RESEARCH PAPER

Papillary Carcinoma Arising in a Thyroglossal Duct Cyst: A Case Report

Running Title: *Papillary Carcinoma in Thyroglossal Duct Cyst*

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ABSTRACT

Papillary carcinoma arising in a thyroglossal duct cyst (TGDC) is an uncommon clinical entity and is most often diagnosed incidentally following surgical excision. Preoperative differentiation between benign and malignant TGDC remains challenging; however, imaging plays a crucial role in raising suspicion for malignancy. This study presents the case of a 50-year-old male who presented with a progressively enlarging midline anterior neck swelling. Contrast-enhanced computed tomography (CT) revealed a well-defined cystic lesion with internal calcifications and associated solid components located in the anterior neck. Further evaluation with magnetic resonance imaging (MRI) demonstrated a predominantly cystic lesion with enhancing solid components and fluid–fluid levels. Diffusion-weighted imaging (DWI) showed restricted diffusion within the solid component, suggesting increased cellularity and raising suspicion for malignant transformation within the TGDC. The patient underwent surgical excision using the Sistrunk procedure. Histopathological examination of the excised specimen confirmed the diagnosis of papillary carcinoma arising within a thyroglossal duct cyst. Subsequent management included total thyroidectomy followed by appropriate adjuvant therapy. This case highlights the importance of considering malignancy in adult patients presenting with complex midline cystic neck lesions. Imaging features such as enhancing solid components, internal calcifications, and diffusion restriction can aid in preoperative suspicion, although histopathological examination remains the gold standard for definitive diagnosis. Early recognition and appropriate surgical management are associated with excellent prognosis.

Keywords: Thyroglossal duct cyst; Papillary thyroid carcinoma; Magnetic resonance imaging; Diffusion-weighted imaging; Sistrunk procedure; Neck mass

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Introduction:

Thyroid glands grow from the foramen cecum and move caudally to the pretracheal location. A TGDC may develop if the thyroglossal duct fails to involute, leaving behind epithelial remains [1]. TGDC causes 70% of pediatric midline neck masses and 7% of adult ones [1].

The most prevalent histological subtype of TGDC is

papillary thyroid carcinoma, which is only 1% malignant [2]. Preoperative diagnosis is challenging as most cases clinically and radiologically resemble benign TGDC [3]. Surgical excision using the Sistrunk procedure remains the standard treatment, while total thyroidectomy is reserved for selected cases [4].

Case Report

A male patient in his fifth decade presented with a progressively enlarging swelling in the midline of the anterior neck. The swelling had been insidious in onset and gradually increased in size over time. It was not associated with pain, dysphagia, or voice changes. On clinical examination, the swelling was cystic in consistency, non-tender, and mobile. A characteristic upward movement of the swelling was observed during tongue protrusion and deglutition, suggestive of a thyroglossal duct cyst. There was no clinical evidence of cervical lymphadenopathy (Fig. 1).

Radiological evaluation was performed to further characterize the lesion. Non-contrast computed tomography (NCCT) of the neck demonstrated a well-defined hypodense lesion located in the deep subcutaneous plane of the left paramedian region, anterior to the thyroid cartilage. The lesion showed internal macrocalcifications along with focal solid components, raising suspicion for a complex cystic pathology (Fig. 2).

Magnetic resonance imaging (MRI) provided further delineation of the lesion. On T2-weighted images, the lesion appeared predominantly hyperintense with internal solid components and fluid–fluid levels. Hypointense foci within the lesion corresponded to calcifications (Fig. 3). Post-contrast T1-weighted images revealed homogeneous enhancement of the solid component, while the cystic portion remained non-enhancing, thereby increasing the suspicion of malignant transformation within the cyst (Fig. 4) [5]. Diffusion-weighted imaging (DWI) demonstrated restricted diffusion within the solid component, with corresponding low apparent diffusion coefficient (ADC) values, further supporting the possibility of malignancy (Fig. 5).

Based on the clinical and radiological findings, a provisional diagnosis of a complicated thyroglossal duct cyst with possible malignant transformation was considered. The patient subsequently underwent surgical management using the Sistrunk procedure, which included excision of the cyst along with the central portion of the hyoid bone and the tract.

Gross examination of the excised specimen revealed a cystic lesion with identifiable solid components (Fig. 6). Histopathological evaluation confirmed the diagnosis of papillary carcinoma arising within a thyroglossal duct cyst. There was no evidence of extracystic extension, lymphovascular invasion, or surrounding tissue infiltration (Fig. 7).

In view of the confirmed malignancy, the patient underwent completion total thyroidectomy followed by adjuvant radioactive iodine therapy and thyroid hormone suppression therapy. The postoperative course was uneventful, and on follow-up over a period of one year, the patient remained asymptomatic with no evidence of recurrence or metastasis.

Discussion

Carcinoma arising in a thyroglossal duct cyst (TGDC) is a rare clinical entity, with papillary thyroid carcinoma being the most frequently reported histological subtype [6]. TGDCs are typically located in the midline of the neck and may contain ectopic thyroid tissue, which is considered the origin of malignant transformation in most cases. However, only a small proportion of TGDCs harbor such ectopic thyroid elements, explaining the low incidence of carcinoma in these lesions. Previous studies have demonstrated that most TGDC carcinomas exhibit indolent biological behavior and are associated with favorable outcomes.

The pathogenesis of TGDC carcinoma is believed to involve de novo malignant transformation of ectopic thyroid tissue present within the cyst wall rather than metastatic spread from the orthotopic thyroid gland [3]. Historically, the diagnosis of malignancy in TGDC was established primarily on postoperative histopathological examination, as clinical and radiological features often mimic benign cystic lesions. Earlier reports, including those by Kennedy, emphasized that most cases lacked definitive preoperative indicators of malignancy and were diagnosed incidentally following excision [7]. This is consistent with the findings of the present study, where definitive diagnosis was achieved only after histopathological evaluation.

With advances in imaging, radiological modalities now play a crucial role in raising suspicion for malignant transformation. Features such as solid enhancing components, mural nodules, and internal calcifications within a cystic lesion are suggestive of carcinoma [5]. In the present study, the presence of enhancing solid components, calcifications, and diffusion restriction on

MRI were key findings that indicated malignancy. Diffusion-weighted imaging further contributes to diagnostic accuracy by demonstrating restricted diffusion in malignant tissues due to increased cellular density.

The standard treatment for TGDC, including cases with malignancy, is the Sistrunk procedure, which involves complete excision of the cyst, tract, and central portion of the hyoid bone [4]. This procedure significantly reduces recurrence rates and remains the cornerstone of management. However, the role of total thyroidectomy remains controversial and is generally reserved for selected cases based on risk stratification, including factors such as tumor size, extracystic extension, lymph node involvement, and presence of synchronous thyroid carcinoma. In the present study, total thyroidectomy followed by radioactive iodine therapy was performed to ensure comprehensive management and facilitate long-term surveillance.

Overall, TGDC carcinoma carries an excellent prognosis, particularly when diagnosed early and managed appropriately. Most cases demonstrate low rates of recurrence and metastasis, supporting a favorable long-term outcome. The present study reinforces the importance of considering malignancy in adult patients presenting with complex midline cystic neck lesions and highlights the role of imaging and histopathology in guiding diagnosis and management.

Conclusion

Carcinoma arising in a thyroglossal duct cyst is rare but should be suspected in adults presenting with atypical midline neck cysts. Radiological features such as enhancing solid components, calcifications, and diffusion restriction are important indicators of malignancy. Early surgical management using the Sistrunk procedure, with selective use of total thyroidectomy, ensures favorable outcomes. Histopathological confirmation remains the gold standard for diagnosis.

Teaching Point

Enhancing solid components, internal calcifications, and diffusion restriction within a midline cystic neck lesion should strongly suggest malignant transformation in a thyroglossal duct cyst.

Patient Consent

Written informed consent was obtained from the patient for publication of clinical details and imaging findings.

Figure Legends

Figure 1: Clinical photograph showing a midline anterior neck swelling corresponding to the anatomical location of a thyroglossal duct cyst.

Figure 2: NCCT neck axial section demonstrating a well-defined hypodense lesion with macrocalcifications and solid components in the deep subcutaneous plane along the left paramedian region anterior to the thyroid cartilage.

Figure 3: T2-weighted sagittal MRI showing a well-defined encapsulated predominantly hyperintense cystic lesion with internal solid components (red arrow), fluid–fluid level (yellow arrow), and hypointense foci representing calcifications (pink arrow).

Figure 4: Post-contrast T1-weighted coronal MRI demonstrating a non-enhancing cystic component and a homogeneously enhancing solid component (curved arrow) with a central non-enhancing area representing calcification (straight arrow).

Figure 5: Diffusion-weighted imaging (DWI) and ADC maps showing diffusion restriction in the solid components with corresponding low ADC values.

Figure 6: Postoperative gross specimen showing cystic lesion with solid components.

Figure 7: Histopathological photomicrograph demonstrating papillary architecture consistent with papillary carcinoma (H&E stain).

References:

1.Mondin V, Ferlito A, Muzzi E, et al. Thyroglossal duct cyst carcinoma: A review of 62 cases. *Acta Otorhinolaryngol Ital*. 2008;28:61–65.

2.Plaza CP, López ME, Carrasco CE, et al. Thyroglossal duct carcinoma: A multicenter study. *Ann Surg Oncol*. 2006;13(6):912–915.

3.Heshmati HM, Fatourechi V, van Heerden JA, et al. Thyroglossal duct carcinoma: Report of 10 cases. *Head Neck*. 1997;19(5):400–405.

4.Patel SG, Escrig M, Shaha AR, et al. Management of well-differentiated thyroid carcinoma presenting within a thyroglossal duct cyst. *J Surg Oncol*. 2002;79:134–139.

5.Ren J, Liu Z, Wang Y, et al. Role of imaging in thyroglossal duct cyst carcinoma. *Clin Imaging*. 2020;60:32–38.

6.Ahmed M, Alqahtani A, Alshahrani S, et al. Papillary carcinoma arising from a thyroglossal duct cyst: A case report and literature review. *Int J Surg Case Rep*. 2022;97:107106.

7.Kennedy TL. Thyroglossal duct carcinoma: Review of the literature and case reports. *Laryngoscope*. 1989;99:1–6.
8.Dedivitis RA, Guimarães AV, Castro MA, et al. Papillary carcinoma in thyroglossal duct cyst. *Int Surg*. 2000;85:198–201.

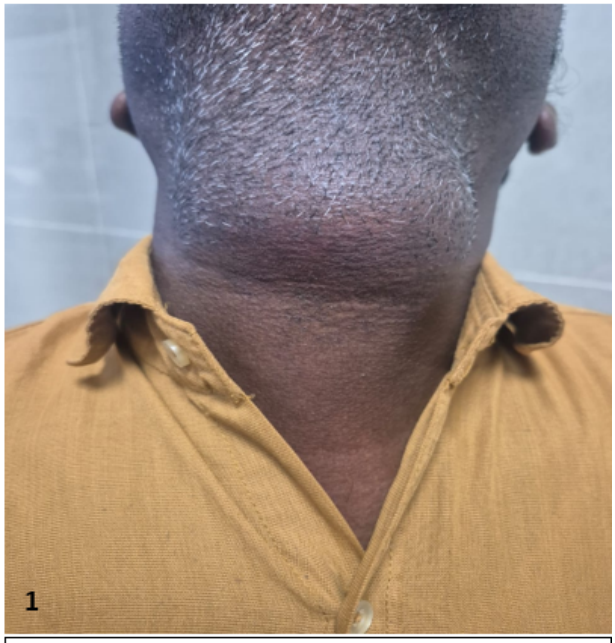

Fig 1: Shows a midline neck swelling.

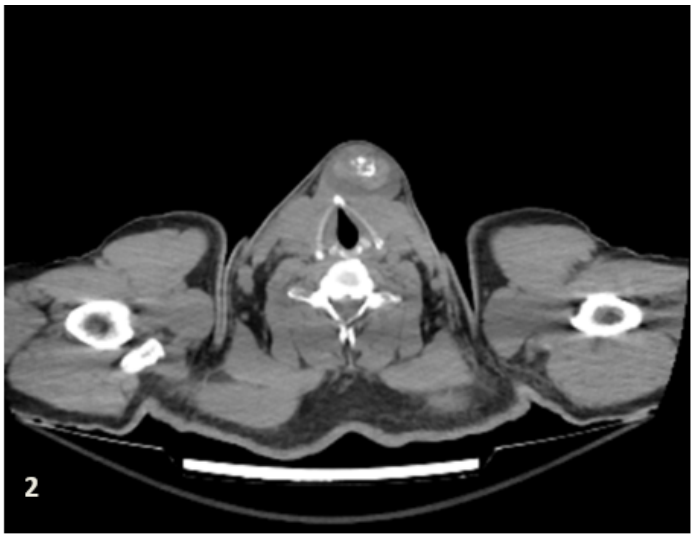

Fig 2: NCCT neck axial section shows a well-defined hypodense lesion with macro calcifications and solid components noted within deep subcutaneous plane along left para midline region anterior to ala of left thyroid cartilage.

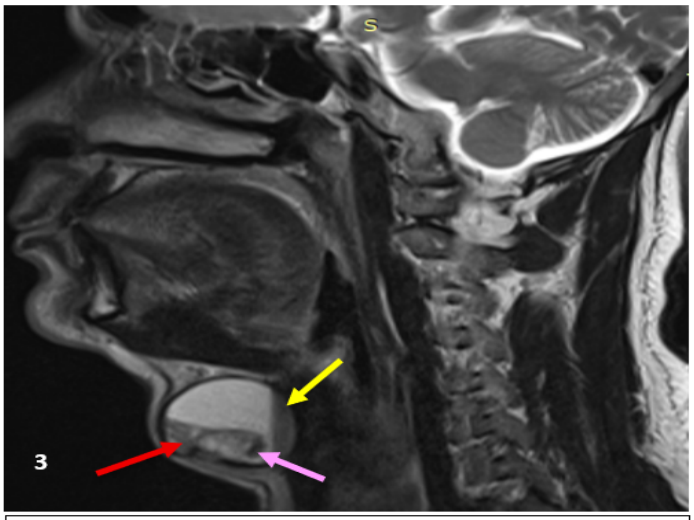

Fig 3: T2W sagittal image of neck shows a well-defined encapsulated predominantly hyperintense cystic lesion showing solid components (red arrow), fluid-fluid level (yellow arrow), and hypointense foci representing calcification (pink arrow) noted in the subcutaneous plane of anterior neck.

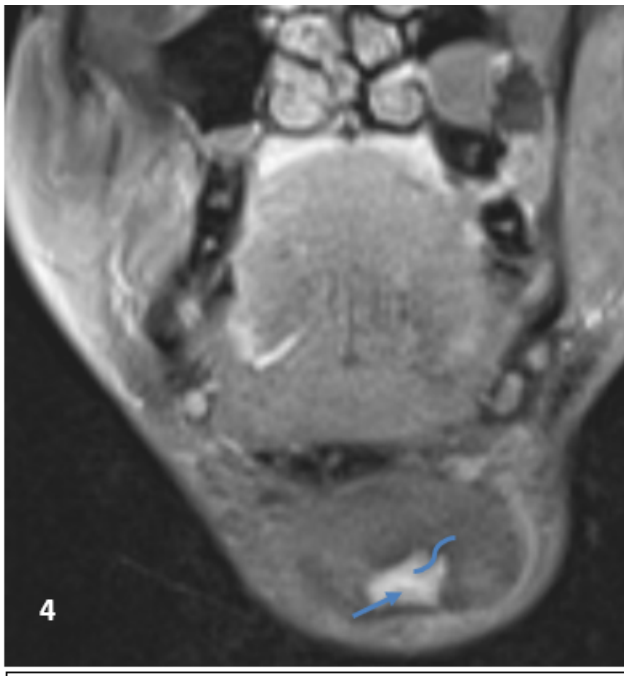

Fig 4: T1C+W coronal image of neck shows non cystic area and the solid component is showing homogenous enhancement (curved arrow) with non enhancing area representing calcification (s arrow).

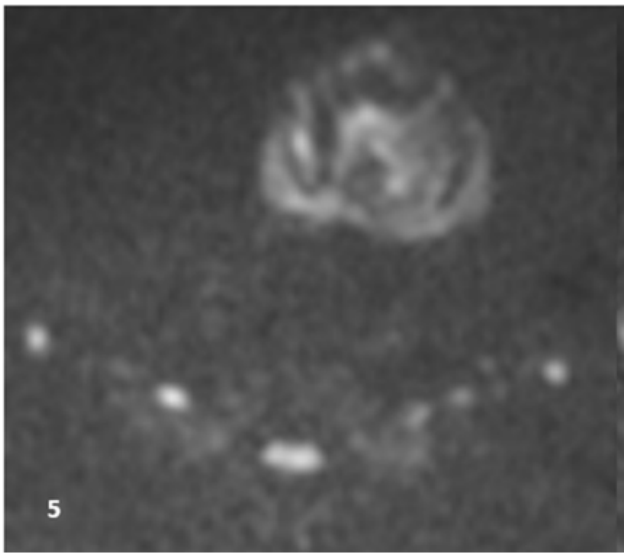

Fig 5: The solid components of the lesion shows diffus

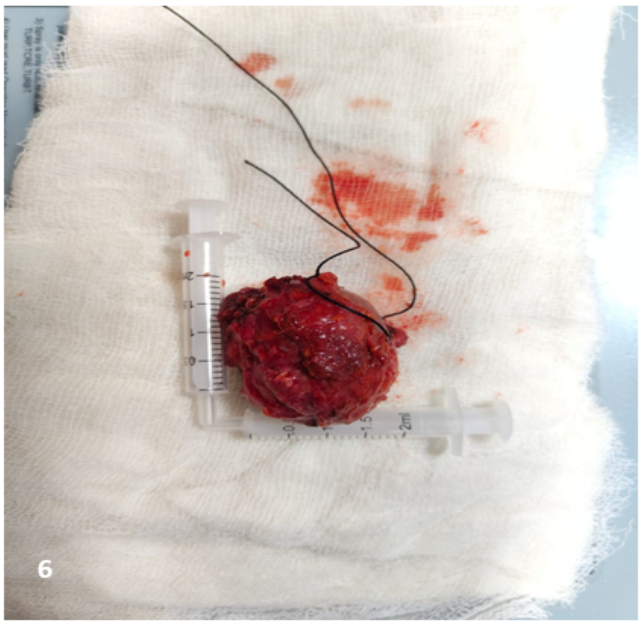

Fig 6: Post operative gross specimen of the lesion.

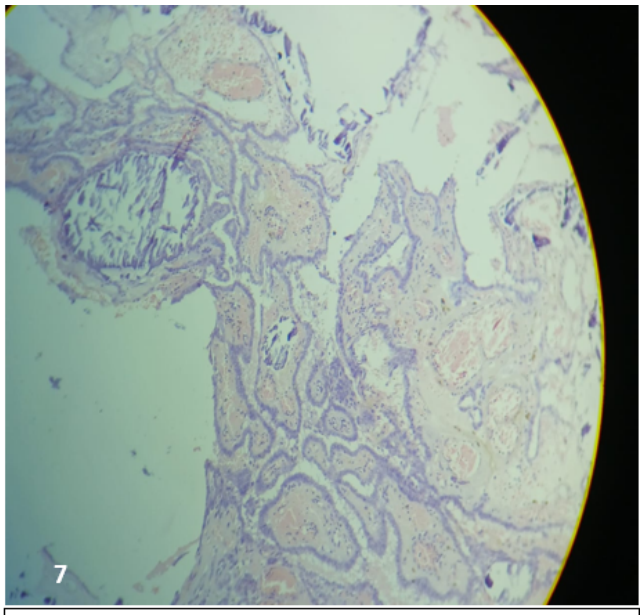

Fig 7: Histopathological section showing papillary carcinoma arising within a thyroglossal duct cyst, lining epithelial cells show crowding, overlapping of nucleus, areas of calcification and psammoma bodies are also seen (Hematoxylin and Eosin stain)