

PTC with nodal involvement

Case

- 18 yo F
- Enlarged neck > 1 year
- Denies odynophagia, dysphagia, SOB, neck pain, voice change
- Famhx: negative
- Radiation exposure: negative

Thyroid US

Right lobe

Measurement: 5.4 cm x 3.5 cm.

Appearance: Heterogeneous

Nodules:1

Nodule number 1:

Size: 5 cm x 3 cm.

Composition: Solid

Echogenicity: Hyperechoic

Shape: Wider than tall

Margin: Ill-defined

Echogenic foci: Punctate

TI-RADS Category: TR5

Left lobe

Measurement: 5.3 x 1.7.

Appearance: Homogeneous

Nodules:1

Nodule number 1:

Size: 1 cm

Composition: Solid

Echogenicity: Hypoechoic

Shape: Wider than tall

Margin: Ill-defined

Echogenic foci: Punctate

TI-RADS Category: TR5

TI-RAD

- **composition:** (choose one)
 - cystic or completely cystic *: 0 points
 - spongiform *: 0 points
 - mixed cystic and solid: 1 point
 - solid or almost completely solid: 2 points
- **echogenicity:** (choose one)
 - anechoic: 0 points
 - hyper- or isoechoic: 1 point
 - hypoechoic: 2 points
 - very hypoechoic: 3 points
- **shape:** (choose one) (assessed on the transverse plane)
 - wider than tall: 0 points
 - taller than wide: 3 points
- **margin:** (choose one)
 - smooth: 0 points
 - ill-defined: 0 points
 - lobulated/irregular: 2 points
 - extra-thyroidal extension: 3 points
- **echogenic foci:** (choose one or more)
 - none: 0 points
 - large comet tail artifact: 0 points
 - macrocalcifications: 1 point
 - peripheral/rim calcifications: 2 points
 - punctate echogenic foci: 3 points
- **TR1 (0):** no FNA required
- **TR2 (2):** no FNA required
- **TR3 (3):** ≥ 1.5 cm follow up, ≥ 2.5 cm FNA
 - follow up: 1, 3 and 5 years
- **TR4 (4-6):** ≥ 1.0 cm follow up, ≥ 1.5 cm FNA
 - follow up: 1, 2, 3 and 5 years
- **TR5 (7+):** ≥ 0.5 cm follow up, ≥ 1.0 cm FNA
 - annual follow up for up to 5 years

FNA – Cytology Consult

- THYROID NODULE, RIGHT LOBE, US-GUIDED FNA WITH CELL BLOCK, (RM19-00920 A, COLLECTED 7/22/2019):
 - **PAPILLARY THYROID CARCINOMA**
- THYROID NODULE, LEFT LOBE, US-GUIDED FNA WITH CELL BLOCK, (RM19-00920 B, COLLECTED 7/22/2019):
 - **PAPILLARY THYROID CARCINOMA**

US and CT obtained to assess LAD

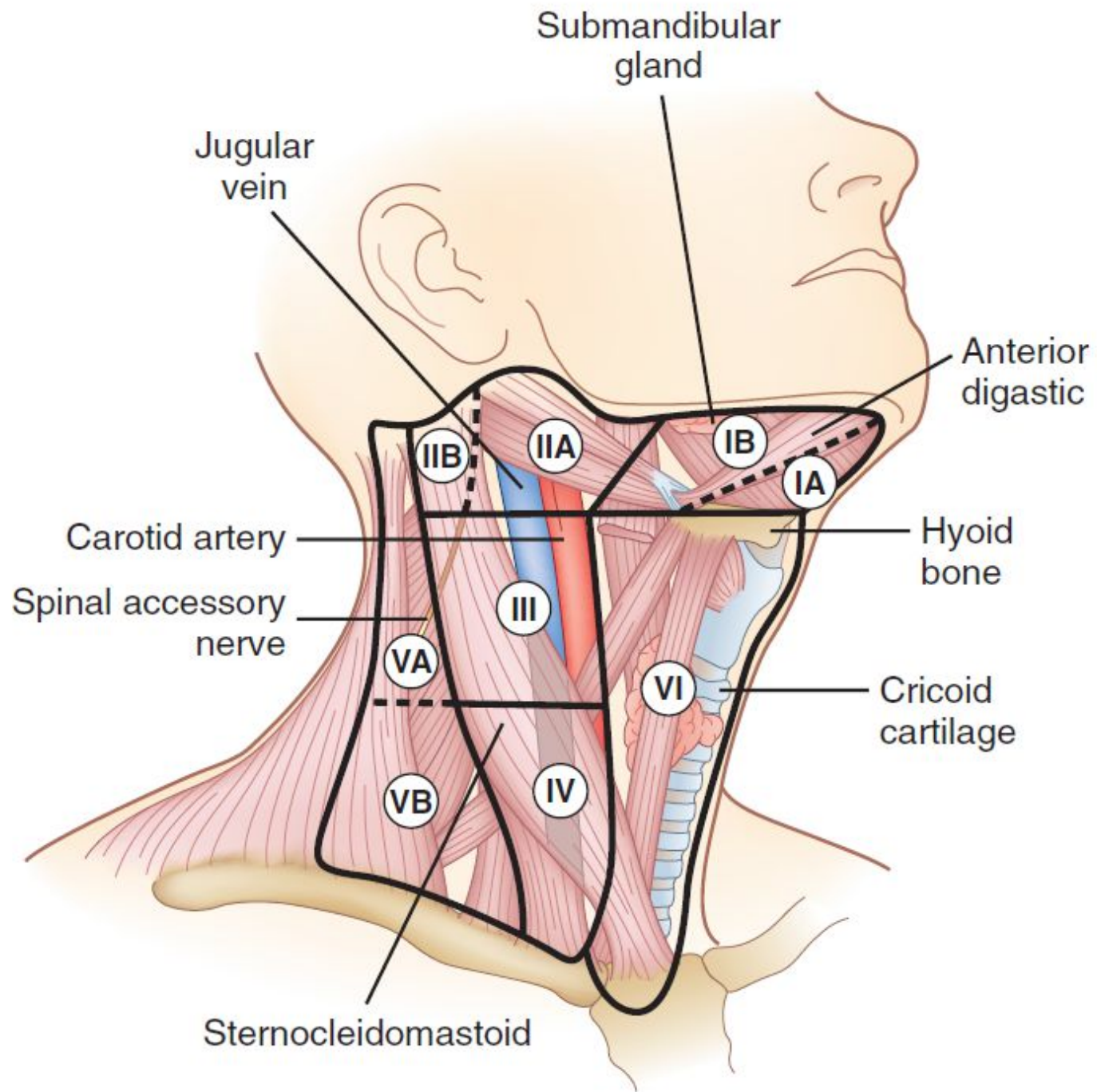
US Neck:

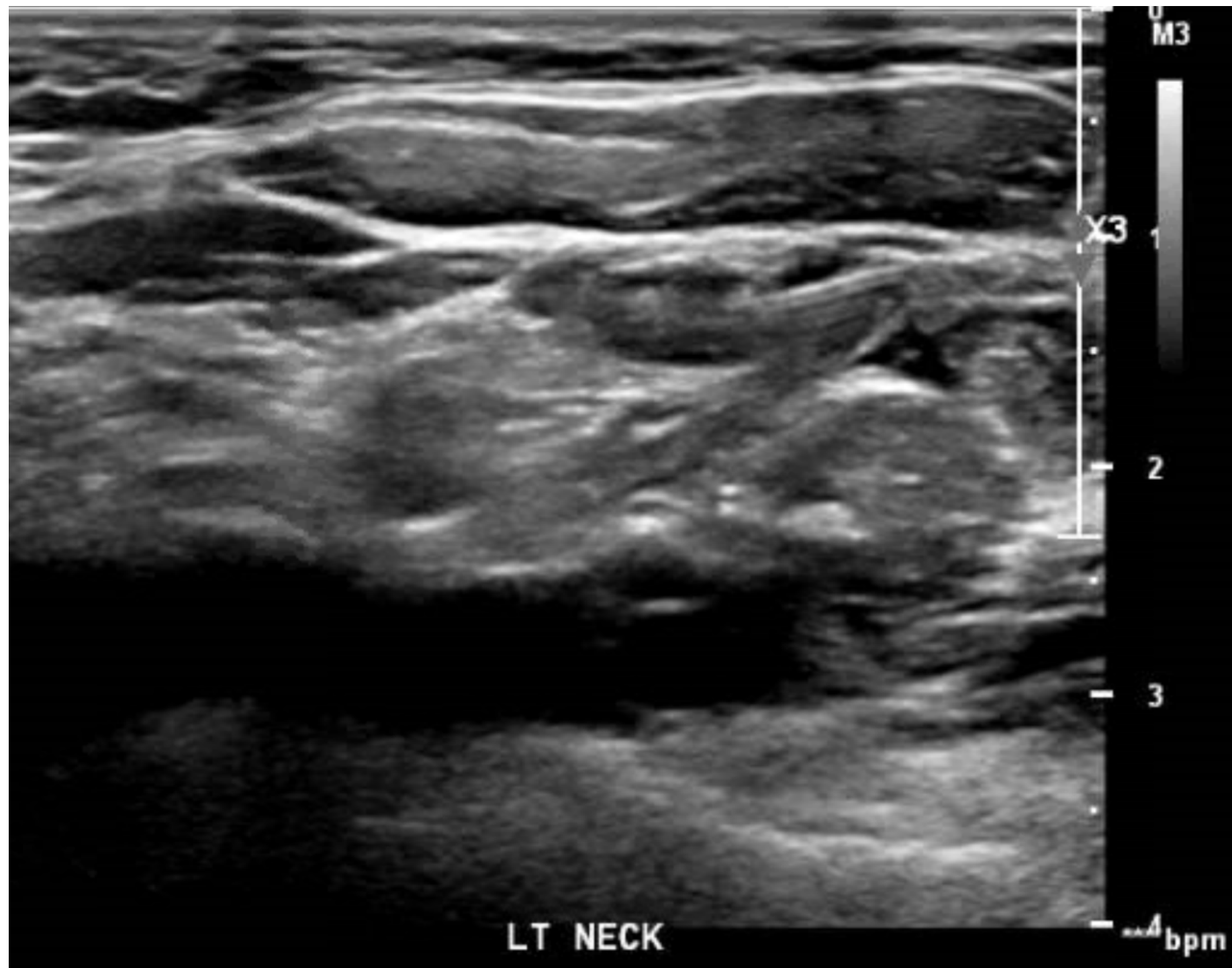
1. A 4.8 cm mass in the right middle lobe and 1.0 cm mass in the left middle lobe, corresponding to biopsy-proven papillary thyroid cancer.
2. Multiple prominent **lymph nodes with abnormal morphology** along the right jugular vein, the largest of which measures 1.4 cm.

US and CT obtained to assess LAD

CT Neck:

1. Hypodense right thyroid mass (2.8 X 3 X 3.4 cm) with an additional ill-defined nodule in the left thyroid lobe compatible with FNA proven papillary thyroid carcinoma.
2. Multi station cervical lymphadenopathy, right more than left (level II B, level III and level IV) along with central compartment lymph nodes suspicious for metastasis.





Cytology

- oncocytic epithelial cells, morphologically compatible with metastatic papillary thyroid carcinoma
- Papillae lined by cuboidal cells*, intranuclear inclusions
 - Other classic features (but not seen on this specimen): psammoma bodies, Orphan Annie nuclei)
- No stains needed
 - Possible stains: CK19, HBME1, CK7, RET, thyroglobulin, vimentin, P-cadherin

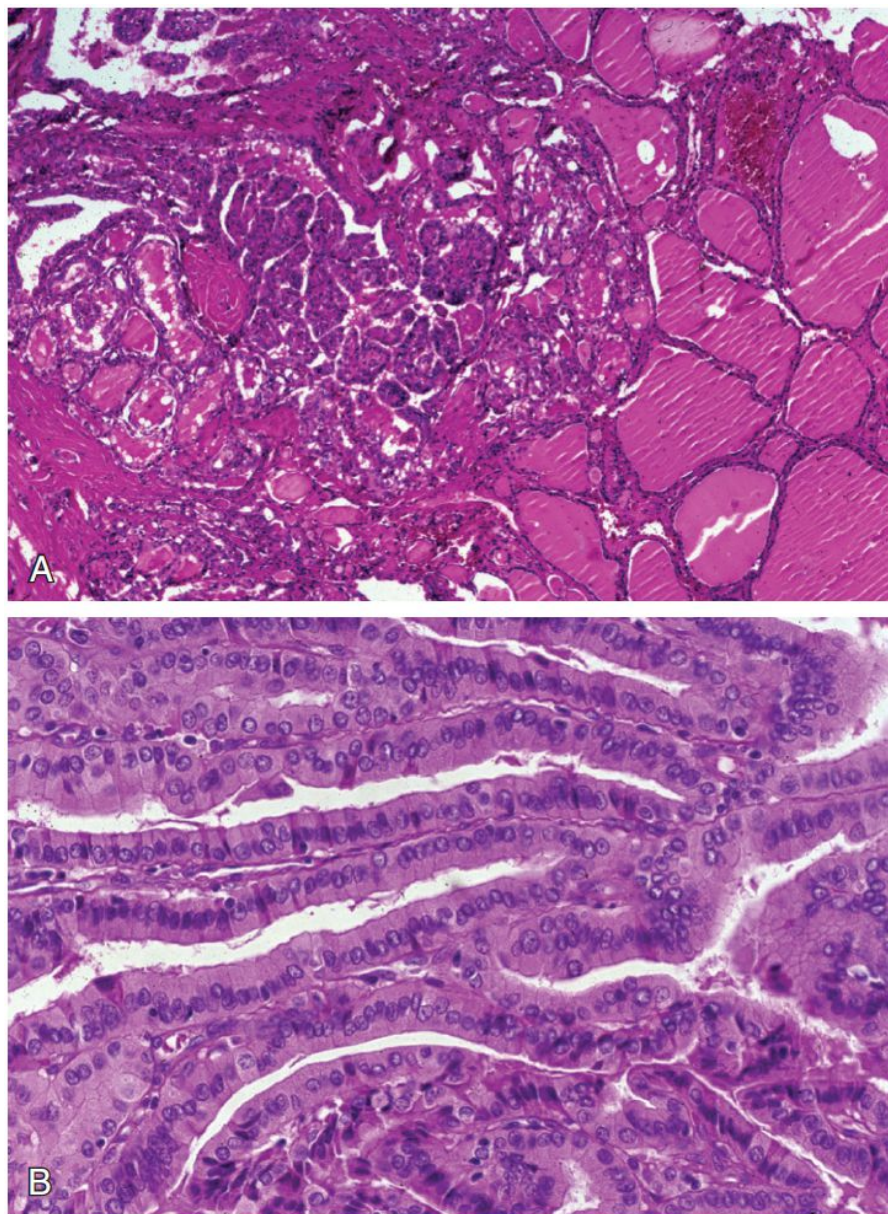


FIGURE 36-15 **A**, Hematoxylin-eosin (H&E) staining of a thyroid mass reveals papillary projections consistent with papillary carcinoma. **B**, H&E staining of a papillary carcinoma shows cells with an increased height-to-width ratio in a single row of cells. This is the so-called tall cell variant of papillary carcinoma, which is associated with a poorer prognosis than differentiated papillary cancer.

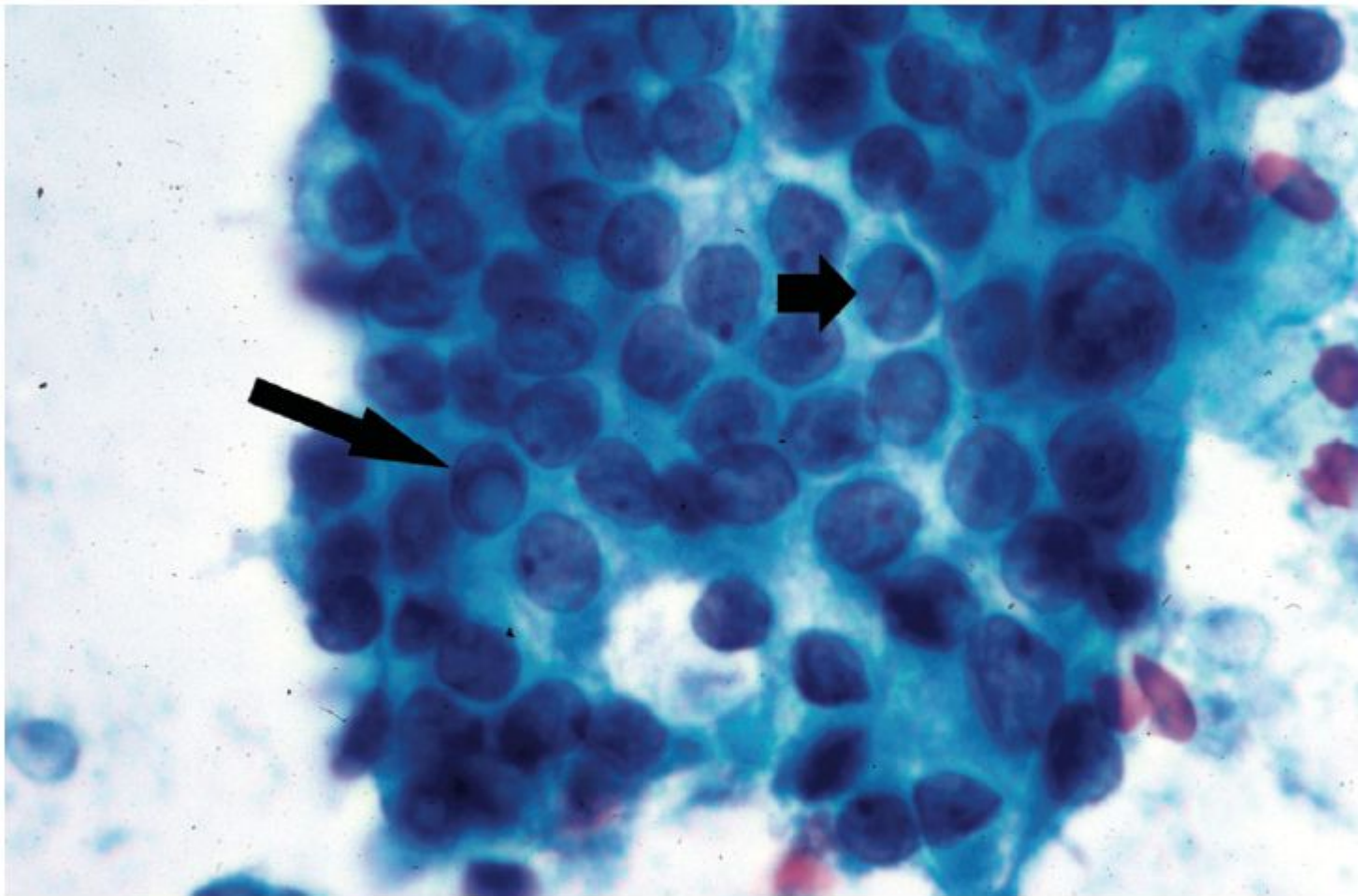
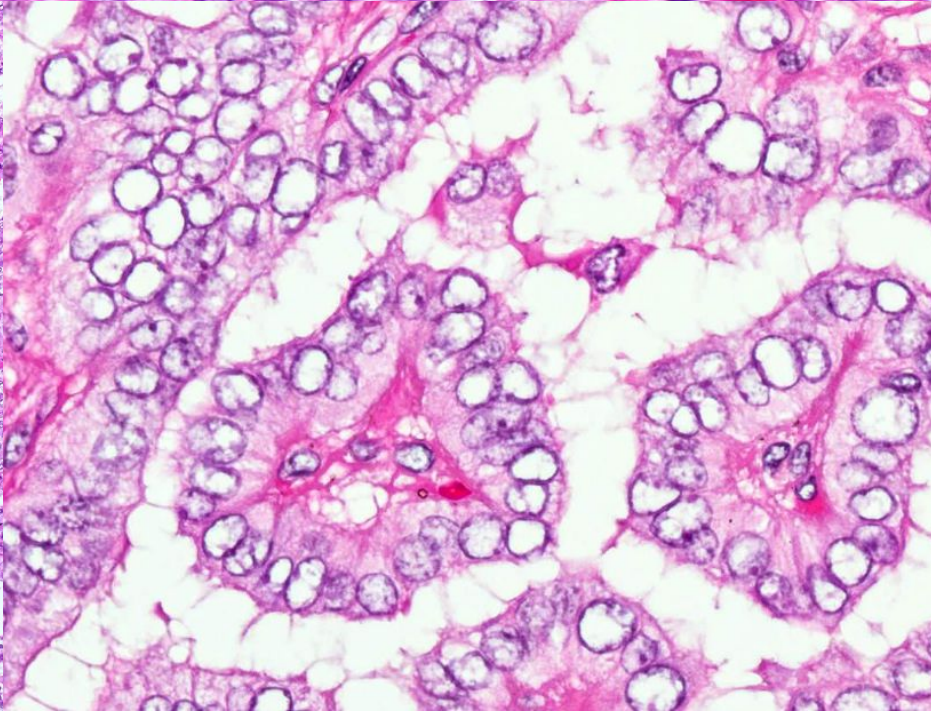
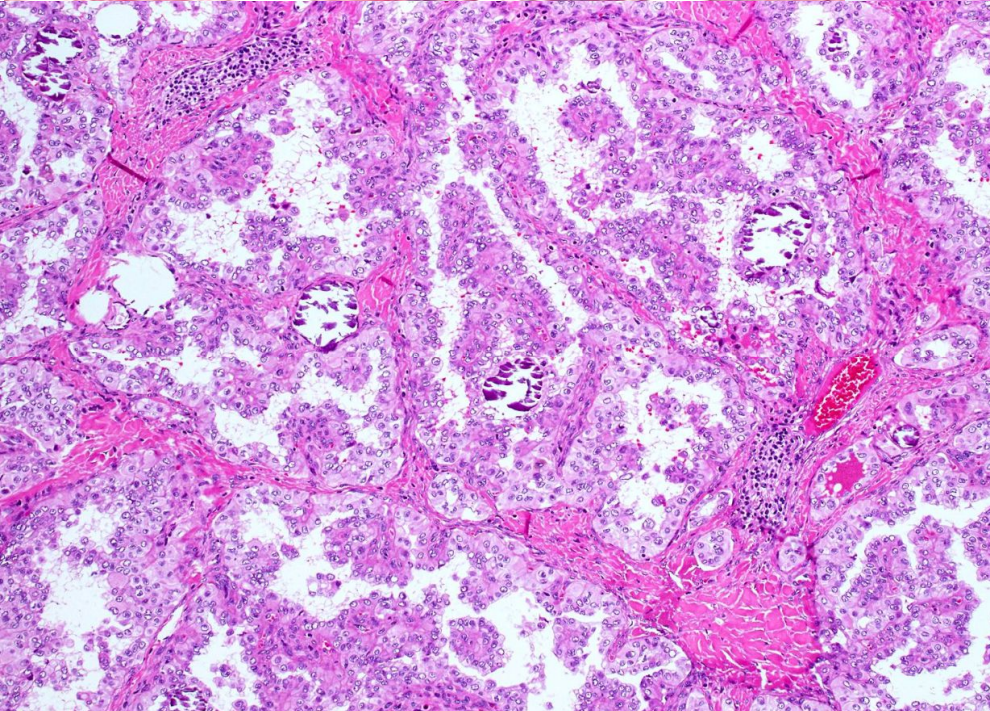
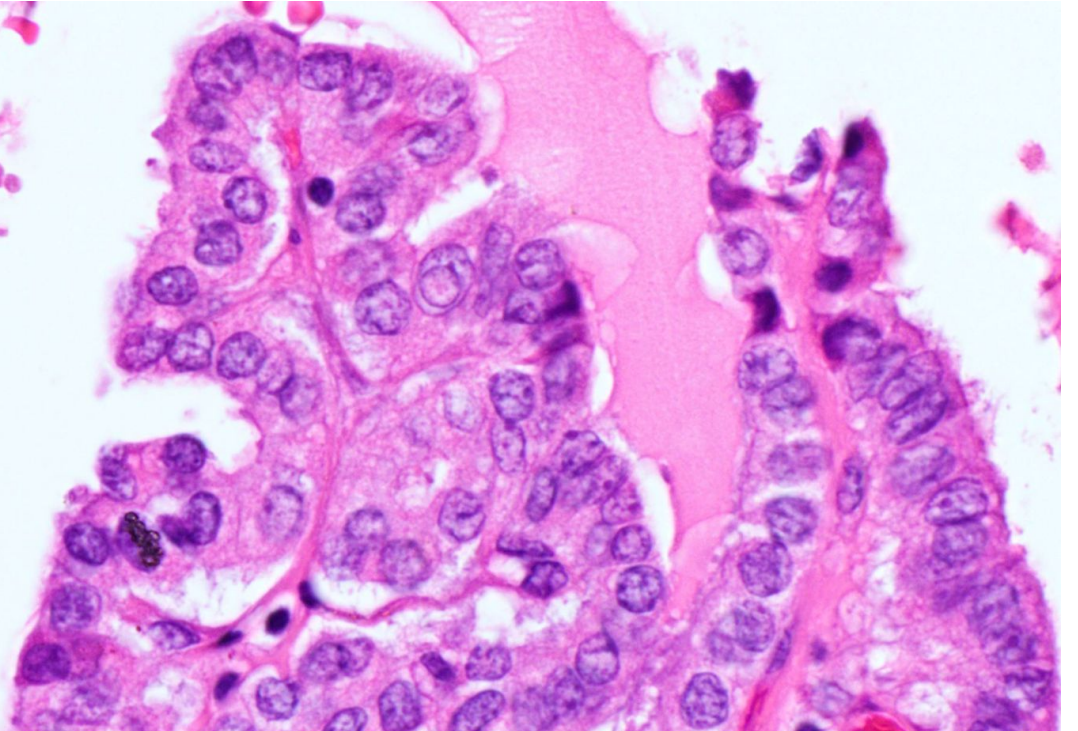
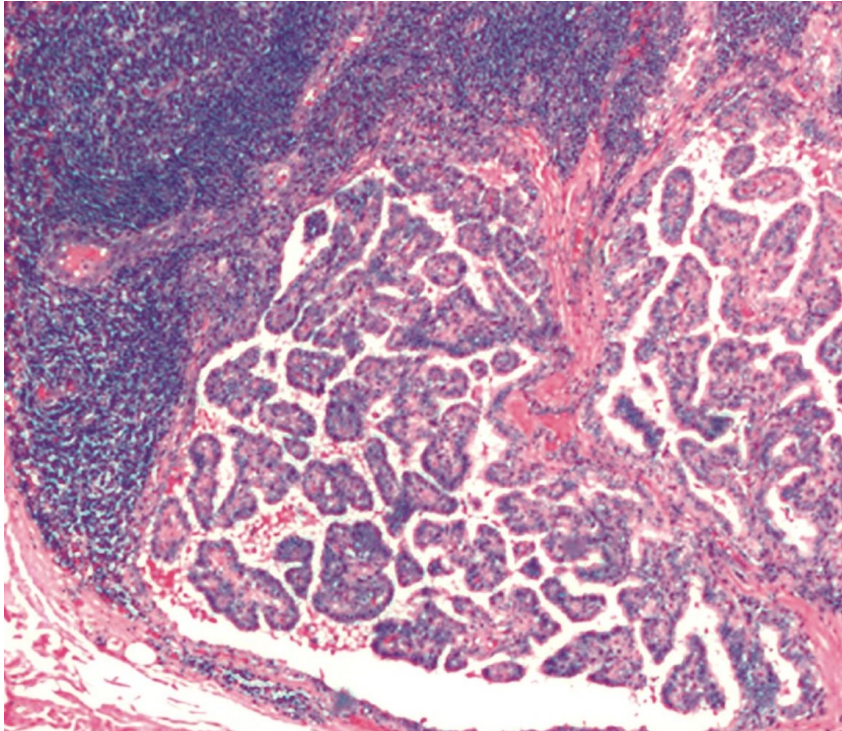


FIGURE 36-12 Fine-needle aspiration of a thyroid mass allows determination of individual cellular morphology. Cells in this aspirate demonstrate intranuclear grooving (*short arrow*) and ground-glass cytoplasmic inclusions (*long arrow*) (so-called Orphan Annie eyes). These cellular features confirm the diagnosis of papillary carcinoma of the thyroid.



US-Guided LN FNA

- LYMPH NODE, LEFT CERVICAL LEVEL III/ IV,
ULTRA-SOUND GUIDED FNA:
 - **METASTATIC PAPILLARY THYROID CARCINOMA.**
- LYMPH NODE, RIGHT CERVICAL LEVEL III / IV,
ULTRA-SOUND GUIDED FNA:
 - **METASTATIC PAPILLARY THYROID CARCINOMA.**

Treatment

- Total thyroidectomy
- Central and bilateral neck dissection
- +/- RAI
- +/- TSH suppression

TABLE 36-7 Indications for Interventional Procedures

PROCEDURE	ADVANTAGES	DISADVANTAGES OR COMPLICATIONS	INDICATIONS
FNA	Accurate diagnosis of malignancy	Capsular hemorrhage	Evaluation of thyroid nodule; concerning lymph node
Open biopsy	Direct visualization; large pathologic tissue volume	Requires operating room and possibly general anesthesia	Complex case in which FNA has failed to give diagnosis
Nodulectomy (less than a lobectomy)	None	Difficult second operation to complete lobectomy if diagnosis of cancer is made	None
Lobectomy (with isthmusectomy)	Preserves thyroid; protects contralateral parathyroids and nerves	May require subsequent completion thyroidectomy	Indeterminate nodules; small intrathyroidal thyroid cancer
Near-total thyroidectomy	Lower rates of hypocalcemia and nerve damage	Possible recurrence in residual thyroid tissue	Benign disease; small nodule on side of complete lobectomy; hyperthyroidism
Total thyroidectomy	Use of postoperative ¹³¹ I is most efficacious; use of post-thyroglobulin levels for recurrence	Higher rate of hypocalcemia and nerve damage	Extensive multinodular disease; hyperthyroidism; thyroid cancer
Modified radical lymph node dissection	Decreased rate of recurrence	Cranial nerve XI injury; loss of sensation over ear and lateral cervical area; (left) thoracic duct leak and lymphocele; Horner syndrome	Lateral neck node metastasis
Median sternotomy	Exposure of mediastinal contents	Bleeding; nonunion of sternum (if complete sternotomy); increased hospital stay	Extension of malignancy into anterior mediastinum; inability to mobilize large substernal goiter
Central neck (level VI) lymph node dissection	Decreased risk for recurrence	Increased risk for hypocalcemia and nerve damage	Medullary carcinoma, DTC with N1 disease and T3 or T4 tumors

Prognosis

<i><45 Years Old</i>			
Stage I	Any T	Any N	M0
Stage II	Any T	Any N	M1
<i>≥45 Years Old</i>			
Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	T3	N0	M0
	T1	N1a	M0
	T2	N1a	M0
	T3	N1a	M0
Stage IVA	T4a	N0	M0
	T4a	N1a	M0
	T1	N1b	M0
	T2	N1b	M0
	T3	N1b	M0
	T4a	N1b	M0
Stage IVB	T4b	Any N	M0
Stage IVC	Any T	Any N	M1

Papillary thyroid cancer

SEER Stage	5-Year Relative Survival Rate
Localized	near 100%
Regional	near 100%
Distant	78%

Nodal Involvement

- In a large series in **younger patients (<45 years old)**, the **presence of lymph node metastases had no effect on the excellent overall survival**, but the presence of lymph node metastases increased the risk of death by 46% in patients older than 45.
- **The presence of lymph node metastasis in patients with contained intrathyroidal primary papillary carcinoma also does not affect long-term survival.** If there is gross or microscopic extension of a primary PTC through the thyroid capsule, a poor prognosis and possibly a higher rate of lymph node metastasis may be anticipated.
- There is a small but statistically significant decrease in long-term all-cause survival in patients with lymphatic metastases compared with patients without lymphatic metastases. **At the present time, it is recommended that all patients with known or suspected PTC undergo a thorough physical examination and complete ultrasound scan of the central and lateral neck before resection of the thyroid lesion.**

Nodal Involvement

- **In the evaluation of the central neck, ultrasound is not as sensitive for pathologic adenopathy as it is for lateral neck adenopathy** because the central compartment nodes are in anatomically challenging locations. Therefore, if there is not already an indication for central compartment lymph dissection, the central compartment nodes should be assessed at the time of thyroidectomy by visual inspection and palpation, in addition to preoperative ultrasound.
- **If pathologic appearing nodes are found, FNA biopsy should be performed.**

References

- Islam S. Papillary carcinoma - general. PathologyOutlines.com website. <http://www.pathologyoutlines.com/topic/thyroidpapillary.html>. Accessed October 3rd, 2019.
- Townsend, C. M., Sabiston, D. C., Beauchamp R. D., Evers, B. M., & Mattox, K.L. (2017) *Sabiston textbook of surgery: the biological basis of modern surgical practice*. Philadelphia: Elsevier.
- Tessler FN, Middleton WD, Grant EG, Hoang JK, Berland LL, et al. ACR Thyroid Imaging, Reporting and Data System (TI-RADS): White Paper of the ACR TI-RADS Committee. (2017) *Journal of the American College of Radiology : JACR*. 14 (5): 587-595.