VER
Vascular & Endovascular Review

Papillary Thyroid Carcinoma Arising in Struma Ovarii: Case Report and Literature Review

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ABSTRACT

Background & Objective: Papillary thyroid carcinoma (PTC) arising in struma ovarii is an exceptionally rare malignancy, accounting for approximately 3% of all struma ovarii cases. In this paper, we report a case of a 61-year-old woman presenting with progressive abdominal enlargement and significant ascites, initially suspected as ovarian carcinoma. Materials & Methods: The patient underwent primary debulking surgery. Postoperative evaluation included imaging and assessment of CA-125 levels. Histopathology was used to confirm the diagnosis. Results: The results shows that imaging revealed a large multiloculated pelvic mass with ascites and pleural effusion, and markedly elevated CA-125 levels further supported the suspicion of ovarian malignancy. Histopathology confirmed papillary thyroid carcinoma arising in struma ovarii. Postoperative evaluation revealed TI-RADS 5 thyroid nodules and suspicious cervical lymphadenopathy, raising concern for synchronous primary thyroid carcinoma. Multidisciplinary management included recommendations for total thyroidectomy, radioactive iodine therapy, and thyroid hormone suppression. Conclusion: This case highlights the diagnostic challenges associated with malignant struma ovarii and underscores the importance of comprehensive postoperative thyroid evaluation. Current evidence supports a risk-stratified approach integrating therapeutic principles from differentiated thyroid cancer to optimize long-term outcomes.

KEYWORDS: Struma Ovarii, Papillary Thyroid Carcinoma, Ovarian Teratoma, Radioactive Iodine

How to Cite: Ayu Dyah Primaningrum, As'ad Naufal, Delvany Rekaputri. (2025) Papillary Thyroid Carcinoma Arising in Struma Ovarii: Case Report and Literature Review, Vascular and Endovascular Review, Vol.8, No.15s, 176-180.

INTRODUCTION

Struma ovarii is a particular subtype of ovarian teratoma. Its principal diagnostic criterion is the predominance of thyroid tissue, which is required to make up a minimum of half of the tumor's total volume [1]. Although most cases are benign, malignant transformation which most commonly into papillary thyroid carcinoma is exceedingly rare and often identified incidentally due to its typically asymptomatic presentation [2]. Malignancy arises in approximately 3% of cases [3], with papillary thyroid carcinoma being the predominant histological subtype, reflecting incidence patterns similar to those observed in primary thyroid malignancies [4].

CASE REPORT

The patient, a 61-year-old woman with no prior history of ovarian disease or familial cancer, initially presented in November 2024 with progressive abdominal enlargement and weight loss, leading to referral for suspected ovarian malignancy based on the presence of an adnexal mass and ascites. On admission, physical examination revealed a fixed, solid abdominal mass measuring 15 cm, with no abnormalities of the uterus or vagina, and the patient remained in good general condition.

Further diagnostic evaluation included an abdominal CT scan, which demonstrated a large multilobulated cystic and solid pelvic mass measuring 11.4 × 10.9 × 12.2 cm, accompanied by ascites and right pleural effusion. Chest radiography revealed minimal right pleural effusion and paracardial infiltration, requiring additional assessment to exclude metastasis or infection. Tumor marker analysis showed a markedly elevated CA-125 level of 600 U/mL with normal CEA levels, supporting suspicion of an ovarian malignancy.

In December 2024, the patient underwent primary debulking surgery. The procedure consisted of a total abdominal hysterectomy, bilateral salpingo-oophorectomy, omentectomy, and cytological analysis of ascitic fluid. Intraoperatively, 11 liters of ascites were evacuated; the omentum exhibited adhesions to the ovarian and uterine masses, and a multiloculated right ovarian mass with dense adhesions to the rectum and pelvic wall was identified. The left adnexa and uterus appeared normal, and no lymphadenopathy was observed.

Histopathological examination confirmed papillary thyroid carcinoma arising in struma ovarii, measuring 10 × 9 × 7 cm, without

evidence of lymphovascular or perineural invasion, and cytology of the ascitic fluid was negative for malignancy (Figure 1). Adjacent gynecological structures and the omentum exhibited no tumor infiltration, and an incidental endocervical polyp was noted. Postoperatively, multidisciplinary evaluation was undertaken. Thyroid function tests were normal; however, thyroid ultrasonography identified multiple highly suspicious TI-RADS 5 lesions in both lobes and suspicious cervical lymph nodes, raising concern for synchronous primary thyroid carcinoma or nodal metastasis. Subsequent management focused on further diagnostic workup and treatment planning, with recommendations including radioactive iodine therapy, total thyroidectomy, chemotherapy, and thyroid hormone suppression, guided by ongoing follow-up and multidisciplinary discussion.

The patient did not show clinical manifestations of thyroid dysfunction, and physical examination did not reveal any palpable cervical mass. Preoperative thyroid function tests were within normal limits, thus supporting the decision not to perform thyroidectomy or initiate thyroid-related medical therapy at that time. Molecular examination for thyroid carcinoma gene panel has been conducted through referral and is currently awaiting results.

The patient has been receiving post-surgery check-ups for a duration of 10 months, with assessments conducted every three months, which showed good clinical outcomes, including well-healed surgical wound, no recurrent pelvic or cervical mass, and thyroid function laboratory results that remained normal. To date, no clinical or radiological evidence of disease recurrence has been found.

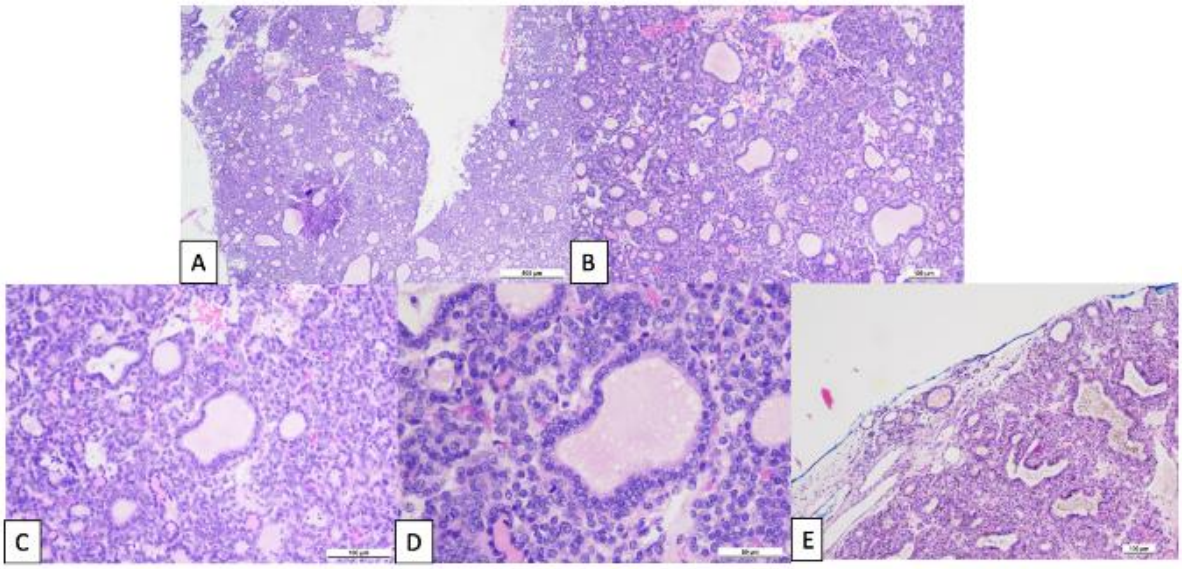

Figure 1: Histopathological features of papillary thyroid carcinoma arising in struma ovarii. (a) at 40× magnification. (b) at 100x magnification. (c) at 200x magnification. (d) at 400x magnification (e) Tumor infiltration through the capsule at 100× magnification.

LITERATURE REVIEW

Papillary thyroid carcinoma (PTC) arising in struma ovarii is an uncommon malignant transformation occurring in specialized ovarian teratomas, with clinical manifestations often resembling those of other ovarian neoplasms. Diagnosis is most frequently established postoperatively through histopathological and molecular examination [2,4–7]. The mean age at presentation typically falls between the fourth and sixth decades of life, with common symptoms including abdominal pain, a pelvic mass, and, less frequently, hyperthyroidism [8]. Most cases are unilateral, and tumor size may range from small lesions to large masses exceeding 10 cm [7–9].

Molecular studies demonstrate that up to 70% of thyroid-type carcinomas arising in struma ovarii harbor activating mutations in BRAF, RAS, or other kinases, supporting a pathogenesis analogous to that of cervical thyroid PTC [7,10,11]. These molecular insights have informed contemporary approaches to management and follow-up.

Historically, treatment algorithms bifurcated along lines of reproductive status: fertility-sparing surgery for younger patients and total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH-BSO) for postmenopausal women or those who had concluded childbearing [6,12,13]. Adjunctive thyroidectomy and radioactive iodine (RAI) ablation are recommended for patients with high-risk features, including tumor size greater than 2 cm, atypical histological features such as BRAF-mutated tumors, metastatic disease, or the presence of a synchronous thyroid lesion [11,13–15].

The results that have been documented are typically positive, with survival rates after 5 and 10 years surpassing 90%, even in situations where the disease is advanced or has recurred [7,11,16]. Nevertheless, late recurrences have been documented, underscoring the need for comprehensive long-term surveillance, including detailed thyroid evaluation, serial thyroglobulin

measurement, and appropriate imaging [6,11,12]. Additionally, approximately 6% of patients may harbor a synchronous thyroid carcinoma, further supporting the necessity of multidisciplinary assessment [10].

Table 1: Summary of Cases/Series

Reference	Age	Tumor size/site	Histology	Surgery	Thyroid-ectomy	RAI	Metastasis/ Recurrence	Outcomes
Rahimi 2024 [5]	64	4x4 cm ovary	PTC	TAH-BSO	Yes	Yes	No	NED 3 yrs
Tan 2015 [7]	22-55	2-7 cm ovary	PTC/FVPTC	USO	No	No	No	NED
Jean 2012 [6]	60	2.5 cm ovary	PTC	BSO	Yes	Yes	Peritoneum	NED 2 yrs
Selvaggi 2012 [16]	50	6.5x4.5 cm ovary	FTC/NEC	TAH-BSO	No	No	No	NED 1 yr
Zhu 2015 [2]	40	3 cm ovary	PTC	Debulk/BSO	No	No	Omentum	NED 1 yr
Al Hassan 2018 [8]	42	11 cm ovary	PTC	TAH-BSO	No	No	Contra ovary	Lost FU
Siegel 2019 [11]	44.9*	Varied	PTC/FVPTC	Diverse	49%	--	25% presented met	see text
Wu 2018 [17]	48	Large, multiple	PTC	Debulk	Yes	Yes	Extensive peritoneum	DG NED
Marti 2012 [12]	32-46	2-7 cm ovary	PTC/FTC	BSO/TAH	Yes	Yes	No	NED
Doganay 2008 [18]	53	--	PTC	TAH-BSO	Yes	No	No	NED
Shrimali 2012 [19]	52*	--	PTC/FTC	Various	Some	Some	No	NED
Leite 2013 [20]	78	8x7.9 cm ovary	FVPTC	USO	None	None	No/micro PTC thyroid	Died non-ca
Kabukcuoglu 2002 [21]	52	--	FVPTC	TAH-BSO	None	None	No	NED
Wong 2009 [22]	44	--	FVPTC	TAH-BSO	Yes	No	No	NED
Coyne 2010 [23]	38	--	FVPTC	Cystectomy	No	No	UK	NED
Roth 2008 [15]	30-77	1.2-12 cm	PTC/FTC	TAH-BSO	Some	Some	Some	Varied

*FVPTC: Follicular-variant papillary thyroid carcinoma. FTC: Follicular thyroid carcinoma. NEC: Neuroendocrine component. NED: No evidence of disease. RAI: Radioactive iodine ablation. Lost FU: Lost to follow-up

DISCUSSION

Papillary thyroid carcinoma (PTC) arising in struma ovarii (SO) constitutes a distinct clinicopathological entity that presents considerable diagnostic and therapeutic challenges [5,6,11]. Its rarity and frequently asymptomatic presentation result in most cases being identified incidentally after surgery, highlighting the limitations of preoperative diagnostic modalities [2,4]. This finding is consistent with our case, where the patient did not show symptoms of thyroid disorder, no palpable cervical mass was found, and the diagnosis was established postoperatively based on histopathological findings. Consequently, management strategies have evolved from treating these tumors as purely ovarian malignancies to adopting principles derived from differentiated thyroid cancer (DTC) management [6,12].

Diagnosis is typically established postoperatively and remains fundamentally dependent on histopathological evaluation [24]. The incorporation of molecular testing for BRAF, RAS, and other kinase mutations is essential [25], as these alterations not only demonstrate a shared pathogenesis with cervical thyroid PTC but also play a significant role in modern risk stratification [7,10,11]. Furthermore, the documented incidence of synchronous primary thyroid cancer in approximately 6% of cases mandates a thorough thyroid gland evaluation, including ultrasound, in all patients diagnosed with malignant SO [10,14].

Surgical management should be individualized, taking into account oncological principles as well as patient-specific considerations such as age and fertility goals. Fertility-sparing procedures, including unilateral oophorectomy, may be appropriate for younger patients with early-stage disease, whereas postmenopausal women or those with advanced presentations generally undergo comprehensive surgical staging, typically total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH-BSO) [6,8,12]. Surgical management in our patient consisted of TAH-BSO as part of primary debulking, which is consistent with recommendations for postmenopausal patients with large masses.

A key management challenge lies in determining the need for adjuvant therapy. A risk-based approach is now supported by evidence, mandating completion thyroidectomy and RAI ablation for high-risk patients. Indications for this aggressive therapy include tumor size >2 cm, metastatic presentation, atypical histology, BRAF mutation, or synchronous thyroid malignancy [6,8,12,13]. In contrast to that report, our patient did not show high-risk factors and had normal thyroid function, so no further thyroidectomy or RAI therapy was performed.

Although PTC arising in SO possesses malignant potential, overall prognosis is favorable, with reported 5- and 10-year survival rates exceeding 90% [7,11,16]. Nonetheless, this positive outlook does not negate the need for vigilant long-term surveillance. Late

recurrences, sometimes occurring more than a decade after initial therapy, have been documented, reinforcing the importance of indefinite follow-up using serum thyroglobulin measurement and appropriate imaging [6,11,12]. This is in line with our patient's follow-up for 10 months postoperatively, which showed good wound healing, no recurrent mass, and thyroid function results that remained normal on periodic evaluation every three months.

CONCLUSION

Papillary thyroid carcinoma arising in struma ovarii is a rare malignant transformation that often mimics primary ovarian cancer and is typically diagnosed only after histopathological examination. This instance highlights the significance of integrating thyroid-focused evaluation into postoperative management, given the potential for synchronous thyroid malignancy. The utilization of a risk-stratified approach, entailing the evaluation of total thyroidectomy and radioactive iodine ablation for high-risk patients, is grounded in current empirical data and serves to align therapeutic strategies with the principles routinely applied to differentiated thyroid carcinoma. Despite overall favorable prognosis, long-term surveillance is essential due to the potential for late recurrence, emphasizing the need for multidisciplinary follow-up and vigilant monitoring using serum thyroglobulin and imaging modalities.

REFERENCES

1. Alnaggar M, Mahyoub MA, Alshargabi N, Gong L. Struma ovarii—diagnostic and treatment strategy: a case report. *J Med Case Rep*. 2025;19(1):285. doi:10.1186/s13256-025-05152-y
2. Zhu Y, Wang C, Zhang GN, et al. Papillary thyroid cancer located in malignant struma ovarii with omentum metastasis: a case report and review of the literature. *World J Surg Oncol*. 2015;14(1):17. doi:10.1186/s12957-016-0776-x
3. Apriliyani F, Wijaya U. Education With Booklets Media On Hiv Patients In The Hospital: A Quasi Experimental Clinical Trial. *Pharmacol Med Reports, Orthop Illn Details*. 2022;1(2):19-26. doi:10.55047/comorbid.v1i2.82
4. Abera SA, Molla D, Abera KA, Adisu GD, Worku MA, Molla YD. Struma Ovarii with Papillary Thyroid Carcinoma and Metastasis to the Appendix: A Case Report and Literature Review. *Int Med Case Rep J*. 2023;16:571-578. doi:10.2147/IMCRJ.S432333
5. Rahimi Y, Rabizadeh S, Seifouri S, Seifouri K, Salarvand S, Nakhjavani M. A case report of malignant struma ovarii with papillary thyroid carcinoma. *Clin Case Reports*. 2024;12(4). doi:10.1002/ccr3.8610
6. Jean S, Tanyi JL, Montone K, Mcgrath C, Lage-Alvarez MM, Chu CS. Papillary thyroid cancer arising in struma ovarii. *J Obstet Gynaecol (Lahore)*. 2012;32(3):222-226. doi:10.3109/01443615.2011.645921
7. Tan A, Stewart CJR, Garrett KL, Rye M, Cohen PA. Novel BRAF and KRAS Mutations in Papillary Thyroid Carcinoma Arising in Struma Ovarii. *Endocr Pathol*. 2015;26(4):296-301. doi:10.1007/s12022-015-9394-3
8. Al Hassan MS, Saafan T, El Ansari W, et al. The largest reported papillary thyroid carcinoma arising in struma ovarii and metastasis to opposite ovary: case report and review of literature. *Thyroid Res*. 2018;11(1):10. doi:10.1186/s13044-018-0054-9
9. Hasanzadeh M, Bazmi F, Malakuti P. An ovarian mass with microcystic stromal tumor: A rare case report. *J Obstet Gynecol Cancer Res*. 2022;4(3):127-130.
10. Schmidt J, Derr V, Heinrich MC, et al. BRAF in Papillary Thyroid Carcinoma of Ovary (Struma Ovarii). *Am J Surg Pathol*. 2007;31(9):1337-1343. doi:10.1097/PAS.0b013e31802f5404
11. Siegel CH, Sammaritano LR. Systemic Lupus Erythematosus. *JAMA*. 2024;331(17):1480. doi:10.1001/jama.2024.2315
12. Marti JL, Clark VE, Harper H, Chhieng DC, Sosa JA, Roman SA. Optimal Surgical Management of Well-Differentiated Thyroid Cancer Arising in Struma Ovarii: A Series of 4 Patients and a Review of 53 Reported Cases. *Thyroid*. 2012;22(4):400-406. doi:10.1089/thy.2011.0162
13. DeSimone CP, Lele SM, Modesitt SC. Malignant struma ovarii: a case report and analysis of cases reported in the literature with focus on survival and i131 therapy. *Gynecol Oncol*. 2003;89(3):543-548. doi:10.1016/S0090-8258(03)00141-0
14. Flavin R, Smyth P, Crotty P, et al. BRAF T1799A Mutation Occurring in a Case of Malignant Struma Ovarii. *Int J Surg Pathol*. 2007;15(2):116-120. doi:10.1177/1066896906299131
15. Roth LM, Miller AW, Talerman A. Typical Thyroid-Type Carcinoma Arising in Struma Ovarii: A Report of 4 Cases and Review of the Literature. *Int J Gynecol Pathol*. 2008;27(4):496-506. doi:10.1097/PGP.0b013e31816a74c6
16. Selvaggi F, Risio D, Waku M, et al. Struma ovarii with follicular thyroid-type carcinoma and neuroendocrine component: case report. *World J Surg Oncol*. 2012;10(1):93. doi:10.1186/1477-7819-10-93
17. Wu CC, Lin JD, Chen JT, et al. Integrated analysis of fine-needle-aspiration cystic fluid proteome, cancer cell secretome, and public transcriptome datasets for papillary thyroid cancer biomarker discovery. *Oncotarget*. 2018;9(15):12079-12100. doi:10.18632/oncotarget.23951
18. Doganay M, Gungor T, Cavkaytar S, Sirvan L, Mollamahmutoglu L. Malignant struma ovarii with a focus of papillary thyroid cancer: a case report. *Arch Gynecol Obstet*. 2008;277(4):371-373. doi:10.1007/s00404-007-0466-6
19. Shrimali RK, Shaikh G, Reed NS. Malignant struma ovarii: The west of Scotland experience and review of literature with focus on postoperative management. *J Med Imaging Radiat Oncol*. 2012;56(4):478-482. doi:10.1111/j.1754-

9485.2012.02394.x
20. Leite IT, Cunha TM, Figueiredo JP, Felix A. Papillary carcinoma arising in struma ovarii versus ovarian metastasis from primary thyroid carcinoma: a case report and review of the literature. *J Radiol Case Rep*. 2013;7(10). doi:10.3941/jrcr.v7i10.1593
21. Kabukcuoglu F, Baksu A, Yilmaz B, Aktumen A, Evren I. Malignant struma ovarii. *Pathol Oncol Res*. 2002;8(2):145-147. doi:10.1007/BF03033726
22. Wong LY, Diamond TH. Severe Ophthalmopathy Developing After Treatment of Coexisting Malignant Struma Ovarii and Graves' Disease. *Thyroid*. 2009;19(10):1125-1127. doi:10.1089/thy.2008.0422
23. Coyne C, Nikiforov YE. RAS Mutation-Positive Follicular Variant of Papillary Thyroid Carcinoma Arising in a Struma Ovarii. *Endocr Pathol*. 2010;21(2):144-147. doi:10.1007/s12022-009-9097-8
24. Limaiem F, Rehman A, Mazzoni T. *Papillary Thyroid Carcinoma*. StatPearls Publishing; 2025. https://www.ncbi.nlm.nih.gov/books/NBK536943/
25. Magdalene TN. Molecular Docking of Cymbopogon Citratus Extracts as Potency for Drug Formulation Targeting Fungal Species Causing Onychomycosis in Benue State, Nigeria. *Pharmacol Med REPORTS, Orthop Illn DETAILS*. 2025;3(4):181-193. doi:10.55047/comorbid.v3i4.1551