

Papillary thyroid carcinoma

Brenda L. Nelson, DDS;
Lester D.R. Thompson, MD

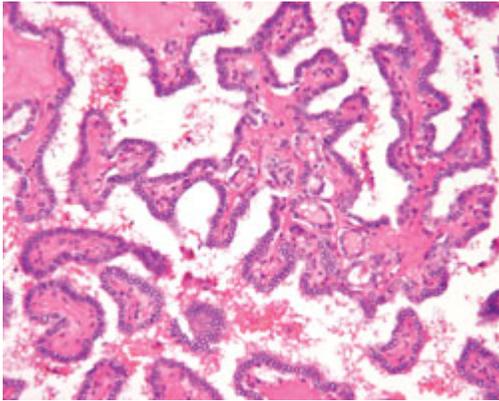


Figure 1. Complex papillary structures are lined with a large number of enlarged cells that overlap. The nuclei are enlarged with nuclear chromatin clearing and accentuation at the periphery. Fibrovascular cores are noted.

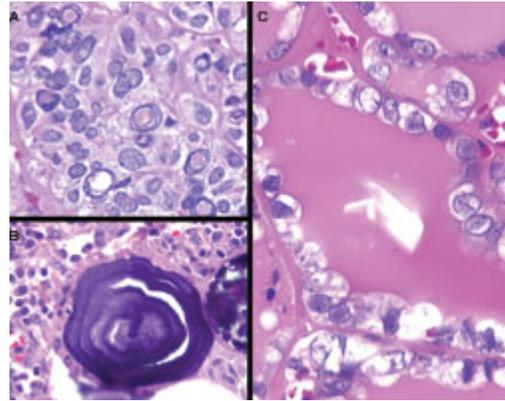


Figure 2. A: Intranuclear cytoplasmic inclusions are invaginations of eosinophilic cytoplasm into the nucleus. B: Psammoma bodies are concentrically laminated calcified papillary structures. C: Fine, delicate nuclear chromatin distribution shows nuclear grooves and folds. A crystalloid is seen in the center of the brightly eosinophilic colloid.

Papillary thyroid carcinoma is the most common type of thyroid malignancy. The tumor occurs largely in adults, usually those between the ages of 20 and 50 years; the female-to-male ratio is 4:1. Papillary thyroid carcinoma is also the most common pediatric thyroid malignancy.

There is a known etiologic link between this malignancy and exposure to radiation, either environmental or therapeutic. Most patients present clinically with a mass, although incidental or unsuspected tumors are commonly identified. Because most papillary carcinomas are nonfunctional and findings on radiography are nonspecific, fine-needle aspiration plays an important role in the initial evaluation of any thyroid nodule and as a guide to subsequent therapy.

Papillary carcinoma exhibits a wide variety of macroscopic patterns and sizes. Tumors can appear as encapsulated masses with irregular and sclerotic borders, they can infiltrate into the surrounding parenchyma, and they frequently demonstrate multifocality. The masses are usually firm and gray-white, and dystrophic calcification is common. Direct extension beyond the thyroid capsule is uncommon.

An aggregate of architectural and cytomorphologic criteria is necessary to establish a diagnosis of papillary carcinoma, but there is no consensus as to how many features are requisite. Among the characteristics of papillary carcinoma:

- capsular or vascular invasion
- variable growth patterns (follicular, solid, trabecular, and cystic)
- elongated and/or twisted follicles
- complex, arborizing papillary structures (figure 1)
- intratumoral acellular fibrosis

- “bright” colloid
- squamous metaplasia
- enlarged cells with a high nuclear-to-cytoplasmic ratio
- nuclear overlapping or crowding
- pale chromatin with chromatin margination/condensation and clearing (Orphan Annie nuclei)
- nuclear grooves and folds
- intranuclear cytoplasmic inclusions (figure 2, A)
- calcospherites (psammoma bodies—i.e., concentrically laminated calcium deposits) (figure 2, B)
- occasional giant cells within the colloid and crystals (figure 2, C)

There are numerous variants of papillary thyroid carcinoma:

- follicular
- macrofollicular
- oncocytic
- clear-cell
- diffuse sclerosing
- tall-cell
- columnar
- solid

Size is also taken into consideration; tumors smaller than 1 cm are classified as microscopic. More than 95% of tumors are classified as well differentiated. Tumor cells are immunoreactive with thyroglobulin and thyroid transcription factor-1.

Many neoplasms are considered in the differential diagnosis, but the principal ones are follicular adenoma, follicular carcinoma, and medullary carcinoma; nonneoplastic considerations are diffuse hyperplasia (Graves’ disease) and adenomatoid nodules.

Papillary carcinoma tends to spread via lymphatic channels, and regional lymph node metastasis is not uncommon. The treatment of papillary thyroid carcinoma is controversial, ranging from lobectomy alone to total thyroidectomy with or without radioactive ablation. Irrespective of treatment, the overall prognosis is excellent, as the 10-year survival rate exceeds 95%.

Suggested reading

LiVolsi VA, Albores-Saavedra J, Asa SL, et al. Papillary carcinoma. In: DeLellis RA, Lloyd R, LiVolsi VA, Eng C, eds. Pathology and Genetics of Tumours of the Endocrine Organs and Paraganglia. World Health Organization Classification of Tumours. Lyon, France: IARC Press, 2004, 57-66.

LiVolsi VA. Unusual variants of papillary thyroid carcinoma. *Adv Endocrinol Metab* 1995; 6: 39-54.