Papillary Thyroid Carcinoma

There are four main types of thyroid cancer, listed in descending order of prevalence are papillary, follicular, medullary, and anaplastic. Papillary thyroid carcinoma (PTC) is the most common, carries the best prognosis, is characterized by lymphatic spread and distinct histological findings like Orphan Annie nuclei and psammoma bodies. Risk factors for papillary thyroid carcinoma include head and neck radiation, RET and BRAF gene mutations, as well as Gardner and Cowden's syndromes.

PLAY PICMONIC

Characteristics

Most Common Thyroid Cancer
#1 Foam-finger with Thigh-droid and Tumor-guy
Papillary carcinoma is the most common type of thyroid cancer in both children and adults, comprising about 75-80% of thyroid cancer cases.

Excellent Prognosis
Doctor with Excellent Prognosis
It is easily treatable since it is slow growing and susceptible to radioiodine therapy and surgical removal.

Lymphatic Spread
Lymph-limes Spreading
Papillary carcinoma has a tendency to spread to the nearby lymph nodes of the head and neck and may manifest with palpable lymphadenopathy on clinical exam.

Diagnosis

Orphan Annie Nuclei
Orphan Annie
This pathologic finding is named for a comic book character known as Little Orphan Annie who is drawn with egg-shaped, clear eyes but no pupils. It is used to describe how papillary carcinoma is made up of papillae that have cells with clear nuclei; these cells are surrounded with inclusions of the nuclear envelope called nuclear grooves.

Empty Nuclei with Central Clearing
Empty Nuclei
This describes the "empty eyes" of Orphan Annie seen microscopically from a biopsy of this tumor. The nuclei appear empty because all of the heterochromatin has been pushed to the edges of the cell, creating a central clearing.

Psammoma Bodies
Samoan
These distinct calcified structures are commonly described as concentric whorls and are found in about half of papillary carcinomas cases. Psammoma bodies are not unique to this disease; they may also be associated with serous cystadenocarcinoma of the ovary, meningioma, and mesothelioma.

Risk Factors

Head and Neck Radiation
Head and Neck Radiation-radio
Patients may be exposed to ionizing radiation from treatment for other head and neck cancer or environmental exposure from nuclear fallout from atomic weapons or power plants. Any such exposure to radiation raises lifetime risk of developing thyroid cancer.

RET and BRAF Mutations

Roulette and B-Raft Mutants

Both of these proto-oncogenes are involved in the pathogenesis of several cancers. RET encodes a tyrosine kinase receptor while the BRAF gene codes for a serine/threonine kinase gene product that is involved in the MAP-kinase (MAPK) cell signaling pathway. Having a mutation in either of these genes increases one's lifetime risk of developing papillary thyroid cancer and has a greater chance of metastases and local tissue invasion if a cancer does form.

Gardner Syndrome

Gardener

Also known as familial colorectal polyposis, Gardner syndrome is one of the hereditary causes of colon cancer. It is characterized by numerous polyps in the colon as well as other bone and soft tissue tumors like osteomas and epidermoid cysts. Inheritance of this syndrome will increase the risk of developing papillary thyroid cancer as well.

Cowden Syndrome

Cow-den

Commonly associated with PTEN tumor suppressor gene mutations, this inherited disease is one of several GI hamartomatous polyp syndromes that also manifests with breast, thyroid, and endometrial cancers, macrocephaly, and various skin tumors.