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Case Report

Papillary Thyroid Carcinoma Arising in a Thyroglossal Duct Cyst Presenting as a Submental Mass: A Case Report

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A B S T R A C T

Background: Malignant transformation of a thyroglossal duct cyst is a rare but well-recognized entity, with an estimated incidence of less than 1%. Papillary thyroid carcinoma represents the predominant histological subtype in this setting. Preoperative diagnosis remains particularly challenging, as clinical and radiological features often overlap with those of benign cysts.

Case presentation: We report a 25-year-old woman with no significant past medical history who presented with a progressively enlarging submental mass over a one-year period. Clinical examination revealed a firm, well-defined 3 cm mass located to the left of the hyoid bone, mobile with swallowing and tongue protrusion. Cervical ultrasonography demonstrated a hypoechoic heterogeneous mass containing microcalcifications, with a morphologically normal thyroid gland. Contrast-enhanced CT and MRI further characterized the lesion as a multilobulated cystic mass with heterogeneous enhancement and calcific foci, without clear evidence of intramuscular invasion. Thyroid function tests were within normal limits. Complete surgical excision was performed, and histopathological examination confirmed the diagnosis of papillary thyroid carcinoma arising within a thyroglossal duct cyst.

Conclusion: This case underscores the importance of considering malignancy in any atypical or persistent midline neck mass. Definitive diagnosis relies on histopathological examination, and the Sistrunk procedure remains the standard surgical approach. Adjuvant therapy should be individualized based on pathological findings and risk stratification.

Keywords: Thyroglossal duct cyst; Papillary thyroid carcinoma; Submental mass; Sistrunk procedure; Congenital neck anomaly; Ectopic thyroid tissue

Introduction

Thyroglossal duct cysts represent the most common congenital midline neck anomaly, resulting from incomplete obliteration of the thyroglossal tract during embryological thyroid descent[1]. While the vast majority of these lesions are benign, malignant transformation is a well-recognized though rare complication, with an estimated incidence of less than 1% of all thyroglossal duct cysts[2,3]. Papillary thyroid carcinoma is by far the most frequently reported histological subtype in this setting, accounting for approximately 80–85% of cases[4]. The preoperative diagnosis of malignancy arising within a thyroglossal duct cyst remains particularly challenging, as

clinical and radiological features often overlap with those of benign cysts[5]. We report a case of papillary thyroid carcinoma arising in a thyroglossal duct cyst presenting as a submental mass in a 25-year-old woman, with emphasis on the diagnostic challenges and surgical management.

Case Report

A 25-year-old female patient with no significant past medical history presented with a submental mass that had been progressively enlarging over a one-year period. Clinical examination revealed a firm, well-defined mass measuring approximately 3 cm, located to the left of the hyoid bone **(Figure 1)**. The lesion was mobile with swallowing and tongue protrusion, and there were no associated signs of inflammation or tenderness.Cervical ultrasonography demonstrated a 40 × 25 mm hypoechoic heterogeneous submental mass containing microcalcifications. The thyroid gland appeared normal in size and morphology, with preserved echostructure, absence of nodular lesions, and normal vascularization on Doppler study.

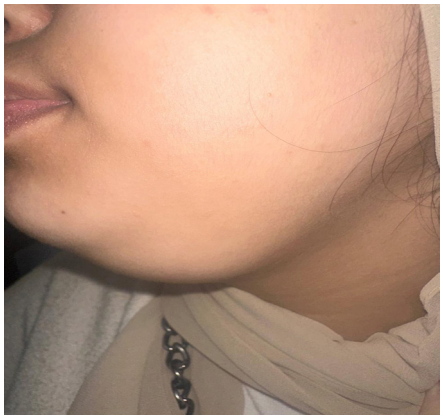

Figure 1: Preoperative clinical photograph demonstrating a firm, well-defined submental mass located to the left of the hyoid bone.

Contrast-enhanced cervical computed tomography (CT) showed a left-sided, oval-shaped lesion of the floor of the mouth measuring 37 × 21 mm. The mass exhibited lobulated margins with internal cystic components and areas of calcification. It demonstrated heterogeneous enhancement after contrast administration. Posteriorly, the lesion extended toward the hyoid bone, which appeared irregular without clear evidence of cortical destruction. Superiorly, it was in close relation with the geniohyoid, mylohyoid, and genioglossus muscles, with apparent infiltration of these structures. Inferiorly, it displaced the submental veins bilaterally and laterally, with lateral displacement of the anterior bellies of the digastric muscles, and possible involvement of the left digastric muscle.

Magnetic resonance imaging (MRI) revealed a well-defined, multilobulated midline mass of the floor of the mouth, with a multilocular architecture and regular septations. The lesion demonstrated intermediate signal intensity on T1-weighted sequences and marked hyperintensity on T2-weighted images. Following contrast administration, heterogeneous enhancement was observed. The lesion measured 35 × 29 × 22 mm. It contained focal T2 hypointense areas suggestive of calcific foci or phleboliths. The mass was in close contact with the genioglossus muscles medially and the hyoglossus muscles laterally, causing displacement without clear evidence of intramuscular invasion or abnormal signal alteration.

Laboratory investigations, including thyroid function tests, revealed normal serum levels of triiodothyronine (T3), thyroxine (T4), and thyroid-stimulating hormone (TSH).

Complete surgical excision of the tumor was performed, and the specimen was sent for histopathological analysis. Microscopic examination, supported by immunohistochemical staining, confirmed the diagnosis of a papillary thyroid carcinoma, consistent with a thyroid-type epithelial malignancy.

Discussion

The thyroglossal duct cyst is the most common congenital anomaly of the neck, arising from incomplete involution of the thyroglossal tract during embryological descent of the thyroid gland[1]. Although typically benign, malignant transformation is rare, with an estimated incidence of less than 1%[2,3].

Among these malignancies, papillary thyroid carcinoma represents the predominant histological subtype, accounting for the vast majority of reported cases[4,5]. This predominance supports the hypothesis that ectopic thyroid tissue within the cyst undergoes malignant transformation.

Clinically, thyroglossal duct cyst carcinoma usually presents as a painless, midline or paramedian neck mass that moves with swallowing and tongue protrusion, as observed in our patient. However, these clinical features are indistinguishable from those of benign cysts, making preoperative diagnosis particularly challenging[5].

Imaging plays a key role in the evaluation of such lesions. Ultrasound is often the first-line modality, allowing assessment of both the cystic nature of the lesion and the thyroid gland. Computed tomography and magnetic resonance imaging provide further characterization, particularly in identifying suspicious features such as solid components, mural nodules, or microcalcifications[6]. In our case, the presence of a heterogeneous mass with microcalcifications raised suspicion of malignancy, although these findings are not pathognomonic.

Despite advances in imaging, definitive diagnosis relies on histopathological examination. In the present case, complete surgical excision followed by histological and immunohistochemical analysis confirmed the diagnosis of papillary thyroid carcinoma[7].

The pathogenesis of carcinoma arising in a thyroglossal duct cyst remains debated. Two main theories have been proposed: primary malignant transformation of ectopic thyroid tissue within the cyst, and secondary involvement from an occult primary thyroid carcinoma[8]. The absence of abnormalities in the thyroid gland on imaging in our patient favors the first hypothesis.

Surgical management remains the cornerstone of treatment. The Sistrunk procedure, which includes excision of the cyst, the tract, and the central portion of the hyoid bone, is considered the standard of care and is associated with low recurrence rates[9]. The role of total thyroidectomy and radioactive iodine therapy remains controversial and is generally reserved for selected cases with high-risk features or confirmed thyroid involvement[2,3].

Conclusion

Papillary thyroid carcinoma arising in a thyroglossal duct cyst is a rare but well-documented entity that should be considered

in any atypical or persistent midline neck mass. Preoperative imaging may raise suspicion of malignancy, but definitive diagnosis relies on histopathological examination. The Sistrunk procedure remains the standard surgical approach, offering adequate oncological control with low recurrence rates[9]. The need for adjuvant thyroidectomy or radioactive iodine therapy should be individualized based on pathological findings and risk stratification[2,3]. Long-term follow-up is essential to monitor for recurrence or thyroid involvement.

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