RESEARCH PAPER

Cystic Lateral Cervical Lymphadenopathy As The Initial Presentation Of Occult Papillary Thyroid Carcinoma: A Case Series Highlighting A Diagnostic Pitfall

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Abstract

Background: Cystic lateral neck masses in adults are commonly attributed to benign entities. Metastatic cystic lymphadenopathy from an occult papillary thyroid carcinoma (PTC) represents a significant diagnostic challenge, often leading to delayed diagnosis and management.

Case Description: This series describes two adult patients presenting with unilateral, progressive cystic lateral neck masses. In both instances, initial ultrasonography and cross-sectional imaging favored benign diagnoses such as branchial cleft cysts or suppurative lymphadenopathy. Definitive histopathological examination of the excised lesions revealed metastatic PTC. Subsequent thyroidectomy identified multifocal, sub-centimeter primary tumors in the thyroid gland (pT1a), confirming the cervical cysts as metastatic nodal disease.

Conclusions: These cases underscore that cystic lateral cervical lymphadenopathy can be the initial manifestation of clinically occult PTC. They highlight critical limitations of imaging and cytology alone and emphasize the necessity of including metastatic thyroid malignancy in the differential diagnosis of adult cystic neck masses to prevent diagnostic delay.

Keywords: Papillary Thyroid Carcinoma; Cystic Lymph Node Metastasis; Occult Primary; Diagnostic Imaging; Histopathology

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Introduction

Papillary thyroid carcinoma (PTC) is the most prevalent endocrine malignancy worldwide and accounts for the majority of differentiated thyroid cancers. It is characterized by an indolent clinical course, favorable prognosis, and a well-documented propensity for early lymphatic spread, particularly to the central and lateral cervical lymph node compartments (1). Cervical nodal metastases are identified in a substantial proportion of patients at presentation and may even precede detection of the primary thyroid lesion. Despite this frequent nodal involvement, the radiologic and clinical appearance of metastatic lymph nodes is variable, which may complicate early diagnosis.

Classically, metastatic lymph nodes from PTC are solid and demonstrate characteristic imaging features such as microcalcifications, hyperechogenicity, loss of fatty hilum, and abnormal vascularity. However, cystic degeneration of metastatic nodes is a recognized phenomenon, occurring more commonly in the lateral cervical chain, particularly at levels II and III (2). These cystic metastases may arise due to tumor necrosis,

intranodal hemorrhage, or degeneration of papillary structures, and can closely resemble benign cystic neck lesions on imaging.

The diagnostic challenge arises because cystic lateral neck masses in adults are frequently attributed to benign or infective etiologies, including branchial cleft cysts, tuberculous lymphadenitis, suppurative lymphadenopathy, or lymphatic malformations (3). In routine clinical practice, such lesions are often managed conservatively or excised without adequate suspicion for malignancy, especially in younger patients or in the absence of overt thyroid abnormalities. Fine-needle aspiration cytology (FNAC) from cystic nodes may further complicate diagnosis, as aspirates often yield cyst macrophages and acellular fluid, leading to false-negative or non-diagnostic results.

This diagnostic pitfall is particularly pronounced when the primary thyroid tumor is small, non-palpable, or exhibits benign-appearing imaging features, a scenario commonly referred to as "occult" papillary thyroid carcinoma. Thyroid microcarcinomas, especially follicular variants, may remain clinically silent while producing significant nodal disease, thereby misleading both clinicians and radiologists. Failure to recognize this presentation may result in delayed diagnosis, incomplete initial surgery, and the need for re-operation, adversely impacting patient management.

In this context, radiologic–pathologic correlation plays a crucial role in identifying malignant cystic lymphadenopathy. Awareness of imaging red flags such as thickened cyst walls, internal septations, mural nodules, or necrotic lymph nodes with atypical distribution is essential.

We present two illustrative cases in which cystic lateral cervical lymphadenopathy was the sole initial manifestation of occult papillary thyroid carcinoma, leading to initial misdiagnosis. Through these cases, we aim to highlight this important diagnostic trap and reinforce the need for a high index of suspicion when evaluating cystic neck masses in adult patients.

Case Presentation

Case 1

A 27-year-old woman presented with a one-month history of a painful, progressively enlarging swelling in the right side of the neck, accompanied by dysphagia. There was no history of fever, weight loss, prior head and neck infection, radiation exposure, or thyroid disease. On clinical examination, a tender, well-defined mass was palpated in the right submandibular region, without overlying skin changes. Thyroid examination was unremarkable, and no additional cervical lymphadenopathy was detected.

Ultrasonography (USG) of the neck revealed a well-defined cystic lesion measuring 4.4 × 2.2 cm with internal septations in the right submandibular region. The thyroid gland demonstrated multiple sub-centimeter nodules categorized as TIRADS II, suggestive of benign pathology. Contrast-enhanced computed tomography (CECT) and magnetic resonance imaging (MRI) of the neck further characterized the lesion as a multiloculated cystic mass without a definite enhancing solid component (Figures 1 and 2). Based on these imaging features and the patient's age, benign etiologies such as an infected branchial cleft cyst or lymphatic malformation were favored.

The patient underwent surgical excision of the cystic neck mass. The lining epithelial cells demonstrated classical nuclear features of papillary thyroid carcinoma, including nuclear enlargement, chromatin clearing, overlapping, and nuclear grooves (Figure 3). Histopathological examination revealed effacement of normal lymph node architecture by a cystic tumor composed of papillary fronds (Figure 4). Histopathology of the thyroid gland revealed multifocal infiltrative follicular variant papillary thyroid carcinoma, with the largest focus measuring 0.9 cm (Figure 5).

Immunohistochemical analysis showed strong positivity for thyroid transcription factor-1 (TTF-1) and paired box gene 8 (PAX8), confirming metastatic papillary thyroid carcinoma (Figure 6). Following this unexpected diagnosis, the patient underwent total thyroidectomy with cervical lymph node dissection. Metastatic involvement of cervical lymph nodes was also identified. Based on these findings, the final pathological stage was assigned as pT1a N1 Mx.

Case 2

A 43-year-old man presented with a two-month history of a painless, gradually enlarging swelling on the left side of the neck. There were no associated symptoms such as dysphagia, hoarseness, fever, or weight loss. Physical examination revealed multiple firm, non-tender lymph nodes in the left upper cervical region. Thyroid palpation was normal.

Neck ultrasonography demonstrated multiple enlarged lymph nodes in the left level II and III regions, displaying central necrosis and loss of the normal fatty hilum (Figure 7). A small 3.4-mm colloid nodule was identified in the left thyroid lobe, without suspicious

sonographic features. FNAC performed on one of the cervical lymph nodes yielded abundant cyst macrophages without malignant cells, leading to an initial impression of a benign or infective process.

CECT of the neck confirmed the presence of necrotic cervical lymphadenopathy (Figure 8). Despite the benign cytology, the imaging pattern and persistence of lymphadenopathy raised concern for an underlying metastatic etiology. Given the diagnostic uncertainty and lessons from the first case, the patient was referred for surgical evaluation. Subsequent histopathological examination following excision confirmed metastatic papillary thyroid carcinoma arising from an occult primary lesion in the thyroid gland.

Discussion

These companion cases exemplify a classic diagnostic dilemma in head and neck oncology. Cystic nodal metastasis can be the inaugural sign of PTC, often from a subclinical sub-centimeter primary tumor (4). The imaging features—well-defined cystic morphology, thin septations, absence of a clear mural nodule—are notoriously misleading and overlap significantly with benign congenital or inflammatory cysts (2,3). As seen in Case 2, even FNAC can be non-diagnostic, often yielding only macrophages or nonspecific debris, failing to sample the malignant epithelial cells (5).

A critical learning point from Case 1 is the histologic discrepancy between the primary tumor (infiltrative follicular variant) and its metastasis (classic papillary architecture). This underscores that the follicular variant, particularly the infiltrative subtype, possesses metastatic potential equivalent to conventional PTC (6). Therefore, the presence of a "follicular-patterned" tumor in the thyroid does not preclude aggressive nodal behavior.

The 2015 American Thyroid Association guidelines emphasize USG evaluation of cervical lymph nodes in all thyroid cancer patients (7). However, these cases highlight the reverse scenario: a suspicious cystic neck node should prompt a meticulous thyroid examination and consideration of metastatic PTC, even with an apparently normal thyroid USG. Key sonographic features that should raise suspicion for a metastatic cystic node include internal calcifications (even specks), residual eccentric solid tissue, and abnormal peripheral vascularity (8).

The primary limitation in such presentations is reliance on imaging morphology alone. A multidisciplinary approach integrating clinical suspicion, detailed USG, and judicious use of FNAC with thyroglobulin washout measurement can improve pre-operative diagnosis (9). When uncertainty remains, diagnostic excision with frozen section may be necessary.

Conclusions

Cystic lateral cervical lymphadenopathy in adults warrants a systematic evaluation to exclude metastatic PTC from an occult primary. These cases demonstrate that benign imaging characteristics and non-diagnostic cytology do not reliably rule out malignancy. Clinicians and radiologists must maintain a high index of suspicion to avoid delayed diagnosis, ensuring appropriate surgical management including thyroidectomy and compartment-oriented neck dissection.

Key Findings and Potential Impacts

- **Diagnostic Pitfall:** Cystic lateral neck masses, often presumed benign, can be the initial presentation of metastatic occult PTC.
- **Limitation of Modalities:** Standard imaging (USG, CT, MRI) and FNAC can be misleading, failing to identify the underlying malignancy.
- **Clinical Impact:** Awareness of this entity is crucial to prevent diagnostic delay, guiding appropriate investigation (e.g., thyroglobulin washout) and definitive surgical management (total thyroidectomy with therapeutic neck dissection).
- **Pathological Insight:** Metastatic nodes may show classic papillary architecture even when the primary thyroid tumor is a follicular variant.

Ethical Statement

Written informed consent was obtained from both patients for the publication of their case details and accompanying images. The report was prepared in accordance with institutional ethical guidelines.

Conflicts of Interest

The authors declare no conflicts of interest

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Figure Legends

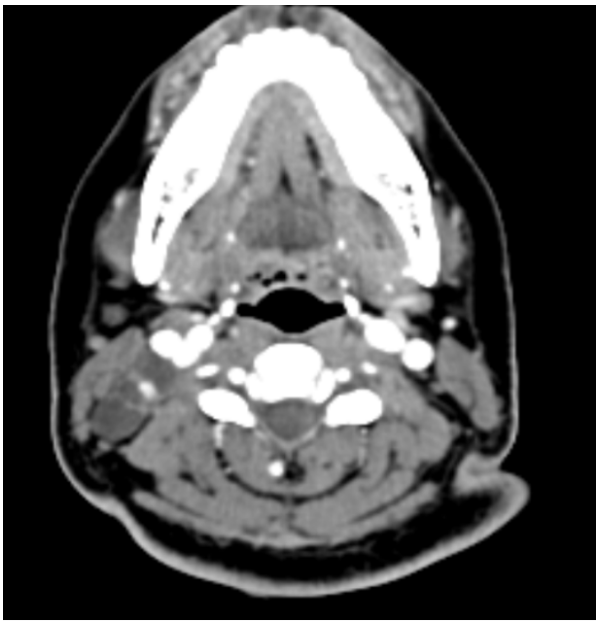

Figure 1: (Case 1) Axial contrast-enhanced CT image showing a well-defined, multiloculated cystic lesion (arrow) in the right lateral cervical region.

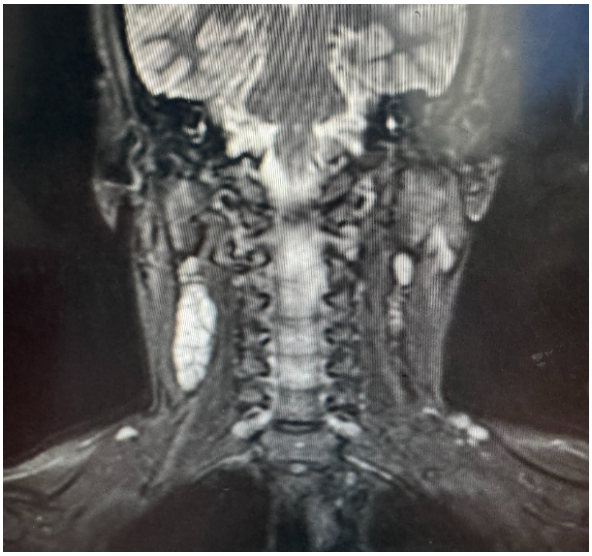

Figure 2: (Case 1) Coronal T2-weighted MRI demonstrating a hyperintense, septated cystic lesion (arrow) in the right neck.

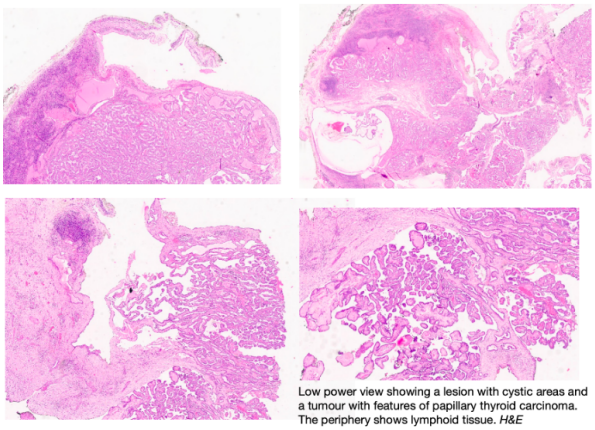

Figure 3: (Case 1) Low-power photomicrograph (H&E) of the excised lymph node showing cystic degeneration and residual lymphoid tissue at the periphery.

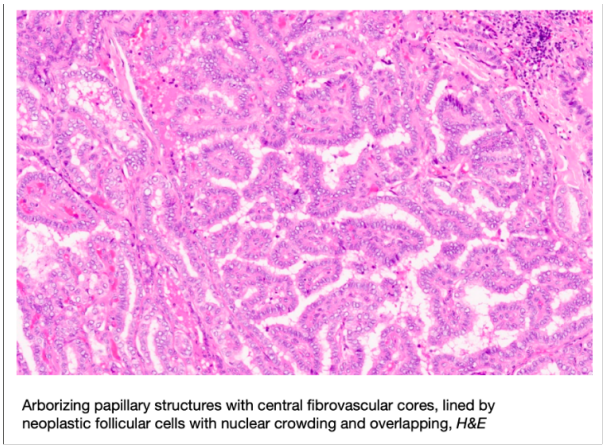

Figure 4: (Case 1) High-power photomicrograph (H&E) revealing arborizing papillary structures lined by cells with nuclear features of PTC (clearing, grooves).

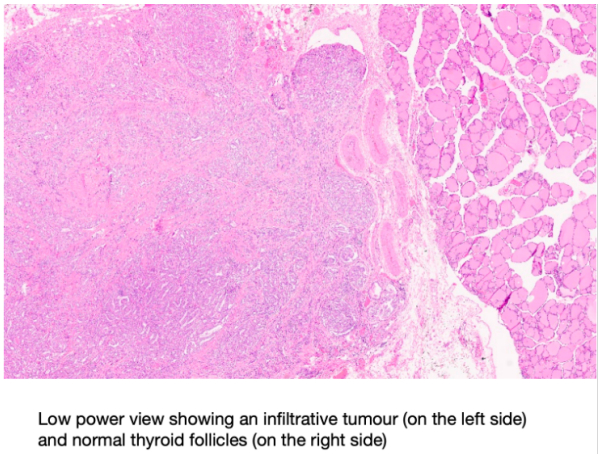

Figure 5: (Case 1) Photomicrograph (H&E) of thyroidectomy specimen showing infiltrative follicular variant PTC (right) adjacent to normal follicles (left).

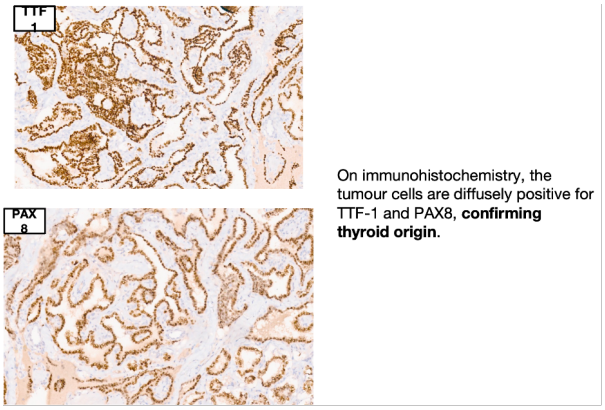

Figure 6: (Case 1) Immunohistochemistry showing tumor cell nuclei positive for TTF-1 (left) and PAX8 (right), confirming thyroid origin.

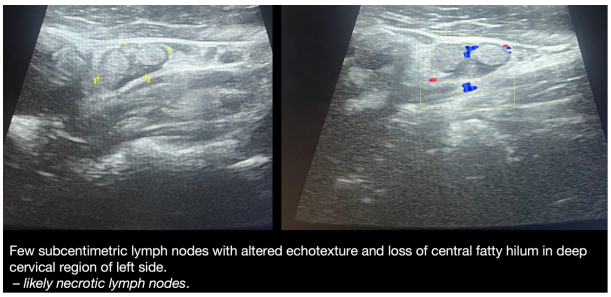

Figure 7: (Case 2) Ultrasonography image showing an enlarged, hypoechoic cervical lymph node with loss of the central fatty hilum and cystic change.

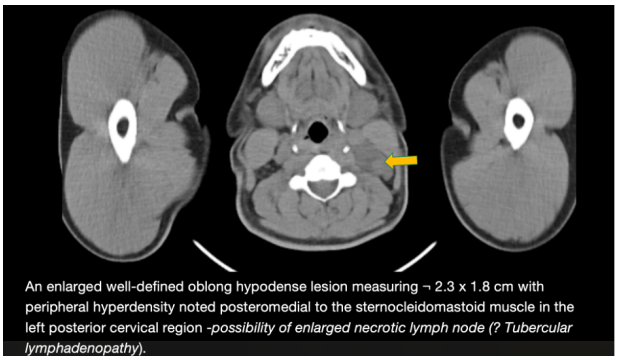

Figure 8: (Case 2) Axial contrast-enhanced CT image revealing a left level II/III lymph node with central necrosis and peripheral rim enhancement (arrow).