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THYROID CANCER: A Journal Review

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ABSTRACT

The thyroid gland is the largest organ of the endocrine system. Disorders of the thyroid gland present the most common clinical manifestations compared to other organs of the endocrine system. Thyroid cancer has a high incidence and is one of the leading causes of death worldwide, accounting for 7.6 million deaths (13% of all deaths) in 2008, with this figure continuing to increase every year. Along with the increasing prevalence of thyroid cancer in Indonesia, this study was conducted to determine the proper diagnosis and management of thyroid cancer.

Keywords: *Thyroid carcinoma, diagnosis, imaging, anatomic pathology examination, thyroid-stimulating hormone (TSH) and free thyroxine (FT4) levels*

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INTRODUCTION

Thyroid cancer is a malignancy that affects the parenchymal cells of the thyroid gland, which consists of two main types of cells: follicular cells, which cause highly differentiated thyroid cancer, and parafollicular cells, which trigger medullary thyroid carcinoma. The most common types of thyroid cancer are papillary, follicular, and Hurthle cell cancer. The exact cause of thyroid cancer is unknown, but exposure to radiation, particularly during childhood, is associated with an increased risk of developing this cancer.

Thyroid cancer tends to occur at a younger age, with the highest incidence recorded in the second to fourth decades of life. However, in the past two decades, the incidence of this cancer has increased in the fourth to fifth decades, likely due to advancements in imaging technology such as ultrasound, CT scans, MRI, and PET scans, which inadvertently detect thyroid tumors during examinations for other purposes.2

The most common type of thyroid cancer, papillary thyroid carcinoma (PTC), is known as a less aggressive form and is typically detected in the thyroid gland. Risk factors include radiation exposure, genetic predisposition, high iodine intake, and obesity. Certain genetic mutations, such as mutations in the BRAF gene, also play a role in the prognosis of this disease. Follicular thyroid cancer (FTC) is more common in older women and is triggered by factors such as radiation, iodine intake, and conditions like diabetes and obesity. Common symptoms include an enlarged thyroid gland, though often without specific symptoms. Medullary thyroid carcinoma (MTC), which originates from specialized thyroid cells, is rarer and can be genetic or sporadic. Meanwhile, anaplastic thyroid carcinoma (ATC) is a very rare and highly aggressive form of cancer with a poor prognosis. It spreads rapidly, characterized by a rapidly growing lump in the neck and symptoms such as hoarseness, difficulty swallowing, and breathing problems.

Definition

Thyroid cancer is a type of malignancy that affects the thyroid parenchymal cells. The thyroid parenchyma is divided into two main types of cells: follicular cells, which cause differentiated thyroid cancer (DTC), and

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parafollicular cells, which trigger medullary thyroid carcinoma (MTC). Approximately 90-95% of thyroid cancers fall under the DTC category, which includes papillary, follicular, and Hurthle cell carcinomas. MTC, on the other hand, accounts for only about 1-2% of all thyroid cancer cases, while anaplastic carcinoma makes up less than 1%.

Etiology

The exact causes of thyroid cancer are not fully understood, but exposure to radiation is often associated as a major risk factor. Specifically, low-dose radiation exposure during childhood, such as in patients who underwent radiation therapy for leukemia or lymphoma, has been shown to increase the risk of thyroid cancer. Additionally, the use of radiation for acne treatment in children has also been linked to an increased risk. Although radiation plays a role in triggering the onset of cancer, the aggressiveness of the disease does not always depend on the radiation exposure.

Epidemiology

Thyroid cancer is more common in younger individuals, with the highest incidence occurring in the second to fourth decades of life. However, in recent decades, there has been an increase in diagnoses in the fourth and fifth decades, likely due to the incidental detection of thyroid tumors through imaging technologies such as ultrasound, CT scans, MRI, and PET scans performed for other purposes. In Indonesia, thyroid cancer ranked 12th in terms of new cases in 2020 and is one of the five most common cancers among women.

Anatomy

The thyroid gland is an endocrine organ located in the anterior neck. It is situated in front of the trachea, and the sternocleidomastoid muscle and the infrahyoid muscles cover its lateral and anterior borders. The thyroid gland consists of two lateral lobes connected in the middle by an isthmus located anterior to the trachea, covering the third tracheal ring. The normal boundaries of the thyroid gland include: the upper border near the oblique line of the thyroid cartilage (around the fifth cervical vertebra), the lower border at the fourth and fifth tracheal cartilages (around the first thoracic vertebra), known as the thyroid bed. The normal size of the thyroid gland has an anteroposterior dimension of 3 cm, a thickness of 2 cm, and a height of 5 cm. 3 The vascularization of the thyroid gland originates from the first branch of the external carotid artery, which forms the superior thyroid artery, and from the thyrocervical trunk, which forms the inferior

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thyroid artery. The thyroid artery is a branch that occasionally arises from the innominate artery and supplies the isthmus. The superior thyroid artery has numerous branches, one of which enters the larynx along with the superior laryngeal nerve. This nerve can easily be cut if the superior pole is dissected too far from the gland during thyroidectomy. The superior thyroid artery is accompanied by the superior thyroid vein, which drains into the internal jugular vein. The middle thyroid vein also drains into the internal jugular vein. The inferior thyroid vein drains into the innominate vein. These veins form a plexus located beneath the original capsule of the gland and also extend downward into the isthmus in front of the trachea. The inferior thyroid artery is located behind the carotid sheath. This artery bends medially at the level of the cricoid cartilage and the sixth cervical vertebra.

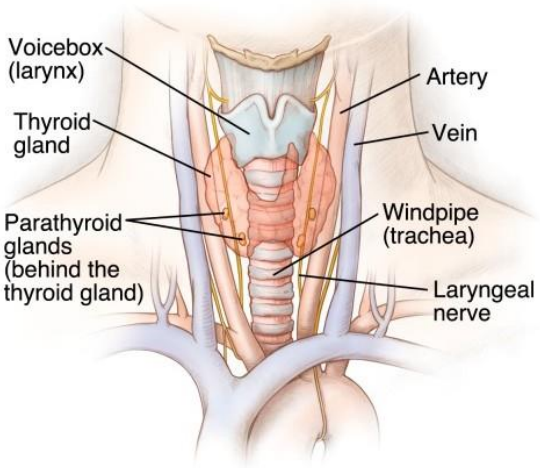

Figure 1. Anatomy of the thyroid and parathyroid glands

Pathophysiology

Thyroid cancer originates from the follicular cells of the thyroid gland. There are two types of cells found in the thyroid parenchyma: follicular cells and supporting cells (also called C cells). Cancer arising from follicular cells is generally referred to as differentiated thyroid carcinoma (DTC). Although these cancers are typically non-aggressive, they can eventually transform into more aggressive variants.

Thyroid cancer develops according to a well-defined tumor progression model. Approximately 85% of patients present with DTC and have an excellent prognosis after treatment. Between 10% and 15% of tumors will progress to more aggressive variants of thyroid carcinoma. These tumors may present with high-grade features or as high-grade thyroid carcinoma and exhibit biological behavior requiring more aggressive surgical intervention and adjuvant therapy. Death from thyroid cancer occurs in patients with anaplastic carcinoma. This is a fatal form of cancer.

Figure 2. Thyroid cancer develops according to a clear tumor progression model.

Classification

Clinical TNM Classification for Thyroid Carcinoma:5

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T-Primary Tumor

Tx Primary tumor cannot be assessed T0 No primary tumor detected

T1 Tumor with the largest size of 2 cm or less, still confined to the thyroid T1a Tumor ≤1 cm, still confined to the thyroid T1b Tumor >1 cm but ≤2 cm, still confined to the thyroid

T2 Tumor with a size of 2–4 cm still confined to the thyroid

T3 Tumor with a size >4 cm still confined to the thyroid or tumor of any size with limited extension to the strap muscles

T3a Tumor >4 cm still confined to the thyroid

T3b Tumors of any size with limited extension to the strap muscles (sternohyoid, sternothyroid, thyrohyoid, or omohyoid)

T4 Involves clear extrathyroidal extension

T4a Tumors of any size that have extended beyond the thyroid capsule and invaded the following structures: subcutaneous soft tissue, larynx, trachea, esophagus, recurrent laryngeal nerve

T4b Tumors of any size that have invaded the prevertebral fascia, mediastinal vessels, or carotid arteries

T4 Advanced Disease (Advanced Disease)

T4a Moderately Advanced Disease: Tumor of any size that has invaded the following structures: subcutaneous soft tissue, larynx, trachea, esophagus, and recurrent laryngeal nerve

T4b Very Advanced Disease: Tumor of any size that has invaded the vertebrae or large blood vessels around them, invaded the prevertebral fascia, mediastinal vessels, or the carotid artery

It is important to note that these patients may be candidates for new therapies if their disease is unresectable or unresponsive to radioactive iodine (RAI). When the same stimulus that triggered the cancer continues, the tumor may transform into a less differentiated carcinoma. Approximately 10% of thyroid cancers present with this feature and have a poorer prognosis requiring more aggressive intervention, both surgical and non-surgical. These cancers are generally resistant to RAI and have a higher risk of death from the disease. Less than 2% of thyroid cancers present as anaplastic carcinoma. Some

N-KGB Regional

Nx KGB cannot be assessed

N0 No metastasis to the KGB

N0a Cytological or histopathological examination indicates benign KGB

N0b Clinical or radiological examination shows no metastasis to regional KGB N1 Metastasis to KGB

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N1a Metastasis to cervical KGB at level VI or VII (pretracheal, paratracheal, including prelaringeal/Delphian, superior mediastinal) unilateral or bilateral

N1b Metastasis in cervical lymph nodes (Level I, II, III, IV, or V) unilateral, bilateral, or contralateral or to retroparapharyngeal lymph nodes

M-Distant metastasis

M0 No distant metastasis M1 Distant metastasis present

Clinical staging classification [5]

Table 1. Well-differentiated thyroid carcinoma, age <55 years

Stadium	T	N	M
Stadium I	Tiap T	Tiap N	M0
Stadium II	Tiap T	Tiap N	M1

Table 2. Well-differentiated thyroid carcinoma, age ≥55 years

Stadium	T	N	M
Stadium I	T1	N0/Nx	M0
	T2	N0	M0
Stadium II	T1	N1	M0
	T2	N1	M0
	T3a/T3b	Tiap N	M0
Stadium III	T4a	Tiap N	M0
Stadium IVA	T4b	Tiap N	M0
Stadium IVB	Tiap T	Tiap N	M1

Table 3. Medullary thyroid carcinoma

Stadium	T	N	M
Stadium I	T1	Tiap N	M0
Stadium II	T2	N0	M0
	T3	N0	M0
Stadium III	T1-3	N1a	M0
Stadium IVA	T4a	Tiap N	M0
	T1-3	N1b	M0
Stadium IVB	T4b	N0	M0
Stadium IVC	Tiap T	Tiap N	M1

Table 4. Anaplastic/undifferentiated carcinoma (All cases stage IV)

Stadium	T	N	M
Stadium IVA	T1-3a	N0/Nx	M0
Stadium IVB	T1-3a	N1	M0
	T3b	Tiap N	M0
	T4	Tiap N	M0
Stadium IVC	Tiap T	Tiap N	M1

Table 5. WHO Classification of Thyroid Tumors (2017)

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- Follicular adenoma
- Hyalinizing trabecular tumour
- Other encapsulated follicular patterned thyroid tumours
  - Follicular tumours of uncertain malignant potential
  - Well differentiated tumour of uncertain malignant potential
  - Noninvasive follicular thyroid neoplasm with papillary-like nuclear features
- Papillary thyroid carcinoma (PTC)
  - Papillary carcinoma
  - Follicular variant of PTC
  - Encapsulated variant of PTC
  - Papillary microcarcinoma
  - Columnar cell variant of PTC
  - Oncocytic variant of PTC
- Follicular thyroid carcinoma (FTC), NOS
  - FTC, minimally invasive
  - FTC, encapsulated angioinvasive
  - FTC, widely invasive
- Hürthle (oncocytic) cell tumours
  - Hürthle cell adenoma
  - Hürthle cell carcinoma
- Poorly differentiated thyroid carcinoma (Insular carcinoma)
- Anaplastic thyroid carcinoma
- Squamous cell carcinoma
- Medullary thyroid carcinoma
- Mixed medullary and follicular thyroid carcinoma
- Mucoepidermoid carcinoma
- Sclerosing mucoepidermoid carcinoma with eosinophilia
- Mucinous carcinoma
- Ectopic thymoma
- Spindle epithelial tumour with thymus-like differentiation
- Intrathyroid thymic carcinoma
- Paraganglioma and mesenchymal / stromal tumours
  - Paraganglioma
  - Peripheral nerve sheath tumours (PNSTs)
    - Schwannoma
    - Malignant PNST
  - Benign vascular tumours
    - Haemangioma
    - Cavernous haemangioma
    - Lymphangioma
  - Angiosarcoma
  - Smooth muscle tumours
    - Leiomyoma
    - Leiomyosarcoma
  - Solitary fibrous tumour
- Hematolymphoid tumours
  - Langerhans cell histiocytosis
  - Rosai-Dorfman disease
  - Follicular dendritic cell sarcoma
  - Primary thyroid lymphoma
- Germ cell tumours
  - Benign teratoma
  - Immature teratoma
  - Malignant teratoma
- Secondary tumours

To simplify management, thyroid carcinoma is classified into 4 types:

a. Papillary Thyroid Carcinoma (PTC) [4]

Papillary thyroid carcinoma (PTC) is one of the most common types of cancer that originates in the thyroid gland. This type is the most common form of thyroid cancer and is generally considered less aggressive, meaning it typically has a good prognosis for patients. PTC tumors often appear as solid masses with irregular shapes, although in some cases, the tumor may contain cysts. An important thing to know about PTC is that this cancer can spread to nearby structures, particularly the lymph nodes around the thyroid.

Some factors that can increase the risk of developing
PTC include:

- Radiation Exposure: Especially in individuals who were exposed to high levels of radiation during childhood, where the risk of developing PTC is significantly higher.
- Genetic Factors: In some cases, this cancer can be inherited within families, and certain genetic syndromes can increase a person's risk of developing PTC.
- Environmental Factors: Individuals living in areas with high iodine intake or those with a history of thyroid disorders are more likely to have a higher risk of developing this cancer.
- Body Weight: Being overweight or obese can also increase the likelihood of developing thyroid cancer.

As the most common type of thyroid cancer, the incidence of PTC has increased over time. However, some experts are concerned that PTC cases may be overdiagnosed and overtreat, meaning that some detected cases may not require aggressive treatment. In PTC, several genetic mutations have been identified, such as mutations in the BRAF

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gene, which can influence the prognosis of this disease. Additionally, it is clear that exposure to radiation is a significant risk factor in the development of PTC.

b. Follicular Thyroid Cancer (FTC)[6]

The thyroid gland is an organ located in the neck that produces hormones essential for the body's metabolic processes. It consists of two lobes connected by a small piece of tissue in the middle. The thyroid is susceptible to various disorders, including cancer. There are several types of thyroid cancer, with papillary and follicular being the most common.

Follicular thyroid cancer is a type that typically affects older women. Its causes can vary, ranging from radiation exposure, iodine intake, to health conditions such as diabetes and obesity, as well as certain types of food. There are also some occupations that are believed to increase the risk of developing thyroid cancer.

In the United States, thyroid cancer is not a common disease, but its incidence is higher in women. Follicular thyroid cancer is one type of thyroid cancer whose prevalence depends on iodine levels in the environment. In areas with adequate iodine intake, this type of cancer is less common. Those with thyroid cancer often experience an enlarged thyroid gland, but generally do not exhibit significant symptoms.

c. Medullary Thyroid Cancer (MTC)[7]

Medullary thyroid cancer is a type of tumor that develops in specific areas of the thyroid gland. This tumor produces a hormone called calcitonin, and elevated levels of calcitonin are the primary indicator of the presence of this cancer. The causes can vary, ranging from genetic mutations to sporadic occurrence without a family history. Some individuals are at higher risk of developing this cancer, particularly those with a family history of certain genetic mutations. Although relatively rare, medullary thyroid cancer accounts for approximately 4% to 10% of all thyroid cancer cases in the United States.

This cancer is typically found in adults, with peak ages varying depending on whether the cause is sporadic or genetic. The cancer cells in medullary thyroid cancer have a different appearance from normal thyroid cells and often grow in clusters without forming the characteristic structures of thyroid tissue. Common symptoms include a lump in the

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upper neck, enlarged lymph nodes, and in some cases, difficulty swallowing or speaking. In advanced stages, this cancer can spread to other organs such as the liver, bones, lungs, or brain. In families with a history of this disease, medullary thyroid cancer may develop at a younger age, but the symptoms are generally similar to those seen in sporadic cases.

d. Anaplastic Thyroid Cancer [ATC]

Anaplastic thyroid carcinoma (ATC), also known as undifferentiated thyroid carcinoma, is a very rare but highly aggressive type of thyroid cancer, accounting for only a small percentage of all thyroid cancer cases. This cancer has the ability to spread rapidly to nearby lymph nodes and to more distant organs. Unfortunately, the prognosis for ATC patients is very poor, as most are diagnosed at an advanced stage. However, recent research in genetics and molecular biology offers some hope for the development of more specific and effective treatments for this cancer.

Several factors increase the risk of developing ATC, including low educational attainment, blood type B, and a history of goiter. Additionally, older age, male gender, more severe local disease, and widespread metastasis are associated with more aggressive forms of ATC. This cancer is more common in regions with a high incidence of goiter. In the United States, ATC accounts for approximately 1.7% of all thyroid cancer cases and primarily affects older individuals, with an average diagnosis age of around 65 years, although women are more commonly affected than men.

Approximately 20% of patients diagnosed with ATC previously had differentiated thyroid cancer, and in 30% of cases, ATC and differentiated thyroid cancer are present simultaneously. Genetic mutations, particularly in the p53 gene, are believed to play a role in the transformation of cancer from a differentiated to an undifferentiated form. The genetic complexity of ATC involves multiple mutations in genes such as p53, RAS, and BRAF. ATC typically presents suddenly as a rapidly growing lump in the neck, accompanied by symptoms such as hoarseness, difficulty swallowing, breathing problems, and coughing. Spread to nearby lymph nodes in the neck is common, and in some cases, the cancer can cause vocal cord paralysis.

Diagnosis

a. Medical History and Physical Examination

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During the medical history and physical examination, suspicion of a malignant process in the patient:

Table 6. Medical History and Physical Examination

Anamnesis	Pemerikasaan fisik
• Riwayat radiasi • Pertumbuhan cepat • Suara serak • Simptom obstruksi jalan napas • Riwayat keluarga positif ▪ Riwayat keluarga dengan MEN • Tetap membesar dengan terapi tiroksin • Umur <20 tahun >50 tahun • MEN: Multiple Endocrine Neolplasia	• Nodul padat dan keras • Pembesaran KGB regional • Metastasis jauh : tulang, paru, jaringan lunak • Terfiksasi dengan jaringan sekitarnya • Paralisis pita suara • Penyempitan jalan napas • Horner's syndrome (miosis, partial ptosis, hemifacial anhidrosis and enophthalmos)

During the medical history, the following should also be noted:

- History of mechanical disorders in the neck region

Complaints of swallowing difficulties, a sensation of fullness, voice changes, and pain (due to tumor compression and/or infiltration)

- Family history of other genetic disorders, such as Werner syndrome, Cowden's disease, and familial adenomatous polyposis

During the physical examination, if facilities are available and there is suspicion of vocal cord paralysis, laryngoscopy is recommended

a. Supportive Tests

Examinations for thyroid cancer involve various methods, including laboratory tests, radiology, ultrasound, thyroid scanning, BAJAH, frozen section, histopathology, and immunocytochemistry. The following is a summary of the important procedures:

- Laboratory Tests:

FT4 and TSH levels are measured to assess thyroid function. Thyroglobulin is used for follow-up after thyroid cancer therapy. Calcitonin levels are only relevant if medullary carcinoma is suspected.
Examination

- Radiology:

Chest X-ray to look for signs of metastasis. Plain neck X-ray to assess microclassification and tracheal diameter.

Esophagogram is performed if there are signs of infiltration into the esophagus. Bone scan or bone scan is performed if there are indications of metastasis. CT Scan, MRI, and PET Scan are not routinely performed.

-Ultrasound examination:

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Detecting small nodules, distinguishing between types of nodules, and assessing response to therapy.

Characteristics of malignant thyroid nodules include intranodular vascularization, incomplete peripheral halo, marked hypoechogenicity, central microcalcifications, irregular borders, vertical diameter greater than horizontal diameter, and cervical adenopathy.

-Thyroid Biopsy:
Involves classifying nodules as cold, warm, or hot.

Preparation includes discontinuation of medications that interfere with thyroid iodine uptake. Not absolutely necessary if facilities are not available

- BAJAH Examination:

BAH accuracy varies, but accuracy improves when combined with ultrasound guidance.

Cytological examination has a high accuracy rate for certain types of cancer. Based on the Bethesda System, cytopathology results, malignancy risk, and clinical recommendations can be viewed according to the following table:

Table 7. Cytopathology classification and malignancy risk according to Bethesda

Kategori Diagnostik	Keterangan	Risiko Keganasan
Nondiagnostik/ *Unsatisfactory*	Sampel tidak memuaskan • Hanya cairan kista • Terhalang oleh darah • Apusan terlalu tebal • Artefak/ noda pengeringan • Jumlah sel tidak adekuat (minimal 6 kelompok sel folikel, tiap kelompok terdiri dari ≥ 10 sel)	1-4%
Benigna	• Spesimen mengandung cukup sel folikel dan membentuk folikel koloid • Nodul folikel jinak (adenomatoid, koloid, dll.) • Tiroiditis limfositik (hashimoto) • Tiroiditis granulomatosa (subakut)	0-3%

- Frozen Section:

Used during surgery to distinguish cancer from benign tissue. Combination with cytology imprint examination improves accuracy.

- Histopathology Examination:

This is the definitive examination performed after surgery. The tissue is evaluated after lobectomy, subtotal thyroidectomy, or total thyroidectomy.

- Immunocytochemistry (IC) or Immunohistochemistry (IHC):

Recommended for BAJAH specimens with indeterminate results (AUS, FLUS) to support diagnosis.
Mutations BRAF and RAS as prognostic markers.

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Management

a. PTC

Decisions regarding the management of papillary thyroid carcinoma are based on several factors. For small tumors, surveillance without surgical intervention may be an option; however, larger or more aggressive tumors typically require thyroid surgery. Following surgery, radioactive iodine therapy is often recommended for certain cases. Patients who undergo surgery generally require lifelong thyroid hormone therapy. Currently, new techniques such as thermal ablation are being developed and tested for treating small tumors. In cases of recurrence or advanced disease, chemotherapy may be considered as one treatment option. ([4])

b. FTC

Treatment for follicular thyroid carcinoma is tailored to the extent of cancer spread. If the cancer is minimally invasive, thyroid surgery is usually sufficient to treat it. However, for more invasive cases, removal of the entire thyroid gland is necessary, along with radioactive iodine therapy. If the cancer has spread to other parts of the body, radiation therapy or chemotherapy, including the use of tyrosine kinase inhibitors, may be treatment options. Regular monitoring of thyroglobulin levels is crucial for evaluating treatment success and detecting potential cancer recurrence.

a. MTC

Surgery is the primary treatment for medullary thyroid carcinoma, with total thyroidectomy often recommended. In certain genetic cases, preventive measures such as prophylactic thyroidectomy may also be considered. Monitoring for cancer recurrence is performed by checking CEA and calcitonin levels. For cases where the cancer cannot be removed, tyrosine kinase inhibitors such as vandetanib and cabozantinib may be used. Additionally, radiation therapy may be an option in the context of palliative care. ([7])

b. ATC

Anaplastic thyroid carcinoma is a difficult-to-treat cancer due to its highly aggressive nature. Surgery is performed with the aim of removing as much of the tumor as possible, although complete removal is often

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not feasible. Radiation therapy and chemotherapy are typically recommended, either sequentially or concurrently. Radioactive iodine therapy is ineffective for this type of cancer. Research into targeted treatments for this cancer is ongoing.

Differential Diagnosis

Some of the most common differential diagnoses include: [1]

a. Benign thyroid nodule

b. Toxic nodular goiter

c. Primary thyroid lymphoma
Cervical lymphadenopathy

Complications and Prognosis

Untreated thyroid cancer can spread locally to the respiratory tract, esophagus, or surrounding neurovascular structures. More distant spread (metastasis) often involves the lungs, bones, and other soft tissues.

. Thyroid lobectomy or total thyroidectomy carries a risk of neurovascular injury, with the most common injury being to the recurrent laryngeal nerve, which can cause hoarseness, and in cases of bilateral injury, may lead to respiratory failure. Treatment of thyroid cancer during pregnancy, typically through thyroidectomy, does not show a significant increase in the risk of pregnancy complications.

The prognosis for thyroid cancer varies depending on the type of cancer, tumor size, extent of spread or metastasis, patient age, and suitability for surgery. In general, the prognosis is good, with a five-year survival rate of up to 95% for patients of various ages and races. However, factors that worsen the prognosis include large tumor size, spread beyond the thyroid or metastasis, advanced age, and more aggressive types of cancer such as undifferentiated thyroid cancer.([1])

Conclusion

Thyroid cancer is a malignancy that affects the cells of the thyroid gland and is classified into several types, including papillary, follicular, medullary, and anaplastic thyroid cancer. The risk of developing thyroid cancer increases with exposure to radiation, particularly during childhood, as well as low-dose radiation exposure. The incidence of thyroid cancer tends to increase in the fourth and fifth decades of life. To detect this cancer, various diagnostic tests are performed,

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including laboratory tests, radiological imaging, ultrasound, thyroid scans, fine-needle aspiration biopsy (FNAB), and histopathological analysis. The management of thyroid cancer depends on its type but generally involves thyroid surgery, lifelong thyroid hormone therapy, and radioactive iodine therapy. The prognosis is generally good but is influenced by several factors such as tumor size, metastasis, patient age, and cancer type.

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