Barw Medical Journal | 2026;4(2):12-21
Journal home page: https://barw.krd/index.php/BMJ

Original Article

Parathyroid and Papillary Thyroid Carcinoma: A Case Series

Ari M. Abdullah[1,2*], Aras J. Qaradakhy[3,4], Abdullah A. Qadir[5], Harun Amanj Ahmed[6], Yousif F. Ahmed[7], Rebar A. Mohammed[8], Dindar H. Hama[5], Aland T. Ahmed[7], Mohammed H. Rifaat[5], Rahand A. Yousif[9], Daroo A. Kareem[5], Sarkrda M. Jamal[10]

1. *Department of Pathology, Smart Hospital, Madam Mitterrand Street, Sulaymaniyah, Iraq*
2. *Department of Pathology, Sulaymaniyah Teaching Hospital, Sulaymaniyah, Iraq*
3. *Department of Radiology, Smart Hospital, Madam Mitterrand Street, Sulaymaniyah, Iraq*
4. *Department of Radiology, Shar Hospital, Malik Mahmood Ring Road, Sulaymaniyah, Iraq*
5. *Department of Head and Neck Surgery, Smart Hospital, Madam Mitterrand Street, Sulaymaniyah, Iraq*
6. *Department of Thoracic and Vascular Surgery, Smart Hospital, Madam Mitterrand Street, Sulaymaniyah, Iraq*
7. *Department of Scientific Affairs, Smart Hospital, Madam Mitterrand Street, Sulaymaniyah, Iraq*
8. *Department of Pharmacy, Smart Hospital, Madam Mitterrand Street, Sulaymaniyah, Iraq*
9. *Department of Ward, Smart Hospital, Madam Mitterrand Street, Sulaymaniyah, Iraq*
10. *Department of Clinical Sciences, College of Medicine, University of Sulaimani, Madam Mitterrand Street, Sulaymaniyah, Iraq*

**** Corresponding author:*** *ariabdullah1978@gmail.com (A. M. Abdullah). Sulaymaniyah Heights, Zone 3, H316, Zip code: 46001, Sulaymaniyah, Iraq*

Check for updates

Keywords:
Endocrine malignancies
Hyperparathyroidism
Papillary thyroid carcinoma
Parathyroid carcinoma
Synchronous neoplasms

Received: September 29, 2026
Revised: October 31, 2026
Accepted: November 8, 2026
First Published: November 16, 2026

Copyright: © 2026 Abdullah et al. This is an open access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Citation: Abdullah AM, Qaradakhy AJ, Qadir AA, Ahmed HA, Ahmed YF, Mohammed RA, et al. Parathyroid and Papillary Thyroid Carcinoma: A Case Series. Barw Medical Journal. 2026;4(2): 12-21
https://doi.org/10.58742/bmj.v4i2.249

Abstract

Introduction

Parathyroid carcinoma (PC) is an exceptionally rare malignancy, whereas papillary thyroid carcinoma (PTC) is the most common thyroid cancer; their coexistence is extremely infrequent. This case series reports the synchronous occurrence of PC and PTC.

Methods

This single-center case series included patients with synchronous PC and PTC diagnosed histopathologically according to the 2022 World Health Organization criteria between March 2021 and February 2026. Demographic, clinical, laboratory, radiological, management, and outcome data were retrieved from electronic records and analyzed descriptively.

Results

Four patients (three females, 75%) with a mean age of 60.25 years (range: 52–69 years) were included. Two patients (50%) underwent right thyroid lobectomy with right parathyroidectomy and lymph node dissection, one (25%) underwent total thyroidectomy with left parathyroidectomy, and one (25%) underwent total thyroidectomy, left parathyroidectomy, cervical lymph node dissection, and left superficial parotidectomy. One patient (25%) died after developing stridor due to bilateral vocal cord paralysis, whereas the other three were alive without local recurrence during follow-up (1–58 months).

Conclusion

Synchronous PC and PTC can present incidentally or with nonspecific symptoms, and a coexisting thyroid malignancy may be overlooked when attention centers on the parathyroid tumor. Careful sonographic and histopathologic evaluation of both glands may improve detection in patients with thyroid or parathyroid lesions.

1. Introduction

Parathyroid carcinoma (PC) is an exceptionally rare cancer, accounting for fewer than 0.005% of all cancers globally, with an estimated annual incidence of 3.5–5.7 cases per 10 million individuals [1]. Accounting for fewer than 1% of primary hyperparathyroidism (PHPT) cases, PC occurs equally in men and women and is most common in mid adulthood [2]. Despite its low prevalence, PC carries significant morbidity, largely driven by severe hypercalcemia and the risk of local and distant metastases [1]. Its etiology remains poorly understood, although hyperparathyroidism-associated genetic syndromes are recognized predisposing factors [2]. Papillary thyroid carcinoma (PTC), by contrast, is the most common thyroid malignancy, accounting for 80-85% of all thyroid cancer, especially in countries where iodine intake is adequate [3]. It occurs predominantly in females, and the median age at presentation is 50 years, with genetic mutations and prior radiation exposure as its established risk factors [4]. Concurrent thyroid disease is common in PHPT, yet the synchronous occurrence of PC and PTC is exceptionally rare [5].

The current series presents a single-center experience regarding diagnosis, management, and prognosis of patients with synchronous PC and PTC. Additionally, all referenced sources have undergone verification [6].

2. Methods

2.1 Study Design and Setting

This study was a retrospective single-center case series. The study period spanned from March 2021 to February 2026.

2.2 Eligibility and Diagnostic Criteria

The study included all patients diagnosed with synchronous PC and PTC. Diagnoses were confirmed through histopathological examination. Patients in whom either malignancy could not be confirmed histopathologically were excluded. Missing clinical, laboratory, or follow-up data were recorded as not available. Histopathological diagnoses were made on the resected specimens according to the 2022 World Health Organization (WHO) classifications of thyroid and parathyroid tumors [7,8]. Papillary thyroid carcinoma was diagnosed on the basis of its characteristic nuclear features, namely enlarged, crowded, and overlapping nuclei, chromatin clearing, nuclear grooves, and intranuclear pseudoinclusions, and its subtype was classified according to the 2022 WHO classification. Parathyroid carcinoma was diagnosed only when at least one of the following was present: vascular invasion, lymphatic invasion, perineural invasion, invasion into adjacent structures, or histologically confirmed metastasis. Trabecular architecture, a thick capsule, fibrous bands traversing the gland, nuclear atypia, and mitotic activity were regarded as supportive but not diagnostic on their own. Synchronous occurrence was defined as the histopathological diagnosis of both malignancies in specimens obtained during the same surgical procedure.

2.3 Data Collection and Variables

Data were systematically extracted from the hospital's electronic registry and radiological archives. Collected variables included demographic profiles, clinical presentations, medical and surgical histories, laboratory results, imaging findings, fine-needle aspiration (FNA) results, histopathological findings, specific surgical procedures, and longitudinal follow-up data.

2.4 Pre-operative Assessments

Clinical examination included assessment of thyroid goiter size using the WHO (World Health Organization) goiter grading, as well as nodule consistency and tenderness. Laboratory investigations were performed to assess thyroid function and overall health status, including thyroid-stimulating hormone (TSH), free thyroxine (FT4), parathyroid hormone (PTH), and serum calcium. Ultrasonography (US) was performed to evaluate thyroid gland morphology, detect nodular changes, and identify parathyroid and cervical lesions, and results were reported according to the American College of Radiology Thyroid Imaging Reporting and Data System (ACR TI-RADS; categories TR1–TR5) [9]. When indicated, FNA was performed under US guidance. Thyroid cytology results were classified according to the Bethesda System for Reporting Thyroid Cytopathology (TBSRTC).

2.5 Treatment Modalities

All patients underwent surgical intervention. Depending on the case, this comprised a combination of thyroid lobectomy or total thyroidectomy, parathyroidectomy, cervical lymph node dissection, and superficial parotidectomy.

Parathyroidectomy was performed with the patient positioned supine and the neck slightly extended over a shoulder roll. A standard transverse cervical (collar) incision of approximately 5 to 6 cm was made two fingerbreadths above the sternal notch along a natural skin crease. The skin and subcutaneous tissues were divided with electrocautery under meticulous hemostasis. The platysma was divided in line with the incision, and superior and inferior subplatysmal flaps were elevated to the thyroid cartilage above and the sternal notch below. The cervical linea alba was divided longitudinally, and the strap muscles (sternohyoid and sternothyroid) were separated in the midline and retracted laterally to expose the thyroid, with partial division of the sternothyroid near its superior insertion when added exposure was needed. Extracapsular sharp and blunt dissection mobilized the lesion circumferentially while avoiding capsular manipulation or rupture, and feeding vessels from the inferior thyroid artery were individually ligated. En bloc resection of the tumor with the ipsilateral thyroid lobe and adherent soft tissue was performed to

preserve oncologic integrity and minimize tumor seeding. The recurrent laryngeal nerve was identified in the tracheoesophageal groove and preserved throughout, with intraoperative nerve monitoring used when available to confirm its integrity before and after excision. The ipsilateral normal parathyroid glands were identified and preserved with attention to their vascular supply.

Total thyroidectomy followed a capsular dissection technique, using a collar-incision flap, cautery-free suture ligation of the vascular pedicles, and division of the inferior thyroid vessels close to the capsule with preservation of the parathyroid glands and their surrounding fat. The recurrent laryngeal nerve was exposed by sharp and blunt dissection kept near the gland [10].

Parotidectomy was performed under general anesthesia through a lazy S incision used to raise a skin flap. The greater auricular and facial nerves were identified and preserved, and the gland was dissected intracapsularly on its anterior surface and extracapsularly on its posterior surface to complete a superficial parotidectomy, with total parotidectomy reserved for deep-lobe tumors [11].

2.6 Post-operative Assessments

Pathological staging was performed for resected specimens in accordance with the American Joint Committee on Cancer (AJCC) Cancer Staging Manual, 8th Edition, for both PTC and PC [12]. Laboratory testing included serum calcium, PTH, and thyroglobulin (Tg) where available, with continued monitoring during follow-up.

2.7 Statistical Analysis

Collected data were entered into Microsoft Excel 2021 and subsequently analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 27.0. Descriptive statistics were applied, with continuous variables reported as mean ± standard deviation (SD) and range, and categorical variables as frequencies and percentages. Symptom duration, postoperative Tg, and follow-up duration were summarized only for patients with available data (n = 3, n = 2, and n = 3, respectively).

3. Results

The study included four patients, with a mean age of 60.25 ± 7 years (range: 52 to 69 years). The cases included three females (75%) and one male (25%). Regarding the chief complaint, one patient (25%) had an incidental finding, one (25%) complained of joint pain, and two (50%) complained of anterior neck swelling. In terms of tobacco use, three patients were non-smokers (75%), and one was a smoker (25%). In terms of comorbidities, two patients (50%) had hypertension, one of whom also had ischemic heart disease, while the remaining two (50%) had no significant medical history. Three patients (75%) had undergone various previous operations, including a subtotal thyroidectomy in one patient (25%), and one had no past surgical history (25%). Family history was positive for follicular thyroid cancer in one case (25%) and hypothyroidism in another (25%), while the remaining two patients had non-significant family histories (50%). Concerning pre-operative blood investigations of the patients, all of them had normal thyroid function (100%), their serum calcium ranged from 8.62 to 16.60 mg/dL, and their PTH ranged from

53.51 to 1050 pg/mL. On US, concurrent parathyroid and thyroid lesions were identified in two cases (50%), a parathyroid lesion alone in one (25%), and a thyroid lesion with a parotid gland mass in one (25%) (Figure 1). Retrosternal extension was present in one case. Fine-needle aspiration was performed in three patients (75%): the thyroid aspirates in Case 2 were nondiagnostic (Bethesda I, right lobe) and benign (Bethesda II, left lobe), the right-sided aspirate in Case 3 suggested a parathyroid adenoma, and the left thyroid aspirate in Case 4 was malignant (Bethesda VI), with cytology from the left parotid mass reported as nondiagnostic.

All of the patients underwent surgical intervention (100%); two (50%) underwent right thyroid lobectomy with right parathyroidectomy and lymph node dissection, one (25%) underwent total thyroidectomy with left parathyroidectomy, and one (25%) underwent total thyroidectomy, left parathyroidectomy, cervical lymph node dissection, and left superficial parotidectomy. Histopathological examination confirmed synchronous PC and PTC in all patients (100%) (Figure 2 & Figure 3).

The average maximum thyroid tumor diameter was 1.03 ± 0.78 cm (range: 0.3–1.8 cm). Pertaining to tumor characteristics, three cases were unifocal (75%), and one was multifocal (25%). The conventional PTC subtype was identified in three patients (75%), while one (25%) exhibited the infiltrative follicular variant. All thyroid tumors (100%) demonstrated the characteristic nuclear features of PTC. Lymphovascular and perineural invasion were each identified in two thyroid tumors (50%), and extrathyroidal extension in one (25%). Lymph node metastases were present in two patients (50%; 3/3 and 10/30 nodes), both staged N1b, whereas the nodes examined in the other two patients were free of tumor (7 and 17 nodes). In reference to the parathyroid tumors, all four (100%) were diagnosed as PC. The mean maximum parathyroid tumor diameter was 2.13 ± 0.85 cm (range: 1.0–3.0 cm). All parathyroid tumors were unifocal (100%). Two were right-sided (50%) and two were left-sided (50%).

Lymphovascular invasion was identified in three parathyroid tumors (75%) and perineural invasion in one (25%). The PC in Case 1 directly invaded the thyroid gland (pT2), whereas the remaining three were staged pT1. During the postoperative period, Tg levels were available for two patients (50%; 0.5 and 1.6 ng/mL).

Barw Medical Journal | 2026;4(2):12-21 | https://doi.org/10.58742/bmj.v4i2.249

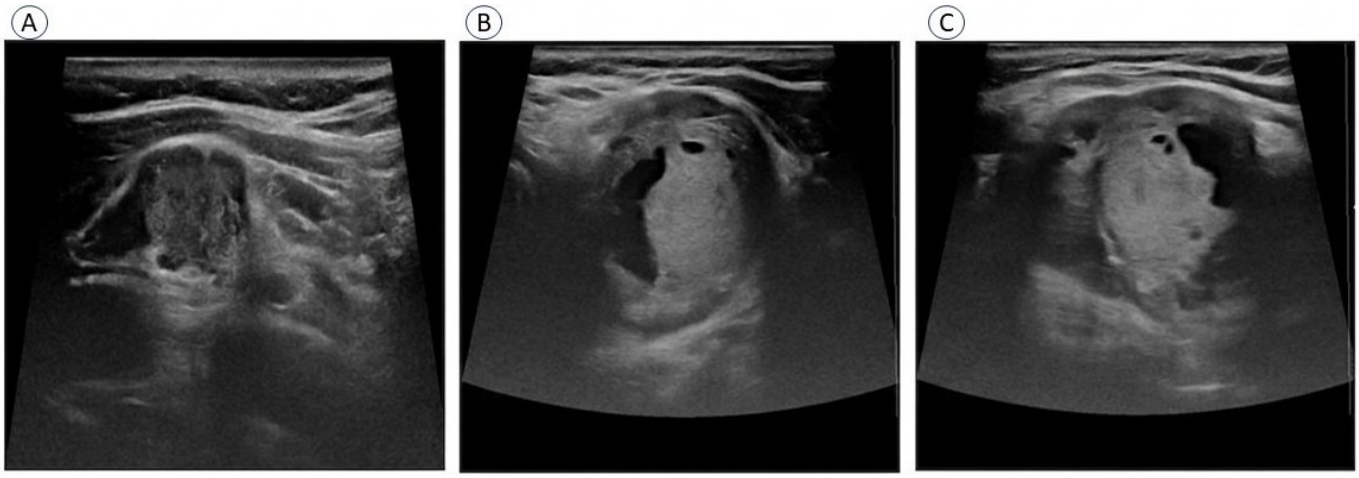


Figure 1. *(A) Longitudinal ultrasound image of Case 1, showing a well-defined solid hypoechoic TR5 thyroid nodule with microcalcifications, measuring 18 × 12 mm. (B and C) Transverse and longitudinal ultrasound images showing a complex, predominantly solid heterogeneous nodule inferior to the lower pole of the left thyroid lobe, measuring 25 mm and suspicious for a parathyroid lesion.*

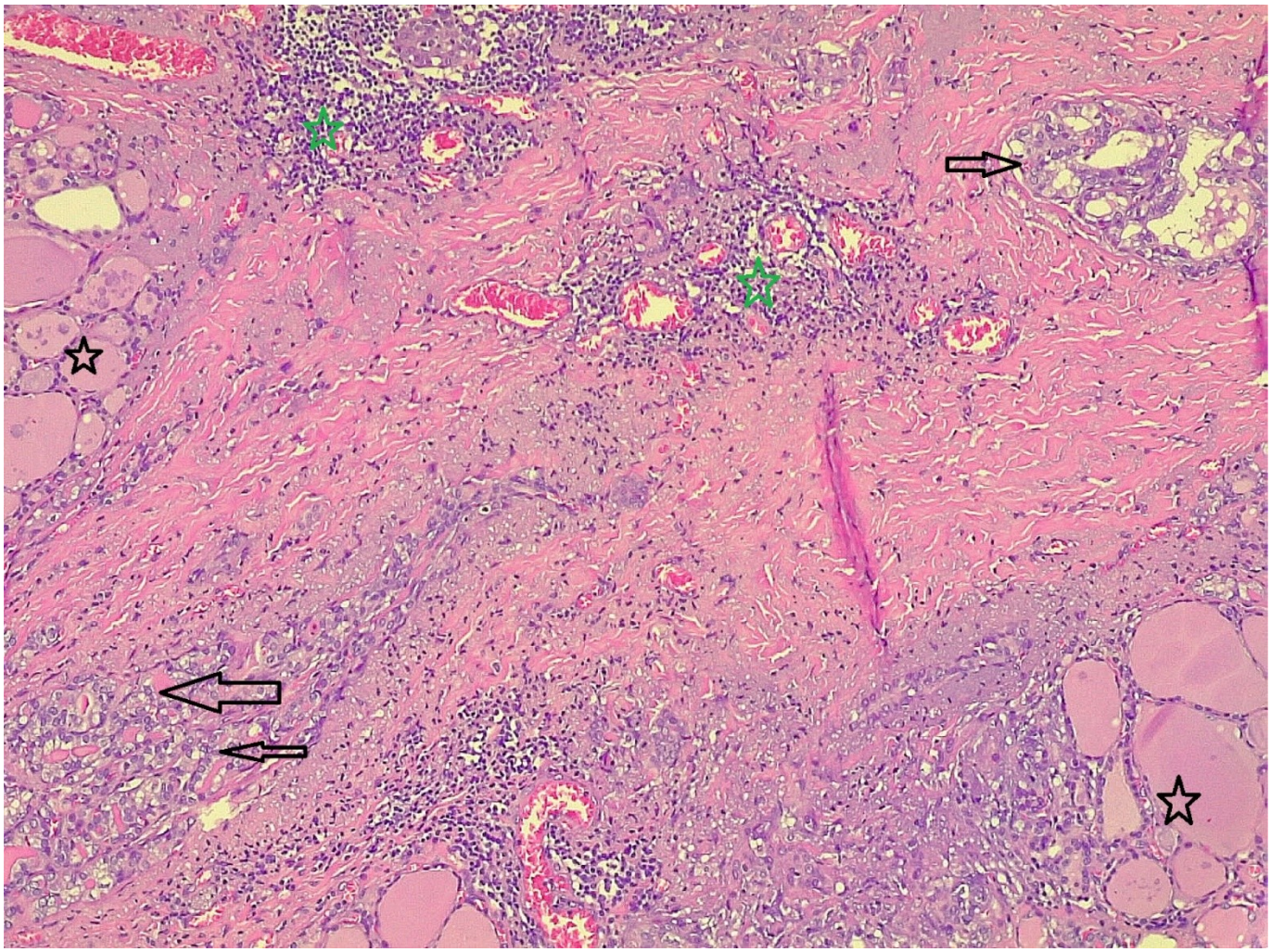


Figure 2. *Infiltrative follicular pattern (dark arrows) with nuclear features of papillary thyroid carcinoma in the form of nuclear clearing and overlapping, in a fibrous stroma containing lymphoid cells (green stars) with the presence of unremarkable thyroid follicles (dark stars). Hematoxylin and Eosin stain. Original magnification, ×10.*

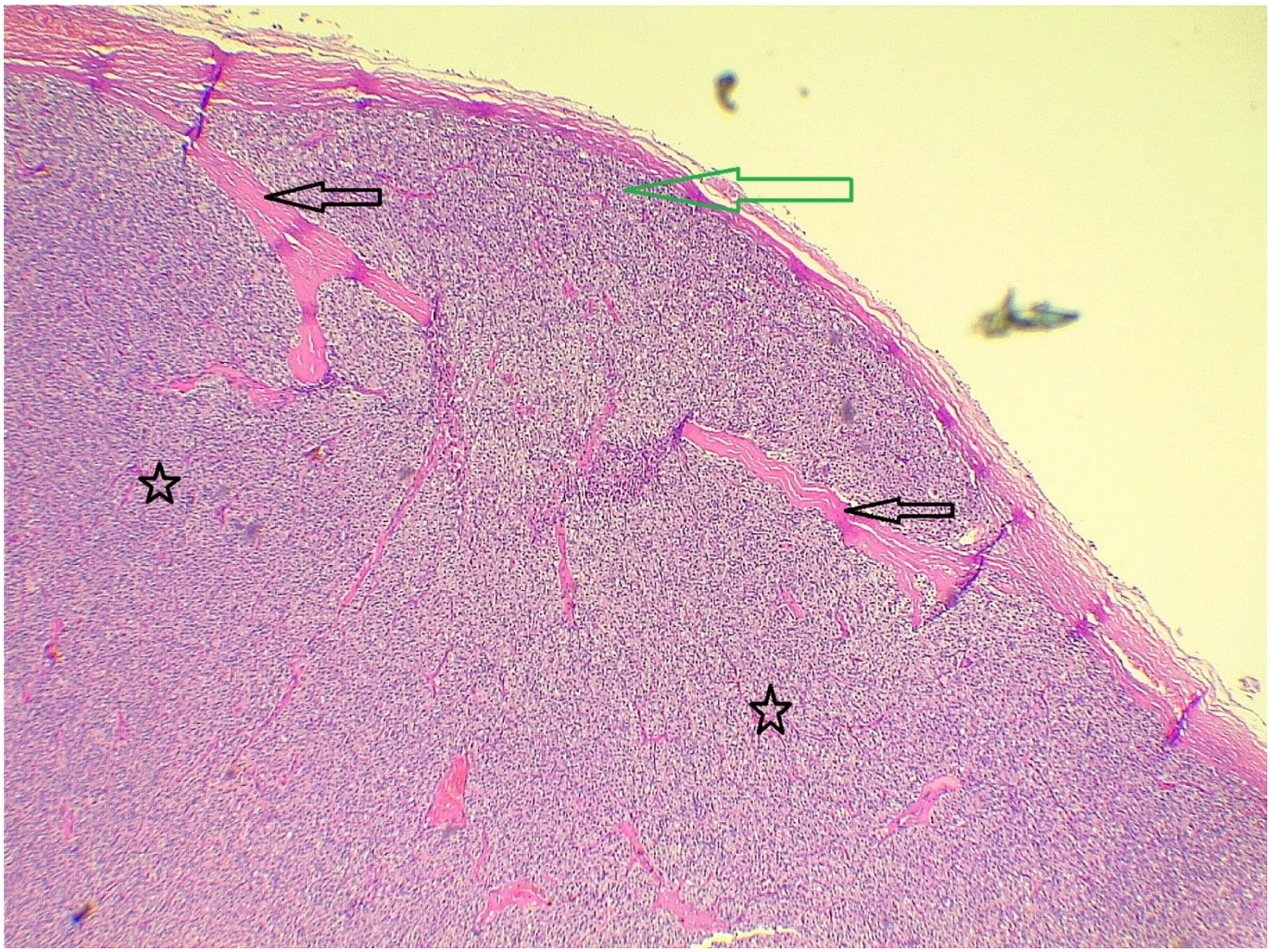


Figure 3. *Low-power view showing a nodule of parathyroid gland (dark stars) having a thick, disrupted fibrous capsule (dark arrows) with evidence of a mushroom-like invasion by the tumor cells (green arrow). Hematoxylin and Eosin stain. Original magnification, ×4.*

Serum calcium levels ranged from 8.7 to 9.4 mg/dL, and PTH levels ranged from 27.71 to 105 pg/mL. One patient (25%) passed away after developing stridor due to bilateral vocal cord paralysis. None of the three surviving patients developed recurrent swelling or evidence of local recurrence during a follow-up period ranging from 1 to 58 months (Table 1 & Table 2).

4. Discussion

Distinguishing PC from benign causes of PHPT is a diagnostic challenge, as presentations are generally similar, imaging lacks reliable discriminatory value and FNA is sometimes avoided because of the risk of tumor seeding [1]. Unlike benign hyperparathyroidism, PC often presents with a palpable neck mass (nearly 50%) and hoarseness, in addition to systemic manifestations of hypercalcemia and hyperparathyroidism, such as bone pain, nephrolithiasis, and neurocognitive symptoms [1,2]. Papillary thyroid carcinoma, by contrast, typically presents as an asymptomatic painless thyroid mass, with or without enlargement of regional cervical lymph nodes. Hoarseness and dysphagia occur in approximately 20% of cases [4].

Females predominated in the present series, accounting for three of the four cases (75%), with ages spanning 52 to 69 years. This pattern mirrors the cases described by Ben Nacef et al., Baek et al., and Chaychi et al., all of whom documented women older than 50 [5,13,14]. Nouira et al., by contrast, presented a 37-year-old woman, younger than any patient in the current series, which indicates that the condition can arise in younger individuals as well [15]. In the present series, one patient presented incidentally (25%), similar to the case reported by Baek et al. [5]. One patient (25%) presented with joint pain, a musculoskeletal manifestation of hypercalcemia, which parallels the bone pain and the lower back pain observed in other reported cases [15,16].

Barw Medical Journal | 2026;4(2):12-21 | https://doi.org/10.58742/bmj.v4i2.249

Table 1. Clinicopathological characteristics and outcomes of the four cases with synchronous parathyroid and papillary thyroid carcinoma.

Case	Age, Gender, Smoking	PH	Presentation	Examination	Investigation		Management	HPE	Follow Up	
					US (largest nodule)	FNAC			Status	Tg (ng/mL)
1	69, F, no	HTN, sub-total thyroidectomy, hysterectomy, cholecystectomy	Incidental finding	G2, firm, no tenderness	Both lobes TR3 (48*42*25mm and 36*30*27), 25mm parathyroid nodule or TR4	N/A	Total thyroidectomy, LT parathyroidectomy	PTC (Conventional, unifocal, LT. lobe, 1.8cm, Well-differentiated, 3/3 involved, pT1b N1b). PC (unifocal, LT. side, 3cm, 1 LN free, pT2 N0)	Dead	0.5
2	61, F, no	Negative	joint pain	G0-1, soft, no tenderness	Both lobes TR4 (7*6*5mm and 4*3*2mm), 30*22*18mm parathyroid lesion	RT. Lobe Bethesda I, LT. lobe Bethesda II	RT. lobectomy, LN dissection, and RT. parathyroidectomy	PTMC (Infiltrative follicular, unifocal, RT. Lobe, 0.3cm, well-differentiated, 7 LN free, pT1a). PC (Unifocal, RT. side, 2.5cm, N/A, pT1 N0)	Alive	N/A
3	52, F, no	Negative, hysterectomy	anterior neck swelling	G1, soft, no tenderness	Parathyroid lesion (23*23*15mm)	RT. lobe parathyroid adenoma	RT. lobectomy, LN dissection, and RT. parathyroidectomy	PTMC (Conventional, unifocal, RT. Lobe, 0.4cm, Well-differentiated, 17 LN free, pT1a). PC (Unifocal, RT. side, 2cm, N/A, pT1 N0 Mx)	Alive	N/A
4	59, M, yes	HTN, IHD, left knee operation	anterior neck swelling	G2, soft, no tenderness	Both lobes (Lt TR5 17×15×13 mm, and Rt TR4 <5mm), 36×30×16mm; LT parotid mass	LT. thyroid Bethesda VI; LT parotid FNA nondiagnostic	Total thyroidectomy, LT parathyroidectomy, left central and lateral cervical LN dissection, and LT. superficial parotidectomy	PTC (Conventional, multifocal, Bilateral, 1.6cm, Well-differentiated, 10/30 involved, pT1b(m) N1b). PC (Unifocal, LT. side, 1cm, N/A, pT1 N0 Mx)	Alive	1.6

Abbreviations: *F, Female; M, Male; HTN, Hypertension; G, Grade; PTC, Papillary thyroid carcinoma; PTMC, Papillary thyroid microcarcinoma; PC, Parathyroid carcinoma; US, Ultrasonography; FNAC, Fine needle aspiration cytology; HPE, Histopathological examination; Tg, Thyroglobulin; RT, Right; LT, Left; N/A, Not-available; LN, Lymph node; IHD, Ischemic heart disease; PH, Past history; T, Tumor; N, Node; TR, TI-RADS*

Table 2. Summary of patient characteristics, tumor features, and perioperative data.

Continuous variables		**Mean ± SD**	**Range**
Age (years)		60.25 ± 7	52 – 69
Duration of symptoms (months) (n = 3)		2.00 ± 1.00	1 – 3
Pre-operative TSH (µIU/mL)		1.69 ± 0.21	1.47 – 1.95
Pre-operative FT4 (pmol/L)		16.37 ± 0.33	15.95 – 16.72
Pre-operative calcium (mg/dL)		11.88 ± 3.41	8.62 – 16.6
Pre-operative PTH (pg/mL)		422.38 ± 442.10	53.51 – 1050
Thyroid tumor size (cm)		1.03 ± 0.78	0.3 – 1.8
Parathyroid tumor size (cm)		2.13 ± 0.85	1.0 – 3.0
Post-operative calcium (mg/dL)		9.02 ± 0.33	8.7 – 9.4
Post-operative Tg (ng/mL) (n = 2)		1.05 ± 0.78	0.5 – 1.6
Follow-up duration (months) (n = 3)		34.33 ± 29.70	1 – 58
Post-operative PTH (pg/mL)		55.13 ± 34.21	27.71–105.00
Categorical Variables	**Sub-Category**	**Frequency (n)**	**Percentage (%)**
Sex	F	3	75
	M	1	25
Chief complaint	Incidental finding	1	25
	Joint pain	1	25
	Anterior neck swelling	2	50
Past medical history	No comorbidities	2	50

Table 2. Continued....

	HTN	1	25
	HTN + IHD	1	25
Past surgical history	Previous subtotal thyroidectomy	1	25
	Other operations only	2	50
	None	1	25
Smoking history	Non-smoker	3	75
	Active smoker	1	25
Family history	Negative	2	50
	Follicular thyroid carcinoma	1	25
	Hypothyroidism	1	25
Ultrasound findings	Parathyroid and thyroid lesion	2	50
	Parathyroid lesion only	1	25
	Thyroid and parotid gland lesion	1	25
Thyroid tumor subtype	Conventional PTC	3	75
	Infiltrative follicular PTC	1	25
Thyroid tumor focality	Unifocal	3	75
	Multifocal	1	25
Thyroid lymphovascular invasion	Present	2	50
	Absent	2	50
Thyroid perineural invasion	Present	2	50
	Absent	2	50
Thyroid extrathyroidal extension	Present	1	25
	Absent	3	75
Thyroid lymph node metastasis	Present (N1b)	2	50
	Absent	2	50
Parathyroid tumor side	Right	2	50
	Left	2	50
Parathyroid lymphovascular invasion	Present	3	75
	Absent	1	25
Parathyroid perineural invasion	Present	1	25
	Absent	3	75
Surgical procedure	Right lobectomy, LN dissection and parathyroidectomy	2	50

Table 2. Continued....

	Total thyroidectomy and left parathyroidectomy	1	25
	Total thyroidectomy, left parathyroidectomy, LN dissection and left superficial parotidectomy	1	25
Patient outcome	Alive	3	75
	Deceased	1	25

Abbreviations: *SD, Standard deviation; TSH, Thyroid-stimulating hormone; FT4, Free thyroxine; PTH, Parathyroid hormone; Tg, Thyroglobulin; PTC, Papillary thyroid carcinoma; IHD, Ischemic heart disease; LN, Lymph node; HTN, Hypertension; M, Male; F, Female*

Ultrasonography, computed tomography (CT), and magnetic resonance imaging (MRI) are commonly used to evaluate both PTC and PC. Among these, US is the primary imaging modality, particularly for PTC [2,4]. In the current series, US detected both the parathyroid and thyroid lesions in two patients (50%). This agrees with the cases described by Ben Nacef et al., Baek et al., and Lam-Chung et al., in which preoperative US visualized the two lesions together [5,14,17]. In one patient (25%), US demonstrated the parathyroid lesion alone. A similar limitation was reported by Nouira et al., whose scan captured only the parathyroid nodule, with the papillary carcinoma recognized on final histopathology [15]. Conversely, in one case, US showed no parathyroid lesion, and the 1 cm left-sided PC in Case 4 was identified only on histopathology, indicating that a small PC can be missed preoperatively.

Managing PC is challenging due to its rarity and diagnostic complexity, with 60–80% recurrence despite parathyroidectomy. Conversely, PTC management relies on preoperative risk assessment, and small tumors may undergo active surveillance with surgery reserved only for significant size or characteristic change [2,4]. Surgical resection was the mainstay of treatment in the present series, consisting of thyroid lobectomy with parathyroidectomy in two cases (50%). This aligns with Baek et al., who treated their patients with thyroid lobectomy alongside parathyroidectomy [5]. No adjuvant therapy was used in the current series, in contrast to the case reported by Nouira et al., who underwent radioiodine therapy postoperatively [15]. This diversity in management highlights the need for a tailored approach.

In PTC, FNA cytology directs the preoperative workup, but the diagnostic nuclear features and the tumor subtype are confirmed on histopathology [4]. In PC, histopathology after resection provides the definitive diagnosis, resting on unequivocal invasion, namely vascular, lymphatic, or perineural invasion, invasion into adjacent structures, or metastasis [2]. All four PCs in the present series fulfilled these criteria, with lymphovascular invasion in three and perineural invasion in one. The histopathology in the current series echoed some reports and departed from others. The 0.3 cm infiltrative follicular papillary microcarcinoma in one case mirrored Baek et al., who found a 0.5 cm follicular-variant papillary carcinoma alongside the parathyroid tumor [5]. In three cases of the present series, the parathyroid and thyroid malignancies remained anatomically distinct. In Case 1, however, the PC directly invaded the thyroid gland (pT2), similar to the case described by Chaychi et al. and the 3.5 cm parathyroid carcinoma directly invading the thyroid gland reported by Nouira et al. [13,15].

The outcome in PC is favorable early but declines over time, with a 5-year overall survival of 84% after surgery and a median survival approaching 14 years [2]. Papillary thyroid carcinoma, by comparison, carries an excellent prognosis even though it frequently spreads to regional lymph nodes [4]. In the present series, one patient (25%) died early from airway obstruction due to bilateral vocal cord paralysis, reflecting a perioperative complication rather than tumor progression. Reoperative surgery after a previous subtotal thyroidectomy and retrosternal extension of the goiter may have increased the risk of bilateral recurrent laryngeal nerve injury in this patient. The other three patients (75%) stayed alive and recurrence-free during follow-up, aligning with the surviving patients described by Baek et al. and Chaychi et al. [5,13].

This case series has several limitations, including a small sample size, a single-center retrospective design, uneven follow-up that was as short as one month in one patient and is insufficient to assess the late recurrence typical of PC, and missing Tg levels in two patients.

5. Conclusion

Synchronous PC and PTC can present incidentally or with nonspecific symptoms, and a coexisting thyroid malignancy may be overlooked when attention centers on the parathyroid tumor. Careful sonographic and histopathologic evaluation of both glands

may improve detection in patients with thyroid or parathyroid lesions.

Declaration

Conflicts of interest: The authors declare that they have no competing interests.

Ethical approval: Ethical approval was not required for this study.

Patient consent (participation and publication): The patients or their next of kin provided written informed consent for the publication of this work.

Funding: No funding was received for this study.

Acknowledgments: The authors have no acknowledgements to report.

Authors' contributions: A.M.A. and A.A.Q. were significant contributors to the conception of the study and the literature search for related studies. H.A.A., Y.F.A., R.A.M., D.H.H., M.H.R., A.J.Q, D.A.K., and S.M.J. were involved in the literature review, the study's design, and the critical revision of the manuscript, and they participated in data collection. A.T.A. was the main contributor to the writing and revision of the manuscript. R.A.Y. wrote the original draft of the manuscript. A.M.A. was the pathologist who performed the diagnosis of the cases. A.T.A. and R.A.Y. confirm the authenticity of all the raw data. All authors approved the final version of the manuscript.

Use of AI: Claude Opus 5 was used to assist with language refinement and improve the overall clarity of the manuscript. All content was thoroughly reviewed and approved by the authors.

Data availability statement: The datasets used during the current study are available from the corresponding author upon reasonable request.

References

1. Viswanath A, Drakou EE, Lajeunesse-Trempe F, Grossman AB, Dimitriadis GK. Parathyroid carcinoma: New insights. Best Practice & Research Clinical Endocrinology & Metabolism. 2025;39(2):101966. doi:10.1016/j.beem.2024.101966
2. Helbing A, Menon G. Parathyroid Carcinoma. In: StatPearls [Internet]. StatPearls Publishing. 2025. Available from https://www.ncbi.nlm.nih.gov/sites/books/NBK519038/
3. Abdullah A, Qaradakhy A, Saeed Y, Salih A, Karim S, Ali O, et al. Papillary thyroid carcinoma associated with non-functioning parathyroid carcinoma with Warthin's tumor of the parotid gland: A case report and brief literature review. Med Int. 2023;3(3):26. doi:10.3892/mi.2023.86
4. Limaiem F, Rehman A, Anastasopoulou C, Mazzoni T. Papillary Thyroid Carcinoma. [Updated 2024 Mar 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/sites/books/NBK536943/
5. Baek C-O, Kim KH, Song SK. Synchronous parathyroid carcinoma and papillary thyroid carcinoma in a patient with long-standing schizophrenia. Korean J Intern Med. 2017;32(6):1104–1107. doi:10.3904/kjim.2015.072
6. Kakamad FH, Mohammed SH, Abdalla BA, Hussein DA, Hammood ZD, Kakamad SH, et al. Non-Recommended Publishing Lists: Strategies for Detecting Deceitful Journals. Barw Med J. 2026:33–41. doi:10.58742/bmj.v4i1.227
7. Erickson LA, Mete O, Juhlin CC, Perren A, Gill AJ. Overview of the 2022 WHO Classification of Parathyroid Tumors. Endocr Pathol. 2022;33(1):64–89. doi:10.1007/s12022-022-09709-1
8. Baloch ZW, Asa SL, Barletta JA, Ghossein RA, Juhlin CC, Jung CK, et al. Overview of the 2022 WHO Classification of Thyroid Neoplasms. Endocr Pathol. 2022;33(1):27–63. doi:10.1007/s12022-022-09707-3
9. Tessler FN, Middleton WD, Grant EG, Hoang JK, Berland LL, Teefey SA, et al. ACR Thyroid Imaging, Reporting and Data System (TI-RADS): White Paper of the ACR TI-RADS Committee. Journal of the American College of Radiology. 2017;14(5):587–595. doi:10.1016/j.jacr.2017.01.046
10. Salih AM, Baba HO, Ahmed MM, Kakamad FH, Hassan HA, Hassan MN, et al. Modified thyroidectomy: 4 techniques to prevent recurrent laryngeal nerve injury and postoperative hypocalcemia. IJS Short Reports. 2022;7(2):e45. doi:10.1097/SR9.0000000000000045
11. Salih AM, Baba HO, Saeed YA, Muhialdeen AS, Kakamad FH, Mohammed SH, et al. Pattern of facial nerve palsy during parotidectomy: a single-center experience. J Int Med Res. 2022;50(7):03000605221108930. doi:10.1177/03000605221108930
12. Amin MB, Edge SB, Greene FL, Byrd DR, Brookland RK, Washington MK, et al., editors. AJCC Cancer Staging Manual [Internet]. 8th ed. Cham: Springer; 2017 [cited 2026 Oct 8]. Available from: https://link.springer.com/book/9783319406176
13. Chaychi L, Belbruno K, Golding A, Memoli V. Unusual Manifestation of Parathyroid Carcinoma in the Setting of Papillary Thyroid Cancer. Endocrine Practice. 2010;16(4):664–668. doi:10.4158/EP10061.CR
14. Ben Nacef I, Khelifi D, Kalthoum M, Rojbi I, Riahi I, Mekni S, et al. Synchronous parathyroid carcinoma and papillary thyroid carcinoma. Clinical Case Reports. 2022;10(9):e06369. doi:10.1002/ccr3.6369
15. Nouira M, Halloul I, Khribi M, Sfar R, Abdelkefi M, Gnaba K, et al. An unusual presentation of papillary thyroid carcinoma: a case report Tunis Med. 2023;101(3):391-394.
16. Iványi G, Christofi A, Sipka G, Zombori T, Kuthi L, Simon A, et al. Radiation-Induced Synchronous Parathyroid Carcinoma and Papillary Thyroid Carcinoma: Clinical, Morphological, and Genetic Insights. International Journal of Molecular Sciences. 2025;26(9):4441. doi:10.3390/ijms26094441
17. Lam-Chung CE, Rodríguez-Orihuela DL, Anda González JD, Gamboa-Domínguez A. An Unusual Simultaneous Existence of Parathyroid Carcinoma and Papillary Thyroid Carcinoma: Case Report and Review of Literature. Case Reports in Endocrinology. 2020(1):2128093. doi:10.1155/2020/2128093