

# Thyroid Neoplasms

## Risk

- Incidence in USA is 23,500 new thyroid cancer cases/y, but incidence is increasing.
- Account for approximately 1% of new cancer diagnoses each y.
- Hispanics, African Americans, lower rate; Caucasians, moderate rate; Japanese, Chinese, Hawaiian, Filipinos, higher rate.
- Overall incidence 3× higher in women than in men; peaks in third and fourth decades of life.

## Perioperative Risks

- Large thyroid mass may produce airway compression, deviation, or vocal cord paralysis.
- Decreased BP, decreased HR, asystole with manipulation of carotid sinus.
- Postop complications: Phrenic nerve injury, pneumomediastinum, pneumothorax, tracheomalacia and tracheal collapse postextubation, hematoma or laryngeal edema leads to airway compromise; bilateral laryngeal nerve injury calls for tracheotomy; superior laryngeal nerve injury leads to aspiration.

- Accidental removal and/or injury of parathyroid glands causes decrease in  $Ca^{2+}$ .

## Worry About

- Occult pheochromocytoma: Bilateral lobe medullary thyroid cancer is associated with MEN IIA and IIB.

## Overview

- Four main types: Papillary (80–90%), follicular (5–15%), medullary (<5%), primary thyroid lymphoma (rare), and primary thyroid sarcomas (rare).
- Prognosis of well-differentiated papillary cancer is excellent, especially for age <40 y with small tumors.
- Prognosis worsens for large tumors with poorly differentiated, anaplastic histology.
- Age at Dx, tumor burden, gender, extra-thyroidal invasion, and distant metastases are important prognostic factors.
- Latest research defines subcellular and molecular prognostic factors through genetic studies.
- BRAF mutation is the most common mutation in papillary thyroid cancer and is associated with disease aggressiveness and resistance to radioiodine treatment.

## Etiology

- Factors include previous radiation, dietary iodine deficiency, goitrogens (chemical or dietary), preexisting benign thyroid disease, and genetic factors (Gardner syndrome, Cowden disease).
- Association between primary thyroid cancer and increased incidence of subsequent breast cancer.

## Usual Treatment

- Surgery initial therapy of choice.
- Lobectomy with or without isthmectomy, near-total, or total thyroidectomy as indicated.
- Radioiodine scanning and ablation commonly used after thyroidectomy in well-differentiated tumors.
- Radical debulking procedure (palliative) for large tumors invading airway and causing esophageal obstruction and bleeding.
- Recurrences usually treated with surgery.
- Combined chemotherapy and radiation therapy for poor prognosis cases.
- Doxorubicin: Most active single agent; medullary thyroid cancer responds poorly.

## Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	Vocal cord dysfunction Tracheal obstruction	Dysphonia SOB, DOE Wheeze/stridor	Neck mass	Indirect laryngoscopy US of neck, fine needle biopsy CXR CT of neck
CV	Mediastinal mass	SOB, DOE Wheeze, may be asymptomatic	Facial swelling	CXR CT/MRI
RESP	Lung metastases Lower airway obstruction	SOB, DOE Wheeze, hemoptysis		CXR CT/MRI
GI	Esophageal obstruction Liver metastases	Dysphagia		LFTs
ENDO	MEN IIA/IIB pheochromocytoma  Hyperthyroidism  Hyperparathyroidism  Ganglioneuromatosis	Htn, especially episodic Flushing Palpitations, episodic Sweating Tachycardia, tremor, heat intolerance  Colic Cramping Diarrhea Obstruction	Mucosal neuromas in tongue, subconjunctival areas, or GI tract Thickened lips Marfanoid features	CT/MRI 24-h urine epinephrine Increased epinephrine/norepinephrine  Increased $T_4^+$ Increased TSH Increased $Ca^{2+}$ Increased PTH Hypercalciuria provocative test for calcitonin release
MS	Bone metastases PTH-induced bone disease	Bone pain		Bone scan

**Key References:** Kato H, Yamashita K, Enomoto T, et al.: Classification and general considerations of thyroid cancer, *Ann Clin Pathol* 3:1045–1054, 2015; Longbottom J, Macnab R: Thyroid disease and thyroid surgery, *Anaesth Intens Care Med* 15:458–464, 2014.

## Perioperative Implications

### Preoperative Preparation

- Assess thyroid gland and/or tumor size, metastases, and hormonal activity.
- Ensure euthyroid state prior to surgery (antithyroid agents and beta-blockers as indicated).
- Assess larynx and/or trachea compression.
- May need smaller or armored ETT to prevent kinking (check CT scan).
- Record description of voice preop; obtain indirect laryngeal assessment of cord function.
- Correct abnormal  $Ca^{2+}$  prior to surgery.
- Check serum calcitonin level if medullary cancer suspected; rule out pheochromocytoma.

### Monitoring

- Routine

### Airway

- Usually straightforward. Difficult airway associated with standard predictors, obesity, invasion of the tracheal, or pharyngeal structures by tumor.

### Induction

- Direct or videolaryngoscopic intubation is more reliable than fiberoptic. If airway is considered to be a major hazard, pt may need to plan ECMO or femoro-femoral bypass in advance.

### Maintenance

- No one agent or technique shown to be superior.
- CV instability may occur with manipulation of carotid sinus (rare).

### Extubation

- May develop tracheomalacia (very rare).
- May require reintubation owing to hematoma. (Anticipate pharyngeal and laryngeal edema and serious difficulty in airway management.)

### Postoperative Period

- Metabolic: Decreased  $Ca^{2+}$ , hypoparathyroidism
- Nonmetabolic: Unilateral or bilateral nerve injury, hemorrhage, airway obstruction

### Adjuvants

- May be performed under local anesthesia with IV sedation in selected cases
- Antiemetics, including dexamethasone, effective in reducing postop N/V

## Anticipated Problems/Concerns

- Pts with medullary thyroid cancer: Rule out occult pheochromocytoma.
- Thyroid tumor can invade larynx, trachea, pharynx, or esophagus.
- Preplanned airway management strategies, especially with invasive tumors.
- Possible hyperthyroidism/hypothyroidism.