

Disease Focus- Pediatric and Young Adult Thyroid Cancer

By Nicholas Farris, MD and Mamatha Kambalapalli, MD

The thyroid gland is a butterfly shaped organ located in the neck and upper chest. The thyroid gland is stimulated to make thyroid hormone utilizing iodine by a gland in the brain called the pituitary gland. Thyroid hormone helps to control metabolism, growth, temperature regulation, bowel movement control among others. Thyroid hormone is active in multiple organ systems in the body.

Thyroid cancer in children less than 20 years old is uncommon. It occurs in about five out of one million children, making up only 1.5% of childhood cancers overall. Thyroid cancer is more common in teenage patients between 15 and 19 years old and is much more common in girls than boys. Thyroid cancer is most common in Asian/Pacific Islander or White individuals; it is least common in black individuals. There has been an increasing rate of thyroid cancers since 1980.

Most cases of thyroid cancer arise in patients without a known risk factor, occurring sporadically. However, there are two recognized risk factors- a personal history of radiation exposure or an inherited genetic risk. Five to 10% of thyroid cancer have an inherited genetic risk. The most common syndromes associated with risk for thyroid cancer share an abnormality in the RET gene which leads to multiple endocrine neoplasia (MEN) syndrome.

Thyroid cancers usually present as an isolated mass that can be felt in the thyroid gland. These can be quite large at the time of their presentation. If the mass is also secreting hormones, the presentation can include symptoms consistent with an overactive thyroid such as high heart rate, anxiety, hyperactivity, weight loss, heat sensitivity, and feeling tired. While most of these cancers are limited to the thyroid, there are rare instances of when it has spread to the local lymph nodes or other places in the body such as the lungs.

The initial evaluation for thyroid masses includes an ultrasound of the thyroid. Additional imaging of the lymph nodes and body as well as blood levels of thyroid stimulating hormone (TSH) and thyroglobulin levels are typically assessed. A biopsy of the mass will be performed in order to diagnose the type of mass.

Abnormal growths of cells in the thyroid gland can lead to two types of masses: a benign growth (adenoma) or a cancer (carcinoma). Only about 20% of growths in the thyroid are cancerous. There are four types of thyroid cancers, papillary, follicular, medullary, and anaplastic thyroid carcinoma. The most common subtype is papillary carcinoma, this accounts for 60% of all thyroid cancer. Medullary subtype is the least common overall but more common in children between 0 and 4 years old. There are different treatment options for thyroid cancer. Surgical thyroidectomy, removal of the entire thyroid gland is used as the first part of treatment. This is curative in many cases. However, some patients may need additional treatments based on the extent of disease. Less commonly, surgical removal of a lymph nodes may be needed. Treatment with radioactive iodine ablation of residual thyroid tissue may be used in treatment. The combination of this treatment has led to very effective eradication of thyroid cancer, >95% of patients are cancer free more than 10 years after completing treatment.

The Surveillance, Epidemiology and End Results (SEER) database collects information about diagnoses of cancers from over 20 major regions in the United States. From 2008 to 2018, rates of thyroid cancer in children less than 20 years of age have been increasing. In 2000, the incidence rate was 0.6 cases per 100,000 children, in 2018 the rate is 1.3 per 100,000 children. This rise is mostly due to more cases of papillary thyroid cancer. Despite the rise in cases, the mortality rate has remained very low showing improved methods in treatment. Since 2005, more than 98% of children with thyroid cancer survive more than 5 years from their diagnosis.

During the same period of time as the SEER data, 2008-2018, Akron Children's Hospital diagnosed 23 cases of thyroid cancer. 22 individuals identified as white, one identified as black. Ages ranged from 4 to 21 years old, 16 patients are female. The majority, 19 of the 23 cases (83%), were papillary and papillary subtypes; the remaining four were follicular subtype. All but one case was localized or loco-regional (involving only the local lymph nodes). There was one case of metastatic lung involvement which was successfully cured with multimodality therapy. There have been no cases of medullary or anaplastic carcinoma. Treatment at Akron Children's has been very successful and focused on both up-front curative treatments, as well as close routine surveillance and symptom management. There have been no deaths from thyroid cancer during this time.

References

PDQ Pediatric Treatment Editorial Board. Childhood Thyroid Cancer Treatment (PDQ®): Health Professional Version. 2022 Apr 19. In: PDQ Cancer Information Summaries [Internet]. Bethesda (MD): National Cancer Institute (US); 2002-. PMID: 29337472.

Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence, Mortality, Population for Thyroid Cancer - SEER Research Data, 8 Registries, Nov 2021 Sub (1975-2018) - Linked To County Attributes - Time Dependent (1990-2018) Income/Rurality, 1969-2020 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, released April 2022, based on the November 2021 submission.

Surveillance Research Program, National Cancer Institute SEER*Stat software (seer.cancer.gov/seerstat) version Feb 1, 2022.