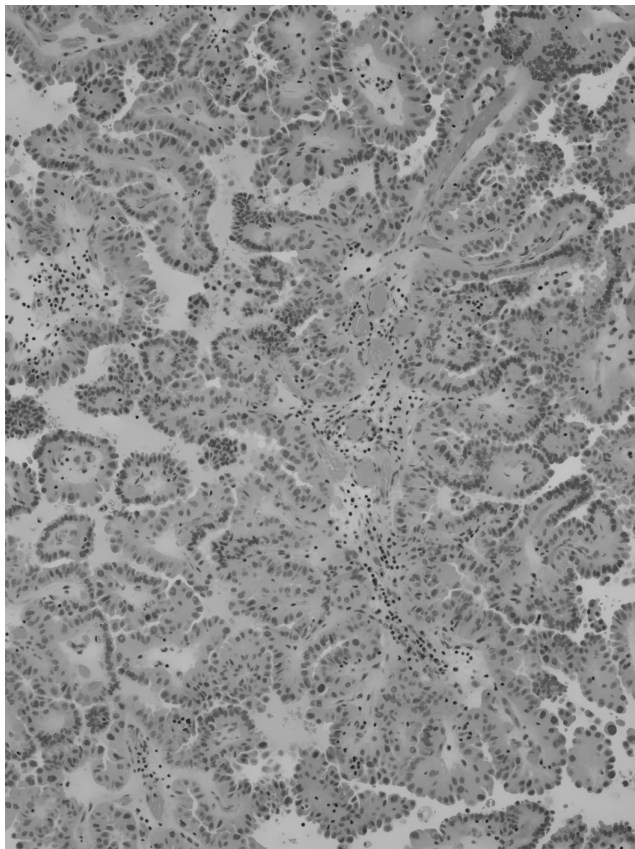


Figure 2
Neck cyst biopsy stained with hematoxylin phloxine saffron at 100× magnification revealing metastatic papillary carcinoma.

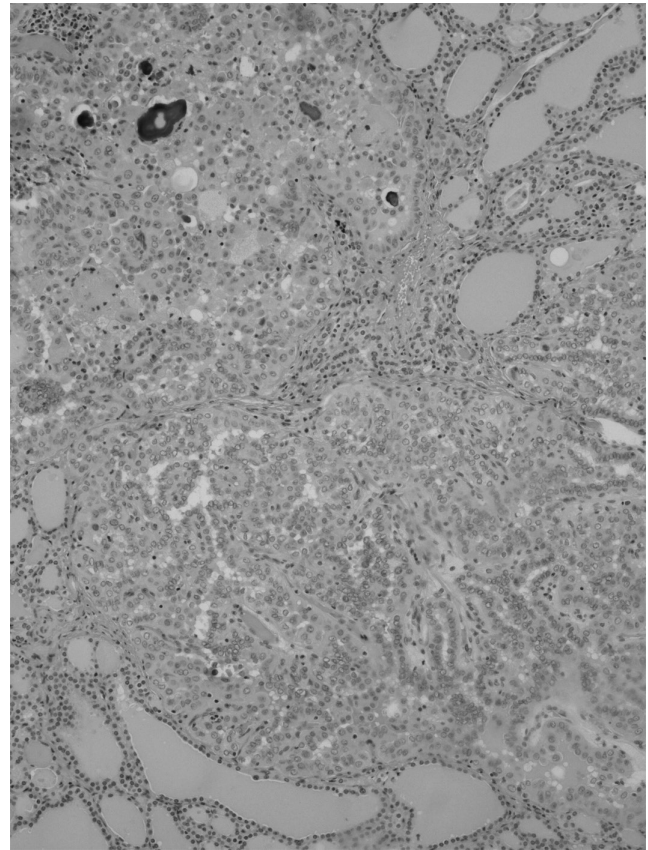


Figure 3
Total thyroidectomy stained with hematoxylin phloxine saffron at 100× magnification confirming metastatic papillary carcinoma.

There was focal extrathyroidal extension. Her thyroid cancer clinical stage was pT3 pN1 MX.

Treatment

Given the high risk for recurrence, she was evaluated by endocrinology for radioactive iodine (I-131) remnant ablation. She received 5630 MBq (150 mCi) of radioactive iodine therapy following thyrogen stimulation. Five days later, a whole-body radioiodine scan showed no evidence of local or distant metastatic disease.

Outcome and follow-up

It has been 6 months since the radioactive iodine therapy and the patient remain well with clinical and biochemical remission. She is currently on levothyroxine with a target TSH of 0.1–0.5 mIU/L given metastatic PTC. Her thyroglobulin and anti-thyroglobulin antibodies remain undetectable. She continues to be followed by endocrinology with yearly thyroid bed and cervical



lymph node ultrasound as well as thyroglobulin and anti-thyroglobulin antibodies to monitor for recurrence.

Discussion

Lateral cervical cysts are usually benign lesions occurring predominantly in young people (6). Malignant lateral cervical cysts are less frequent and can be caused by primary brachyogenic carcinoma or metastatic tumors arising mainly from the oro-nasopharyngeal area, the salivary glands and the thyroid gland (6). When the nodal metastases are solitary and cystic, with no obvious suspicious thyroid nodule/s on ultrasound, it may be misdiagnosed as branchial cleft cyst (7). As emphasized by this patient's case, this can lead to diagnostic and therapeutic delays.

PTC has a tendency toward cystic transformation (6). This can occur both in the primary tumor and in the metastatic lymph nodes, in which a subcortical liquefaction necrosis results in a cystic cervical mass (6). Ultrasound is the preferred imaging modality for the thyroid; the patient's initial neck ultrasound was directed toward the right neck lump and did not include the thyroid gland, as her thyroid clinical exam was normal with no enlargement or nodules palpable. The 7 mm calcified left thyroid nodule that was seen on CT was benign on pathologic examination. The primary thyroid cancer that was found pathologically was not visualized by the CT scan, further highlighting the importance of a dedicated thyroid ultrasound and the limitation of neck CT scans to characterize thyroid nodules. Previous studies have evaluated predictive factors for detecting malignancy in central and lateral cervical lymph nodes in PTC. It has been found that in the lateral compartment, hypoechogenicity with loss of hilum, microcalcifications, cystic parts and an index value ≥ 0.51 are suspicious ultrasonographic features and indicates a lymph node biopsy to rule out malignancy (8).

Ultrasound-guided FNA biopsy is the initial diagnostic test for cystic neck masses. There is a risk of non-diagnostic cytology following FNA for cystic neck lesions, largely predicted by the cyst content of the nodule (9). In our patient, the initial cytology did not reveal malignant cells but showed mildly atypical cells that were presumed to be reactive in nature given the clinical history of preceding infection. Previous studies have shown that FNA of cystic lesions detect metastatic disease in 22% of the cases when nodal disease is present (10). If metastatic thyroid cancer is suspected and the cytology of the cystic lymph node is negative, consideration for thyroglobulin washout

when performing US-guided FNA should be considered and high thyroglobulin indicates a high probability of metastatic PTC (10).

Treatment for high-risk metastatic PTC is total thyroidectomy with cervical lymph node dissection to reduce the risk of recurrence and metastases but also to facilitate postoperative treatment with radioactive iodine ablation, and long-term surveillance with thyroglobulin and anti-thyroglobulin levels (2). RAI adjuvant therapy is routinely recommended after total thyroidectomy for high-risk differentiated thyroid cancer and our patient received 5630 MBq (150 mCi) of radioactive iodine (2). Dose selection for this patient was based on the risk factor of cervical lymph node metastasis. For lymph node metastasis 150 mCi is the standard dose in the literature and based on the society of nuclear medicine and molecular imaging (SNMMI) therapy guidelines (2, 11). Presence of lymph node metastasis changes the therapy goal from simply remnant ablation to adjuvant therapy for potential microscopic disease with the goal of lowering the risk of thyroid cancer recurrence.

Conclusion

Metastatic PTC presenting as a recurrent solitary cystic cervical lymph node is not common. PTC should be considered in the differential diagnosis of a cystic neck mass even in the absence of any clinical or radiographic thyroid pathology. A high degree of clinical suspicion is required and a negative FNA cytology may need to be followed by an excisional biopsy to rule out malignancy.

Declaration of interest

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

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Patient consent

Written informed consent has been obtained from the patient for publication of this article and accompanying images.

Author contribution statement

Dr Alexa Clark is the primary author of the case report is the Internal medicine resident working with Dr Sara Awad who is the patient's endocrinologist. Dr Marosh Manduch is the pathologist who interpreted the patient's thyroidectomy pathology. He provided the pathology image,



the pathology description and reviewed the manuscript. Dr Russell Hollins is the otolaryngologist who removed the patient's thyroid. He has also reviewed the manuscript. Dr Sara Awad is the patient's endocrinologist. She reviewed and edited the manuscript.

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