

Occult Papillary Thyroid Carcinoma Presenting as Cystic Lateral Neck Swelling. Case Series and Review of Literature

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Background: Up to 85% of thyroid carcinoma cases are papillary thyroid cancers. It may be the only or initial symptom of the disease, undergoing cystic transformation and manifesting as lateral neck metastases or regional lymph nodes from an unknown primary source.

Patients and methods: Between January 2020 and May 2023, five individuals exhibiting a lateral cervical swelling in conjunction with a clinically unremarkable thyroid gland were managed within the surgical oncology division of the general surgery department at Tanta University Hospital, Egypt. A mass was found in the supraclavicular area in two patients, the mid-anterior border of the right sternomastoid muscle region in one case, and the submandibular region in two cases. In all cases, there were no detectable thyroid gland masses. The clinical examination revealed no enlargement of the thyroid gland. The patients underwent indirect laryngoscopy, free T3, free T4, fine needle aspiration cytology (FNAC), neck ultrasonography, and CT scan.

Results: Sub-centimetric nodules were found in two cases with non-suspicious cervical lymph nodes, while the neck ultrasonography and CT scan revealed cystic swelling and a normal thyroid gland in three cases. In two cases, the FNAC revealed benign cells consistent with a branchial cyst; in one case, it revealed a parotid tail tumor; in the final two cases, it revealed malignant cells. The indirect laryngoscope, TSH, free T3, and free T4 were all normal. In every case, the histology revealed occult metastatic papillary thyroid cancer that had spread to a cystic lymph nodal tissue. The patients had radioactive iodine therapy after a modified cervical lymph node dissection in addition to a total thyroidectomy.

Conclusion: while addressing a cystic lesion in the neck, surgeons should take into account the potential for nodal metastases from hidden malignancies, this condition may be attributed to pathologies such as papillary thyroid carcinoma.

Key words: Hidden metastatic disease, Cystic enlargement, Papillary carcinoma, Thyroid gland.

Introduction

Papillary thyroid carcinomas constitute approximately 85–90% of all thyroid malignancies. The metastasis of thyroid papillary carcinoma predominantly occurs in the cervical lymph nodes. Cervical ultrasonography and ultrasound-guided fine-needle aspiration biopsy are regarded as the most sensitive techniques for the detection of loco-regional recurrence in the neck. The early identification of metastatic disease is of substantial clinical significance, as it facilitates more effective surgical and radiotherapeutic interventions. Ultrasonography stands as the preferred imaging modality for the identification and characterization of cervical lymphadenopathy in patients diagnosed with thyroid carcinoma. Furthermore, it offers the capability to conduct ultrasound-guided fine-needle aspiration biopsy, which yields critical information regarding the pathological nature of the disease.¹ Malignant lymph nodes are characterized by a heterogeneous architecture, often exhibiting hypoechoic properties along with a diminished hilum, and may occasionally display cystic degeneration or calcifications.² Nodal metastases originating from papillary carcinomas can manifest as either solid or cystic lesions. Approximately 40% of lymph node metastases arising from papillary thyroid

carcinomas demonstrate a propensity for complete cystic degeneration of the lymph node.³ While solid metastatic lesions do not typically pose diagnostic challenges, cystic lymph node metastases may be erroneously classified as benign cervical cystic masses.^{3,4}

Occult thyroid carcinoma (OTC) presents with varying manifestations yet shares similarities with papillary thyroid microcarcinoma (PTMC).⁵ Boucek et al. categorized OTC into four distinct groups.⁶ The initial group comprises cases that are incidentally discovered within the thyroid gland post-total thyroidectomy (TT) performed for benign conditions,⁷ or identified during autopsy.⁸ The second group encompasses incidentally detected PTMC, predominantly identified via ultrasonography,⁹ or through fine needle aspiration biopsy (FNAB).¹⁰ The third group consists of cases with clinically evident metastases of thyroid carcinoma, where the primary tumor remains undetectable prior to surgical intervention but is subsequently identified in the final histopathological analysis.^{11–13} The fourth group includes patients presenting with ectopic thyroid tissue who exhibit clinical symptoms or demonstrable metastases.^{14,15} The primary distinctions among the four groups of OTC lie in their initial presentation

and the ultimate identification of the primary tumor mass.

Patients and methods

Patients showed up as a painless lateral neck cyst and had PTC. Between January 2020 and May 2023, they have been managed at the General Surgery Department, Tanta University Hospital, Egypt, Surgical Oncology Unit. The cases have been reviewed in retrospect. We studied their clinical characteristics, diagnosis, and treatment. FNAC or an excisional biopsy of the cyst have validated the diagnosis of PTC manifesting as a neck cyst. Following the removal of the cyst or thyroidectomy, formalin-fixed paraffin-embedded microscope slides underwent haematoxylin and eosin (H&E) staining for histological analysis. The five patients' clinical results were gathered from their files, surgical notes, and pathology reports. All of the study's patients have given their written approval to be published. Human Research Ethics Committee approval has been obtained for this study.

Results

Presentation

The study included five patients; two of them were females and the other three males. The patients' median age was 47 (33-63) years, and they all had a painless, ovoid, slowly growing, cystic and mobile lateral neck mass that had been present for 12 (3-24) months. None of the patients had a family history of thyroid cancer, and the cyst's diameter ranged from 3 to 7 cm. Two of the patients had the mass located in the supraclavicular area, two of the patients had it in the submandibular region, and one of the patients had it in the mid-anterior border of the right sternomastoid muscle region. In all cases, there were no detectable thyroid gland masses.

Investigations

For every patient, a neck ultrasound scan was done.

There were no microcalcifications in any of the cysts' regions of varied echogenicity. All patients had many enlarged cervical lymph nodes with preserved hilum, and two of them had enhanced vascularity. Two patients had sub-centimetric thyroid nodules. In two cases, CT was performed, however the results did not supplement the ultrasound findings. In two cases, the diagnosis of thyroid carcinoma metastasis was established prior to surgery using fine-needle aspiration cytology of the nodes. In the remaining three cases, on the other hand, the diagnosis was made intraoperatively by frozen section following microscopic examination of the resected cyst in two cases, and after excision of the cyst and subsequent paraffin block histopathologic examination in the remaining case. Cytological examination in the other three cases, however, did not reveal any malignant cells in the aspirate.

Operative treatment

Every patient had a neck dissection along with a total thyroidectomy. Following surgery, all patients had radioisotope scanning, radioactive iodine ablation, and levothyroxine replacement and suppressive medication.

In every case where surgery was performed, histopathologic examination of the removed material demonstrated PTC with cervical lymph node involvement. It revealed two micro-carcinomas, measuring 5 mm and 10 mm in diameter, in the isthmus of two of the patients; two micro-carcinomas, measuring 4 and 9 mm in diameter, in the other two cases; and in the final patient, a multicentric papillary micro carcinoma with nodules measuring 5 mm and 4 mm in the upper and lower poles of the right thyroid lobe. There were one to five metastatic nodes in total.

Follow up

After a follow-up period from one to four years, all patients are still alive with no clinical or radiological signs of local recurrence or distant metastasis.



Figs 1,2: Male patients presented with a cystic mass located in the cervical region.

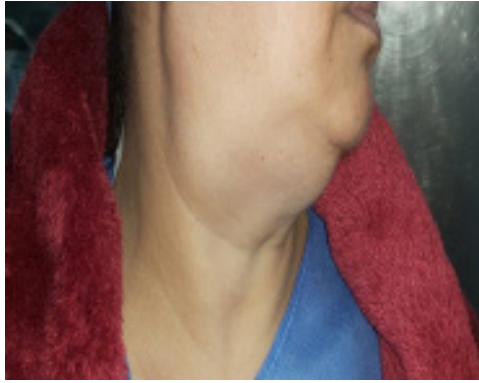
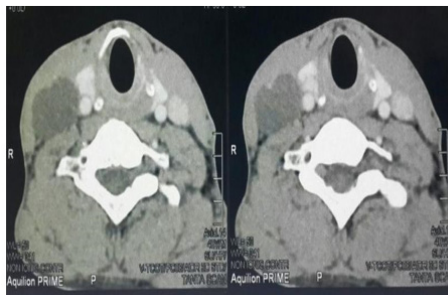
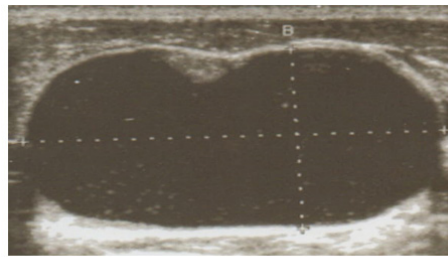


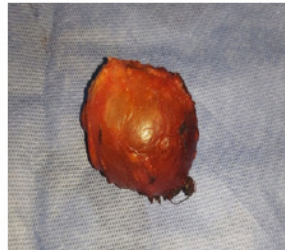
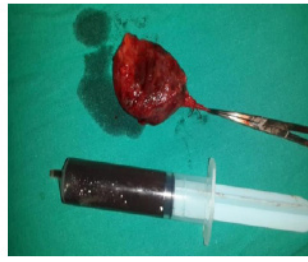
Fig 3: Female patient presented with a cystic mass located in the cervical region.



Figs 4,5: Ultrasonography and computed tomography of the neck demonstrated a cystic mass measuring 3 × 5 cm.



Figs 6-10: intraoperative images depicting the cystic mass situated laterally in the neck, adjacent to the carotid sheath.



Figs 11-14: Resected cystic specimens with aspirated fluid.

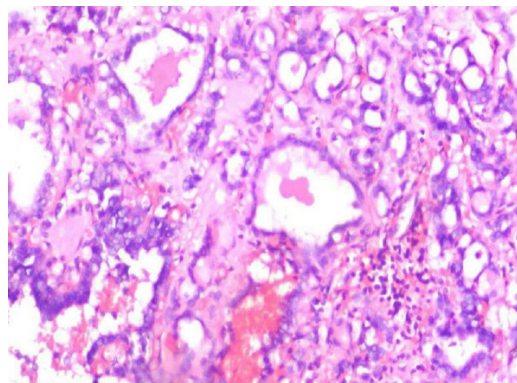


Fig 15: Histopathological examination of the excised cystic lesion revealed nodal tissue encasing papillae and follicles characterized by pleomorphic cells exhibiting nuclear overlap, cytoplasmic clearing, and nuclear grooving (H & E, X 100).

Table 1: Patient characteristics and clinical presentation

Patient number	age	Sex	Duration of complaint	Co-morbidities	Location of the cyst
1	47	female	6 months	None	Submandibular
2	35	Male	12 months	Hypertensive	Submandibular
3	33	Female	8 months	Diabetic	Mid-Anterior border of sternomastoid
5	52	male	18 months	None	Supraclavicular
5	63	male	24 months	Hypertensive and diabetic	supraclavicular

Table 2: Diagnostic modalities and data collected

Patient number	Imaging modality	Cyst size by imaging	Presence of thyroid nodules by imaging	FNAC from cyst
1	USS and CT neck	4x4 cm	-ve	(-ve)- Cells consistent with branchial cyst
2	USS and CT neck	3x5 cm	+ ve	(-ve)-Cells consistent with parotid tail swelling
3	USS neck	3x3 cm	-ve	(-ve)- Cells consistent with branchial cyst
4	USS neck	4x5 cm	-ve	+ ve for papillary thyroid cancer
5	USS neck	6x7 cm	+ ve	+ ve for papillary thyroid cancer

Table 3: Surgical treatment and histopathologic results

Patient number	Surgical procedure	Thyroid status	Lymph node status
1	Total thyroidectomy and modified neck dissection	4 mm papillary micro carcinoma	2\ 9
2	Total thyroidectomy and modified neck dissection	9 mm papillary micro carcinoma	3\ 12
3	Total thyroidectomy and modified neck dissection	10 mm papillary micro carcinoma	5\ 20
4	Total thyroidectomy and modified neck dissection	5 mm papillary micro carcinoma	1\ 8
5	Total thyroidectomy and modified neck dissection	4 and 5 mm papillary micro carcinoma	5\ 15

Discussion

Thyroid cancer accounts for less than 1% of all malignant tumors, it's the most prevalent endocrine-related disease despite its rarity in comparison to other malignancies.^{16,17} Ninety percent of thyroid tumors are differentiated thyroid cancers (DTC), which include both PTC and follicular thyroid carcinoma (FTC).¹⁸ In 36–40% of PTC patients, who often appear with a thyroid nodule and firm cervical lymphadenopathy, local lymphatic spread is prevalent. On the other hand, PTC might manifest clinically as a single neck cyst without any thyroid lesions.¹⁹

Branchial cleft cysts, dermoid cysts, teratomas, epidermoid cysts, and cystic hygromas are the most prevalent benign lateral cervical cysts. Cystic masses of the neck could potentially be metastases from an oropharyngeal or tonsillar tumor due to the rising prevalence of oropharyngeal cancer.^{20,21} PTC seldom manifests in the form of a lateral cystic neck mass, in the absence of a palpable thyroid gland lesion.²² It's debatable where these cysts originate. According to multiple authors, it is a malignant alteration of thyroid tissue that is ectopic. There exists a hypothesis that this condition may represent a secondary metastatic dissemination from an undetected thyroid lesion to the lymph node, which subsequently underwent central liquefaction leading to cystic development.^{23,26} Since papillary thyroid cancer grows slowly, the neck masses in our patients have been present for a comparatively long time between six and twenty-four months. Mistaken or delayed diagnosis might result from the extended duration of these cysts, a negative family history, and the lack of malignant characteristics. Clinical examination of the thyroid gland revealed no masses in any of our patients. Furthermore, no case mentioned a family history of thyroid cancer. An ultrasound scan revealed irregularly thick walls in cystic lesions. Typically, based on ultrasound, it is challenging to distinguish between branchial cysts and the cystic metastases of PTC.²⁷ An ultrasound and CT scan revealed a thyroid lesion in two of our patients. Cervical lymphadenopathy and irregularly shaped thick wall cystic masses are commonly observed on computed tomography (CT) scans. For a number of weeks, intravenous iodine-containing contrast media used during a CT scan

may prevent the thyroid from absorbing radioactive iodine. However, taking into account the duration of using radioactive iodine later on, this impact is temporary and unlikely to be considerable.^{28,29} Magnetic resonance imaging (MRI) and CT scan are superior modalities once the tumor has penetrated through the thyroid capsule, but ultrasound scan is still the best method for identifying tumors within the thyroid.

When it comes to diagnosing cystic neck masses, FNAC is less sensitive compared with solid masses, with a false negative rate that can range from 50% to 67%.³⁰ Only two of our patients got positive FNAC results for PTC; the other three patients had negative results (False negative rate of 60%). In their case study, Schwaiger et al. (2019) noted that even while imaging suggested a fairly clear diagnosis, a histologic examination of the removed mass ultimately revealed cystic metastases from occult papillary thyroid carcinoma, which is the correct diagnosis.³¹ Cystic metastatic PTC should be suspected if the cystic fluid lacks the opaque yellow colour that is typical of a branchial cyst.³² Thyroglobulin is the reason why aspirates for PTC cystic metastases frequently have a reddish-brown colour, as seen in figure 5. The aspirate assay with thyroglobulin immunohistochemical labelling will improve the FNAC's diagnostic precision for PTC.³³ In individuals with negative FNAC, excisional biopsy is necessary to identify papillary thyroid cancer.³⁴ And this is exactly what happened in our first case, when the patient underwent a complete thyroidectomy and neck dissection one week after the cyst was removed and sent for histology, which revealed a pathologic surprise. According to Subha et al. (2018), patients who present with a single cystic neck lesion require high-index clinical suspicion. While 18F-FDG-PET is not a first-line imaging modality, it can be very helpful in evaluating patients with a cystic neck lesion when routine investigations, such as FNAC and ultrasonography, have been performed but the diagnosis is still unclear.³⁵

Frozen section examination of the specimen may be helpful to proceed with a total thyroidectomy with modified radical neck dissection in the same context as we did in the two subsequent patients if there is clinical or radiological suspicion of malignancy. All of our patients had lymph node dissection along

with a total thyroidectomy and cyst excision. All thyroidectomy specimens from individuals who had multiple lymph node metastases contained PTC. The idea that these cysts are metastatic in nature is supported by this finding. Vargas et al. (2017), however, reported that histological results in his case showed sixteen lymph nodes in the right neck without evidence of metastases and a normal thyroid gland without evidence of papillary thyroid cancer.³⁶

Postoperative radioisotope scanning was performed on all patients in order to look for any residual activity. Thyroid hormone replacement treatment and radioactive iodine ablation were administered to all patients.

Conclusion

Cervical cystic masses are mostly caused by branchial cysts; nevertheless, as a differential diagnosis, malignant disorders such as occult papillary thyroid cancer need to be considered. Thyroid cancer in an ectopic tissue can exist even in a healthy thyroid gland. When treating adult neck cysts, a high index of suspicion should be maintained even if there is no history of the condition or risk factor for cancer or if the cyst is benign and has a lengthy course. In order to avoid misdiagnosis or delayed diagnosis, FNA should also be carried out in all patients with cervical masses and should be combined with USS, CT, MRI, and even PET-CT if necessary. When FNAC and radiological data are unclear, excision biopsy and frozen section are crucial to an accurate diagnosis. Improved prognosis and care are made possible by early diagnosis and accurate surgical planning.

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