Annals of Case Reports
Canovi S, et al. Ann Case Rep: 10: 102293
www.doi.org/10.29011/2574-7754.102293
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Case Report

An Exceptionally Indolent Course of Papillary Thyroid Carcinoma: A 37-Year Untreated Case with Extensive Local Progression and No Anaplastic Transformation

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Citation: Canovi S, Kecman S, Hartel M, Polutak A (2025) An Exceptionally Indolent Course of Papillary Thyroid Carcinoma: A 37-Year Untreated Case with Extensive Local Progression and No Anaplastic Transformation. Ann Case Report. 10: 2293. DOI:10.29011/2574-7754.102293

Received: 20 May 2025, **Accepted:** 24 May 2025, **Published:** 26 May 2025

Abstract

Papillary thyroid carcinoma (PTC) typically has an indolent course and an excellent prognosis. However, in long-standing untreated cases, PTC may occasionally undergo anaplastic transformation. We report the case of a 63-year-old woman with a PTC diagnosed in 1986 that remained untreated for 37 years. In September 2023, after years without medical or surgical intervention, she presented with a large cervical mass and multiple bleeding skin ulcers. Imaging showed a heterogeneous 9.2 × 8.7 × 11.2 cm thyroid mass infiltrating surrounding structures. Fine-needle aspiration confirmed PTC (Bethesda VI), and the patient underwent a complex total thyroidectomy with partial skin resection. Histology revealed well-differentiated PTC with skeletal muscle infiltration but no anaplastic features. Adjuvant radioiodine therapy was recommended. This case demonstrates an extraordinary example of a long-standing untreated PTC that did not undergo anaplastic transformation despite extensive local progression. It emphasizes the importance of regular follow-up and the potential risks of neglecting thyroid malignancies.

Keywords: Papillary Thyroid Carcinoma; Anaplastic Transformation; Thyroid Neoplasms; Indolent Neoplasms; Neoplasm Progression.

Introduction

Papillary thyroid carcinoma (PTC) is the most common thyroid malignancy, accounting for approximately 80% of all thyroid cancers. Its incidence has increased over recent decades, largely due to improved detection through ultrasound screening and fine-needle aspiration. PTC is typically indolent and carries an excellent prognosis when treated, with ten-year survival exceeding 95% in localized disease [1, 2].

Nonetheless, a subset of patients may experience aggressive disease marked by local invasion, nodal metastases, or rarely, transformation into anaplastic thyroid carcinoma (ATC). Although ATC accounts for only 1–2% of thyroid cancers, it causes nearly half of thyroid cancer–related deaths and has a median survival of less than one year [3, 4].

Molecular alterations such as BRAF, TERT promoter, and TP53 mutations are associated with dedifferentiation and aggressive thyroid cancer behavior, with TERT mutations particularly linked to anaplastic transformation [5]. Clinically, advanced age, large tumor size, and long untreated disease duration are key risk factors for aggressive progression [6].

Wiseman et al. reviewed clinical, pathological, and molecular data supporting that anaplastic thyroid carcinoma (ATC) arises from pre-existing differentiated carcinomas such as PTC or follicular carcinoma through a multistep dedifferentiation process driven by genetic instability and clonal evolution. The coexistence of differentiated and undifferentiated tumor areas reinforces this concept and highlights the importance of early detection and close monitoring, especially in long-standing untreated cases [7].

Here, we present the longest documented case, to our knowledge, of untreated papillary thyroid carcinoma, with a 37-year natural course and extensive local progression without dedifferentiation into anaplastic carcinoma. This case highlights the exceptional biological indolence that PTC can exhibit, even over decades.

Case Presentation

A 64-year-old woman presented to our emergency department in September 2023 with acute bleeding from a large cervical mass. Her history dated back to 1986, when a thyroid nodule was first noted but left untreated due to medical anxiety.

Her medical history included an invasive ductal breast carcinoma (ER-positive, PR-negative, HER2-negative) treated surgically in 2010 with no recurrence. She had also undergone a hysterectomy with bilateral adnexectomy for a large uterine leiomyoma. Her family history was notable for thyroid nodules in two sisters and diabetes mellitus in her mother and one sister.

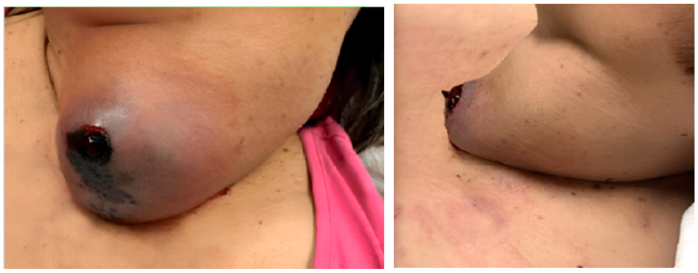
In 2011, during a hospital admission for an unrelated issue, an endocrine evaluation revealed a 32 mL multinodular goiter with a dominant left thyroid nodule measuring 4.3 × 2.3 × 5.0 cm. Fine-needle aspiration of this nodule confirmed PTC (Bethesda VI), but the patient again refused surgery and discontinued follow-up.

Over the year prior to her 2023 presentation, the cervical mass had enlarged rapidly, accompanied by episodes of spontaneous bleeding and minor purulent discharge. On physical examination, a large, ulcerated left-sided neck mass (approx. 12 × 10 cm) with active bleeding and skin necrosis was evident (Figures 1 and 2). No cervical lymphadenopathy was palpable.

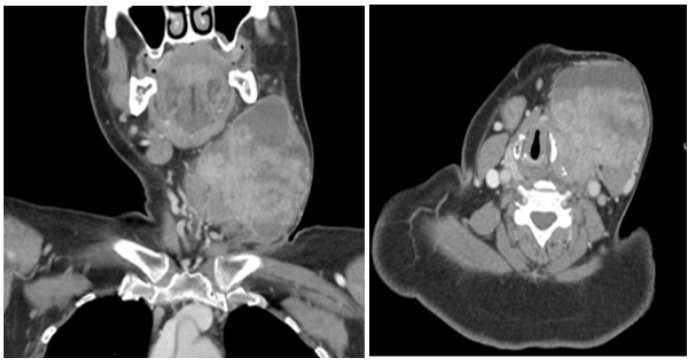
Contrast-enhanced computed tomography (CT) of the neck showed a large 9.2 × 8.7 × 11.2 cm heterogeneous thyroid mass with necrotic, cystic, and calcified components (Figures 3 and 4). The tumor exhibited extensive invasion into adjacent structures, including the left sternocleidomastoid muscle and internal jugular vein, and caused displacement of the laryngopharynx.

After multidisciplinary tumor board discussion and a repeat fine-needle aspiration confirming PTC, the patient underwent surgical resection in October 2023. A total thyroidectomy with en bloc resection of the involved skin was performed. Despite significant anatomic distortion, both recurrent laryngeal nerves were preserved, as were the accessory and hypoglossal nerves and all four parathyroid glands.

Histopathological examination confirmed a multifocal PTC involving both thyroid lobes, with the largest tumor focus measuring 9 cm, and microscopic invasion into adjacent muscle. Immunohistochemistry demonstrated retention of thyroid differentiation markers and no evidence of anaplastic transformation, despite focal nuclear pleomorphism. One cervical lymph node metastasis (5 mm) was present without extracapsular extension. All surgical margins were clear (R0 resection). The final pathologic staging was pT3a pN1a (AJCC 8th edition).



Figures 1 and 2: Clinical appearance of the ulcerated tumor at initial presentation.



Figures 3 and 4: Contrast-enhanced CT at initial presentation showing the tumor's extent.

Discussion

This case illustrates an exceptionally indolent clinical course of papillary thyroid carcinoma (PTC), which progressed locally over 37 years in the absence of treatment, without evidence of dedifferentiation into anaplastic thyroid carcinoma (ATC). Despite the long delay in intervention and the presence of muscular invasion and cutaneous ulceration, the tumor retained well-differentiated histological features.

Although the precise incidence of anaplastic transformation in untreated PTC is unknown, smaller case series and clinical reports suggest that delayed treatment may increase the risk in selected patients, particularly those with high-risk molecular profiles or advanced age. Timely surgical management and regular follow-up remain essential to prevent complications and monitor for disease progression [8].

The absence of anaplastic features in this case, despite extensive local disease, is striking. Grossly, the tumor was ulcerated and necrotic in parts but did not invade the skin directly. Histology

showed a predominantly conventional PTC architecture with characteristic nuclear features, alongside regressive changes such as fibrosis, focal necrosis, squamous metaplasia, and nuclear pleomorphism. Immunohistochemistry confirmed strong expression of thyroid differentiation markers (TTF-1, CK7, PAX8), including in morphologically atypical areas, supporting the diagnosis of well-differentiated PTC. A second pathology review confirmed the absence of dedifferentiation.

Only a few similar cases of long-term untreated PTC without dedifferentiation have been described in the literature. Miyauchi et al. reported that papillary microcarcinomas observed over decades often remain stable [9]. In contrast, other cases document dedifferentiation in long-standing tumors, particularly those of larger size [10].

As part of our review, we identified five case reports describing long-term untreated PTC in which patients presented with large, ulcerating, or locally invasive tumors that nonetheless remained well-differentiated histologically. These include a 12-year neglected case with cervical lymph node ulceration [11], a 9-year untreated case with a draining cutaneous sinus [12], a 7-year neglected exophytic thyroid tumor reaching 17 cm [13], a 10-year case featuring a cutaneous fistula and tall-cell variant histology [14], and a recently reported case of a massive 15 cm tumor in an elderly patient that remained differentiated despite ulceration and local invasion [15]. Notably, none of these cases approached the 37-year disease duration observed in our patient.

Taken together, these findings confirm that while PTC is generally indolent, long-term neglect can result in significant local morbidity, including ulceration and soft tissue invasion, even in the absence of dedifferentiation. This underscores the need for early diagnosis, appropriate patient counseling, and consistent long-term surveillance, even for low-risk thyroid cancers.

Conclusion

To our knowledge, this represents the longest documented case of untreated PTC without progression to anaplastic transformation. Despite extensive local disease, the tumor remained well-differentiated, underscoring the unpredictable nature of PTC biology. This case highlights the importance of early diagnosis, patient education, and regular surveillance to prevent complications such as local invasion and ulceration, even in cancers traditionally considered low risk.

Declarations

Acknowledgments: None.

Ethics and patient consent: Informed consents were obtained from the patients for the publication of this manuscript.

Conflict of Interest Statement: The authors report no conflict of interest in connection with this article.

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