ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may156

A Rare Presentation of Intracystic Papillary Thyroid Microcarcinoma within the Thyroglossal Duct

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Publication Date: 2026/05/16

Abstract: Papillary carcinoma arising from a thyroglossal duct cyst (TGDC) is a very rare occurrence. TGDCs are the most commonly encountered congenital neck cyst, occurring as a result of the persistence of thyroglossal ducts and presented as midline neck masses. Although thyroglossal duct cysts are considered benign tumors, malignant transformation may occur on rare occasions. Malignancy arising from TGDC occurs in less than 1% of cases and consists of squamous cell carcinoma and, more rarely, of thyroid papillary carcinomas. This case report highlights the clinical presentation, diagnostic challenges and importance of considering malignant transformations in patients with TGDCs.

Keywords: *Papillary Carcinoma, Thyroglossal Duct Cyst.*

How to Cite: Elona Xhardo; Bledar Hysenbelli; Jehona Neziraj; Daniela Xhemalaj; Dorina Ylli (2026) A Rare Presentation of Intracystic Papillary Thyroid Microcarcinoma within the Thyroglossal Duct. *International Journal of Innovative Science and Research Technology*, 11(5), 243-246. https://doi.org/10.38124/ijisrt/26may156

I. INTRODUCTION

The most common type of congenital cervical mass is a thyroglossal duct cyst (TGDC), and it accounts for over 70% of midline neck masses in children [1].

This type of lesions develops from thyroglossal duct epithelium, which is present in about 7% of the world population [2,3].

TGDCs typically represent painless midline masses found in the area of thyrohyoid membrane, which moves during deglutition [3].

The definitive position of thyroid gland formation is reached during the embryonic period. At this point, the thyroglossal tract normally experiences atrophy [4]. TGDCs arise when there is no regression of thyroglossal ducts, which is the pathway between the thyroid gland development and its base, at the level of tongue [4]. In most cases, thyroglossal duct cysts are benign and they might be complicated by infections, inflammation, fistulas and sometimes malignancy [5].

TGD carcinomas represent a very rare occurrence, as it was diagnosed in only 1% of all cases. It is presented by enlargement of painless neck mass [6].

The most frequent thyroid carcinoma type and also the one most commonly diagnosed along with TGDC is papillary thyroid carcinoma [6].

It is not known how exactly the process of malignancy takes place but possible causes include genetic predisposition and presence of ectopic thyroid tissue in the lining of cysts [7].

It is important to properly diagnose and treat to prevent any complications [7]. Early diagnosis and adequate treatment play essential role here. We present below a case of occult papillary thyroid carcinoma in a patient with TGD.

II. CASE REPORT

A 30 year-old male patient with no pathological personal history presented at the primary care physician with painless swelling on his anterior neck. His mother has Hashomoto's thyroiditis.

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A physical examination revealed a swelling in the infrahyoid region, wich moves with deglution. Than he was refered to a neck surgeon who asked a neck ultrasound (Fig .1) and a Contrast enhanced CT-tomography of the neck.(Fig.2), to investigate this neck mass.

Imaging: A neck ultrasound revealed a well-defined complex cyst (32x25x18 mm) slightly left of the hyoid bone , containing a mural nodule (19x12x15 mm) that was isoechoic to thyroid tissue, with microcalcifications and mild vascularity.

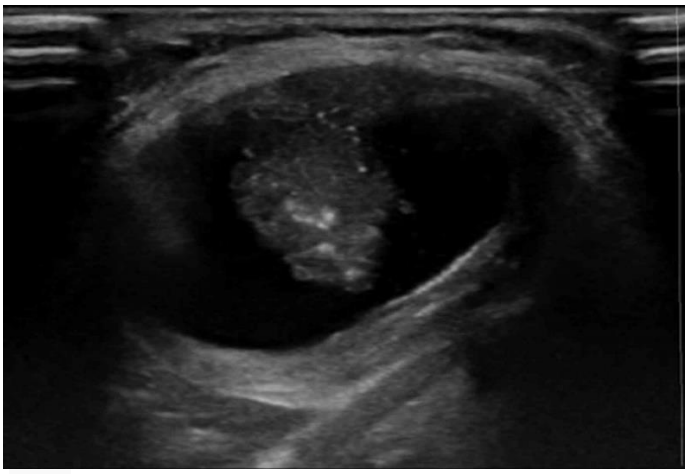

Fig 1 A neck Ultrasound Revealed a well-Defined Complex Cyst (32x25x18 mm) Slightly Left of the Hyoid Bone , Containing a Mural Nodule (19x12x15 mm) that was Isoechoic to Thyroid Tissue, with Punctiforme Microcalcifications and Mild Vascularity.

Ultrasound imaging show for the fist time a complex cystic structure near the hyoid bone ,with an izoechoic solid nodule attached to the cyst wall.

Unenhanced CT at the level of the thyroid gland reveals a complex cystic mass with septations, a small thyroid nodule and microcalcifications (Fig .2)

Fig 2 Contrast-Enhanced CT Scan of the Neck Region-Showed a Complex Cystic Mass with Septations, a Mural Nodule, and Microcalcifications.

➢ *Pathological Diagnosis:*

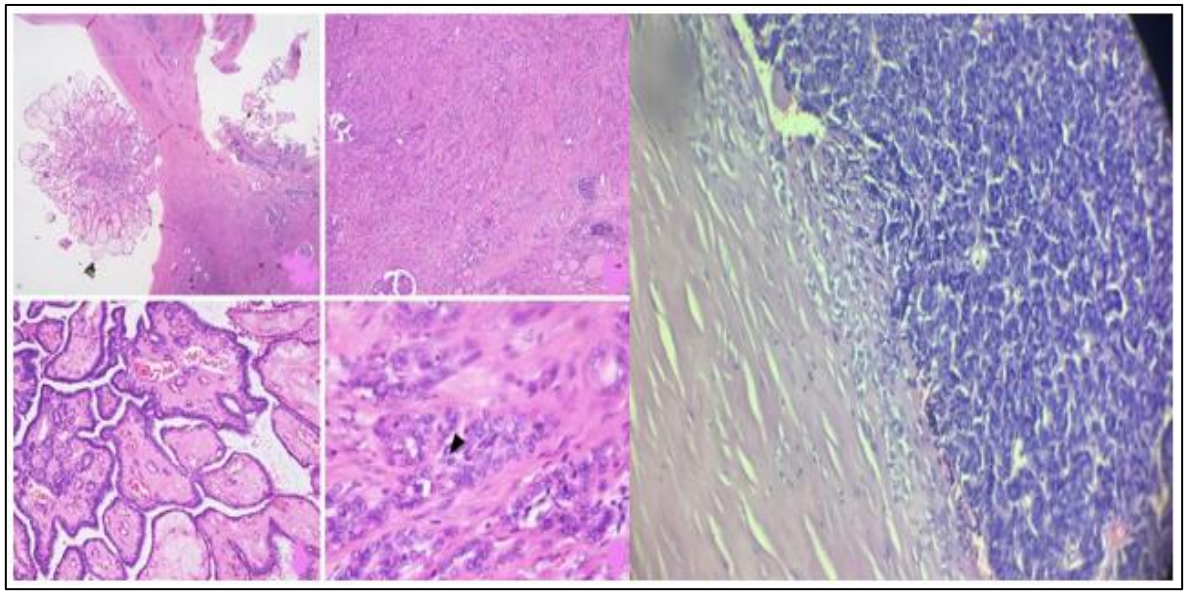

Fig 3 H-E x10 HPF

➢ *Thyrocites with Clear Nuclear Features Infiltrating Fibrous Capsule*

Following surgical removal of the cyst in December 2025, the biopsy revealed a cystic structure with inflammation, hemorrhagic infiltration, and importantly, thyroid tissue present in the cyst wall.

Features of papillary thyroid carcinoma with a maximum diameter of 1.7 cm were found within the cyst wall, showing intracystic growth of papillary structures with characteristic nuclear features of PTC.

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➢ *Subsequent Management:*

Approximately one month after cyst removal, a follow-up neck ultrasound showed an isoechoic nodal structure (8.5x5.5 mm) with undefined contours and similar vascularization to peripheral thyroid tissue. Hormonal panels were normal.

Based on the findings, total thyroidectomy was recommended ans the surgery was performed in January 2026.

Pathology of the excised thyroid gland showed the right lobe was normal, but the left lobe contained occult papillary carcinoma (multicentric sclerogenic variant) in three foci, the largest being about 4 mm (staged as pT1aN0Mx).

Bilateral neck lymph node dissections showed no tumor deposits.

- *Follow-up:*

The patient is stable on Levothyroxine to manage TSH levels. Radioactive iodine (RAI) therapy at a minimal dose is planned for September 2026.

III. DISCUSSION

The incidence of malignancy in a thyroglossal duct cyst (TGDC) is rare (about 1%) and arises due to either neoplastic change of thyroid tissue in the cyst wall or metastasis from an occult thyroid malignancy. [4]

The most common type of malignancy (about 80%) is papillary carcinoma, arising from thyroid tissue located in the walls of the cyst, found in approximately 65% of all TGDC. [4]

There are two main theories about the origin of the tumor, that of de novo transformation of the ectopic thyroid tissue or metastasis from an occult thyroid cancer. [4]

Distinguishing between benign TGDC and cancerous one is practically impossible preoperatively; usually, the final diagnose is made only upon histopathological examination after the surgery. [5]

However, malignancy is highly suspected when the cyst appears to be irregular, firm, growing fast, fixed and attached to adjacent tissues, and in case of involvement of the cervical lymph nodes. [5]

Radiological investigation is vital in this regard (ultrasound, CT, MRI). [5] Usually, CT scan shows well-defined lesions having relatively low density, while calcification in a TGDC is highly indicative of papillary carcinoma (it corresponds to psammoma bodies). [5]

Generally, ultrasound presents a simple cyst, however, detection of microcalcifications and solid components predicts the malignancy.[5] The classical way of treating TGDC is the Sistrunk's procedure, i.e. removal of the cyst, the middle part of the hyoid bone, and the thyroglossal tract to the level of the foramen cecum. [5].

For high-risk groups (the patient is over 45 years old, invasion of the lesion, metastases to cervical lymph nodes, irradiation of head and neck area, and clinically malignant thyroid nodule, a more aggressive approach is advocated (Sistrunk's procedure plus total thyroidectomy and neck dissection and then radioactive iodine therapy and thyroid suppression). [5]

In some papers, total thyroidectomy is recommended for carcinomas greater than 10 mm or lesions smaller than 10 mm but infiltrative in the cyst wall, with enlarged cervical lymph nodes and/or irradiation of the head/neck region. [5]

Total thyroidectomy combined with Sistrunk's procedure allows for better staging, planning treatment, and long-term monitoring with thyroglobulin levels and and whole-body scans. [5]

IV. CONCLUSION

Papillary carcinoma developing within a thyroglossal duct cyst is an extremely rare case, which must be taken into consideration in the differential diagnosis of midline neck masses especially in adults and in a situation where there is a persistent thyroglossal duct cyst. [5]

Surgery remains the mainstay of management through the performance of what is referred to as the Sistrunk operation. More management may include total thyroidectomy and use of radioiodine in some instances. [5], [6]

Patients with this condition have excellent prognoses especially in those with localized disease and who undergo successful surgery. [5]

It is imperative to perform preoperative investigations, which include imaging techniques and if need be FNAC, along with thorough workup of the thyroid gland and regional lymph nodes in suspected cases of cancer. [5], [6]

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