

Diagnostic Pitfalls on Thyroid Ultrasound: Recognizing Diffuse Sclerosing Papillary Thyroid Carcinoma

Jane B. Cleland, BS¹; Elizabeth Zieser-Misenheimer, BS, MBA¹; Joshua Waltonen, MD²; Matthew Gorris, MD³

¹Wake Forest University School of Medicine, Winston-Salem, NC, ²Department of Otolaryngology/Head and Neck Surgery, Wake Forest University School of Medicine, Winston-Salem, NC, ³Department of Endocrinology, Wake Forest University School of Medicine, Winston-Salem, NC

Background

- Diffuse sclerosing variant (DSV) is a rare, aggressive subtype of papillary thyroid carcinoma (PTC)¹
- Recognizing its unique and variable US features and identifying suspicious lymph nodes may prevent diagnostic delays

Initial Case Presentation

- 37-year-old female presented to PCP with palpable right neck lymph node noticed several weeks ago
- No past medical history
- Family history: thyroid cancer
- ROS: Positive for fatigue. Negative for fever, chills, recent illness, changes to hair/skin/nails, weight changes, night sweats
- Exam: normal head and neck exam, no thyromegaly
- Imaging: ultrasound in central panel (Figure 1)

Labs:

- TSH: 2.783
- Free T4: 0.9
- TPO antibodies: 736

- Referred to endocrinology for suspected Hashimoto's thyroiditis based on labs and ultrasound appearance
- POCUS prompted lymph node fine needle aspiration (FNA) → consistent with PTC

Review of Imaging

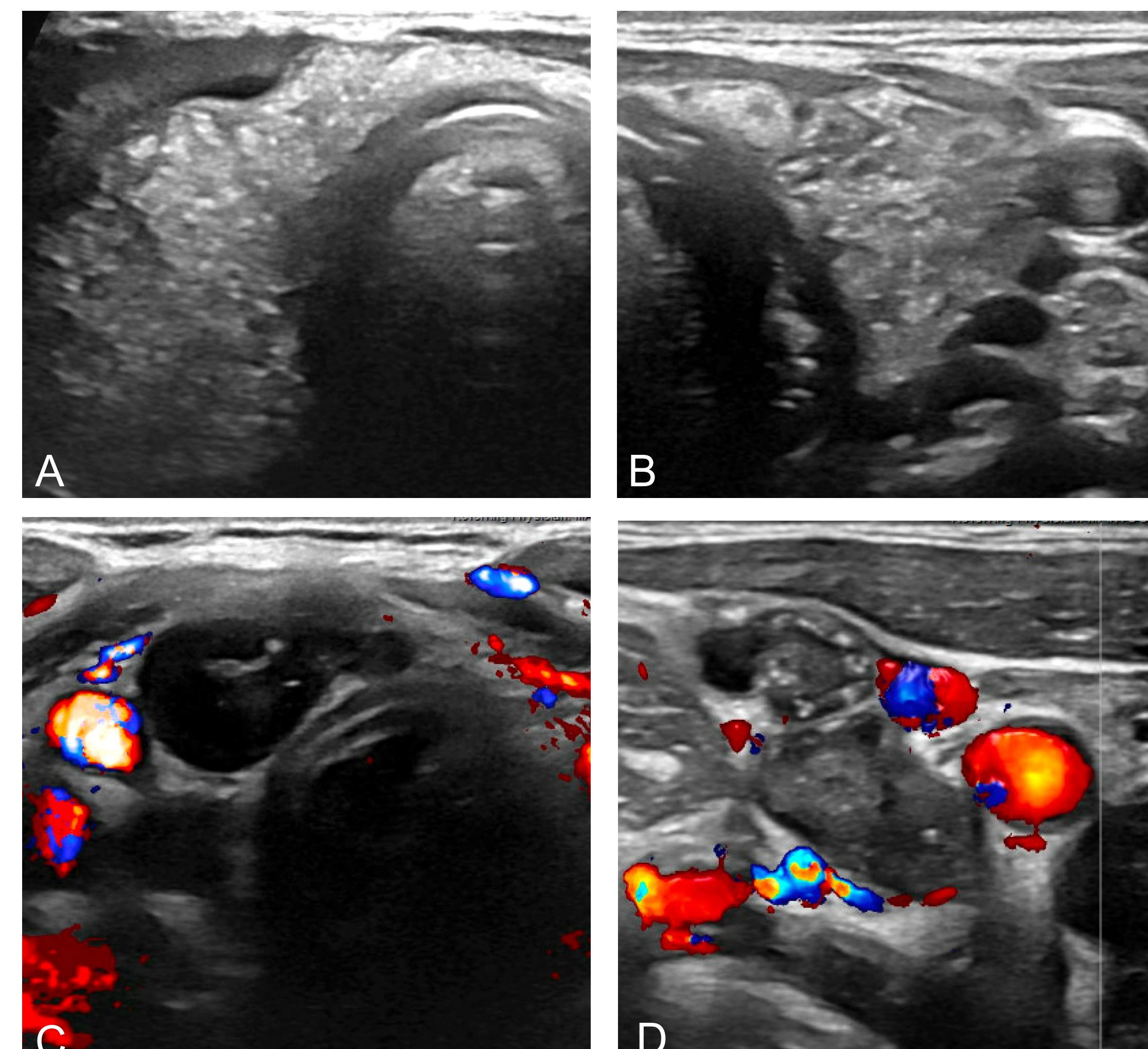


Figure 1. Ultrasound (left) showing nonspecific parenchymal heterogeneity of the (A) right and (B) left lobes of the thyroid gland without discrete nodules. Mild to moderate right cervical lymphadenopathy of the (C) right central neck and (D) right lateral neck level 3 is demonstrated.

Figure 2. CT scan (below) showing heterogeneous mass-like enlargement of the right lobe with diffuse calcifications

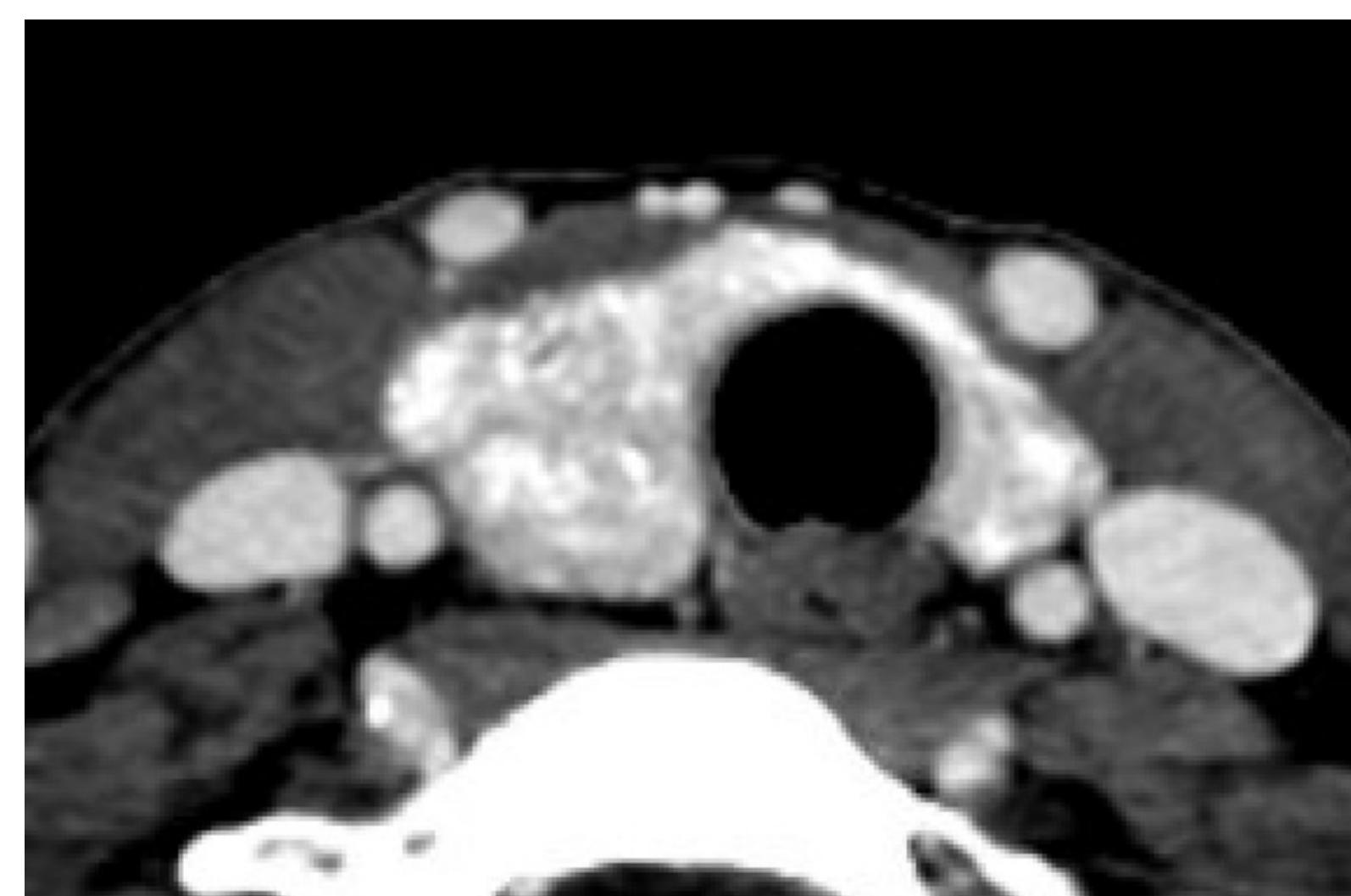
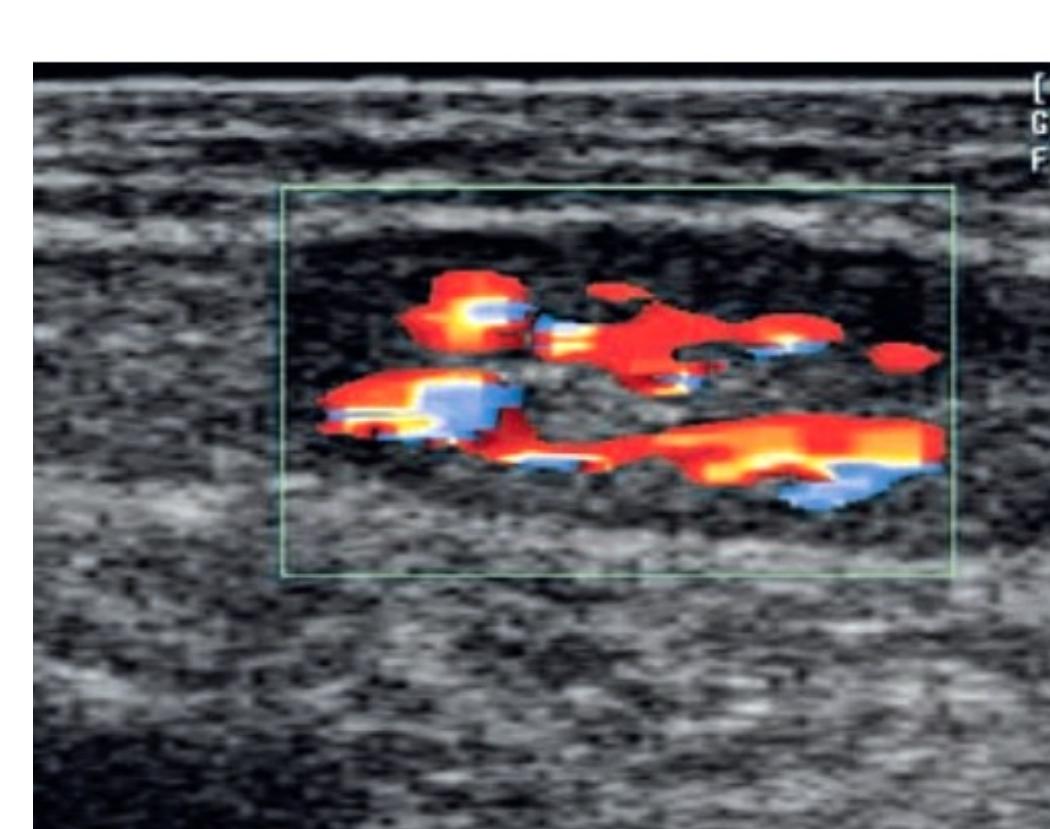


Table 1. Comparison of Lymph Node Characteristics

	Pathologic nodes	Normal nodes
Size	> 1.0 cm	< 0.5 cm
Shape	L/S ratio < 2 (round)	L/S ratio > 2 (elliptical)
Hilum	Absent fatty hilum	Central fatty hilum
Vascular pattern	Peripheral or absent vascular pattern	Central vasculature
Echogenicity	Heterogeneous, hyperechoic	Homogenous, hypoechoic
Margins	Irregular, blurred margins	Well-defined margins
Exam findings	Fixed, nontender, progressive enlargement	Mobile, tender, stable size

Long axis/Short axis ratio has accuracy of up to 94%⁴



Baskin 2012²

Case Wrap-Up

- Patient underwent total thyroidectomy with bilateral central and lateral modified radical neck dissections
- Pathology: diffuse sclerosing PTC involving entire gland
- Papillary carcinoma seen in 19 of 71 lymph nodes across bilateral central and lateral neck compartments, with the largest metastasis measuring 4.5cm (stage pT3apN1b)
- She recovered without complications, underwent I-131 thyroid ablation (151 mCi), and was disease-free at three months

Discussion

- DSV accounts for 0.7-6.6% of PTC cases¹
- Characterized by diffuse thyroid infiltration, extrathyroidal extension, and nodal metastasis at presentation^{1,2}
- Epidemiology: increased prevalence in women and children, most common in third decade (vs. fifth for classic PTC)
- DSV and Hashimoto's thyroiditis:
 - Both can have on ultrasound diffuse heterogeneity, lack of discrete nodule, and microcalcifications (though fewer in Hashimoto's)
 - Up to 90% of DSV cases coexist with Hashimoto's thyroiditis³
 - Thorough lymph node mapping prior to surgery is necessary given the prevalence of lymph node metastases at diagnosis
- Prognosis: Meta-analyses (Vuong 2017, Crayton 2023) show that DSV has higher odds of lymph node and distant metastases, vascular invasion, extrathyroidal extension, and recurrence compared to classic PTC^{6,7}
- Despite this, survival tends to be similar to classic PTC

Learning Points

- DSV can mimic and coexist with Hashimoto's thyroiditis
- Pathologic lymph node identification is critical →**
 - lymph nodes may be the only clue distinguishing malignancy from Hashimoto's thyroiditis
- Early recognition is crucial due to higher rates of metastasis and recurrence

References

- Pallai S, Gopalan V, Smith RA, Lam AKY. Diffuse sclerosing variant of papillary thyroid carcinoma – an update of its clinicopathological features and molecular biology. *Critical Reviews in Oncology/Hematology*. 2015;94(1): 64-73.
- Baskin HJ, Duick DS, Levine RA. *Thyroid Ultrasound and Ultrasound-Guided FNA*. Third edition. New York, NY: Springer; 2012.
- Takagi N, Hirokawa M, Nobuoka Y, Higuchi M, Kuma S, Miyauchi A. Diffuse sclerosing variant of papillary thyroid carcinoma: a study of fine needle aspiration cytology in 20 patients. *Cytopathology*. 2014;25:199–204.
- Genes I, Mogoanta CA, Lostun G, Lostun A, Mozes H, Muhlfay G. Ultrasonographic and histopathological features of cervical lymph node metastases. *Rom J Morphol Embryol*. 2014;55(2):369-375
- Vuong HG, Kondo T, Pham TQ, et al. Prognostic significance of diffuse sclerosing variant papillary thyroid carcinoma: a systematic review and meta-analysis. 2017;176(4):433-441
- Crayton H, Wu K, Leong D, Bhimani N, Gild M, Glover A. Diffuse sclerosing variant papillary thyroid carcinoma has worse survival than classic papillary thyroid carcinoma: a meta-analysis. *Endocr Relat Cancer*. 2023;30(6): e220348.