Strategy of long-term differentiated thyroid cancer management according to 2025 American Thyroid Association Guidelines.

Nguyen Tuan Cuong

BACKGROUND

Three decades before 2015, the incidence ↑ three times, peak in 2015. In Korea: being the most common malignant diseases.

PTMC: 50%: more application of ultrasound and FNAC.

Between 2015 and 2017, a decline observed for the first time in 30 years.
May be due to a heightened awareness of the potential harms of overdiagnosis.

Early detection of PTMC: ↓ postoperative complications.

“Active surveillance”: an alternative to surgery: 76-95% stable in many years.

“Overdiagnosis” is defined as the diagnosis of cancers that would not, if left in place, result in symptoms or death.

OUTLINES:

1. Preoperative staging?
2. Surgery option? lymph node dissection?
3. Estimate risk of recurrence?
4. After surgery: RAI?
5. Treatment? Follow-up?

TSH suppression

Blood test, Imaging (ultrasound, Diagnostic RAI WBS, CT scan, 18FDG-PET scanning)

6. Response to therapy?

    12 weeks post-op on levothyroxine therapy?

    12 months after initial therapy?

7. Dynamic (ongoing) risk stratification?
8. Persistent/recurrent disease?
9. When can monitoring be de-escalated or discontinued in patients with low-risk DTC?
10. Pregnant patients?
11. Active surveillance
12. Percutaneous therapy: ethanol / RFA/ Laser ablation

Role of preoperative staging with diagnostic imaging and laboratory tests (REC 7-10):

Measurement of serum Tg or TgAb levels is not recommended.

Neck ultrasound to evaluate cervical lymph nodes as well as for gross extrathyroidal extension and Ultrasound-guided **FNA of sonographically suspicious lymph nodes** greater than 8–10 mm in the smallest diameter are recommended for all patients.

Preoperative use of cross-sectional imaging studies (CT, MRI) of the neck and mediastinum with intravenous contrast **is recommended for patients with clinical suspicion for advanced or invasive disease**, including primary tumors with gross extrathyroidal extension, extensive adenopathy, or disease concerning for aerodigestive tract and/or thoracic involvement .

18FDG-PET-CT is not recommended prior to surgery.

Genomic evaluation of confirmed DTC prior to surgery is not recommended routinely.

TABLE 6. AJCC/UICC TNM STAGING: THE 8TH EDITION TNM[27,595]

	TNM	
CATEGORY[a]	*Code*	*Description*
Primary tumor (pT)	TX	Primary tumor cannot be assessed
	T0	No evidence of primary tumor
	T1	Tumor ≤2 cm limited to thyroid
	• T1a	Tumor ≤1 cm limited to thyroid
	• T1b	Tumor >1 cm but ≤2 cm limited to thyroid
	T2	Tumor >2 cm but ≤4 cm limited to thyroid
	T3	Tumor >4 cm or minimal extrathyroidal extension
	• T3a	Tumor >4 cm limited to thyroid
	• T3b	Gross extrathyroidal extension to strap muscles
	T4	Gross extrathyroidal extension to major neck structures
	• T4a	Invading soft tissue, larynx, trachea, esophagus, or recurrent laryngeal nerve
	• T4b	Invading prevertebral fascia or encasing carotid/mediastinal vessels
Regional lymph node (pN)	NX	Regional lymph nodes cannot be assessed
	N0	No evidence of regional lymph node metastasis
	• N0a	One or more cytological or histologically confirmed benign lymph nodes
	• N0b	No radiological/clinical evidence of metastasis
	N1	Metastasis to regional nodes
	• N1a	Metastasis to level VI or VII (pretracheal, paratracheal, prelaryngeal / Delphian or upper mediastinal) lymph nodes; this can be unilateral or bilateral disease
	• N1b	Metastasis to unilateral, bilateral or contralateral lateral neck lymph nodes (levels I, II, III, IV or V) or retropharyngeal lymph nodes
Distant metastasis (M)	M0	No distant metastasis
	M1	Distant metastasis present
STAGING		
1. <55 YEARS	Stage I	Any T, Any N, M0
	Stage II	Any T, Any N, M1
2. ≥55 YEARS	Stage I	T1–T2, N0/NX, M0
	Stage II	T1–T2, N1, M0 or T3a/T3b, Any N, M0
	Stage III	T4a, Any N, M0
	Stage IVA	T4b, Any N, M0
	Stage IVB	Any T, Any N, M1

Treatment definitions

Total thyroidectomy: Surgical removal of the entire thyroid gland.

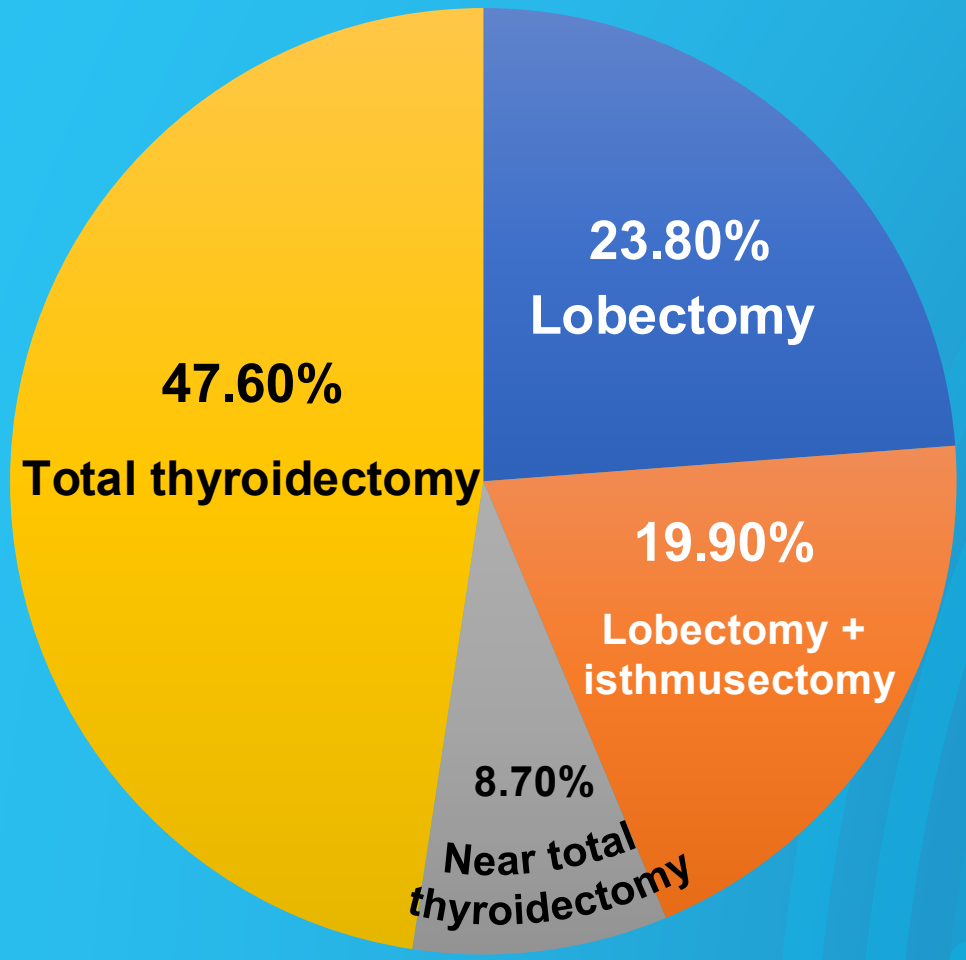
Near-total thyroidectomy: Intended extent of resection for thyroid cancer is total thyroidectomy, but a small remnant may be left for a specific reason (usually confidence in nerve preservation).

Lobectomy or hemithyroidectomy with or without isthmusectomy: Surgical removal of one lobe (half) of the thyroid with or without the isthmus.

Subtotal thyroidectomy: Surgical removal of almost all of the thyroid gland, **leaving 3–5 g of thyroid tissue** with the intent of maintaining adequate thyroid hormone production. This operation **is not recommended if the diagnosis of thyroid cancer**.

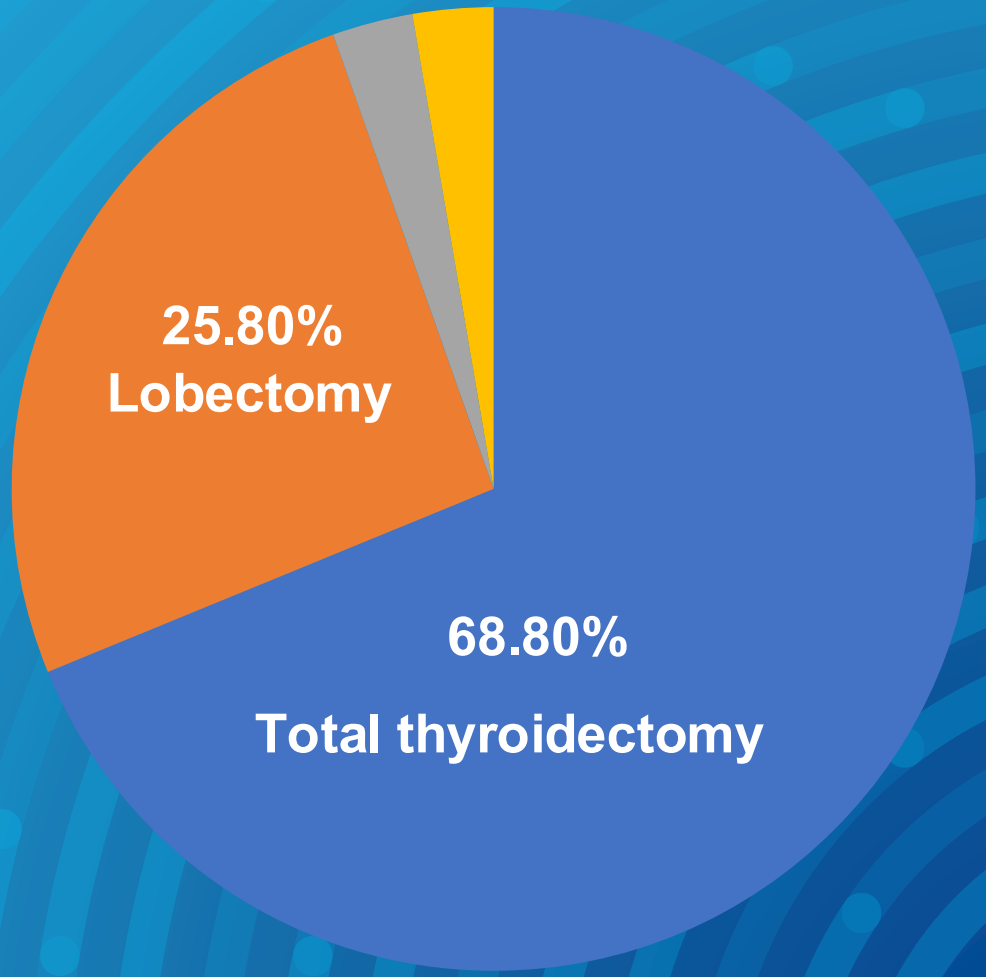
Completion thyroidectomy: Surgical removal of the remnant thyroid tissue following procedures of less than total or near-total thyroidectomy.

OUR STUDY:



≤10mm

Near total thyroidectomy
= lobectomy + isthmusectomy



>10mm

What is the optimal operative approach for DTC? (rec 15)

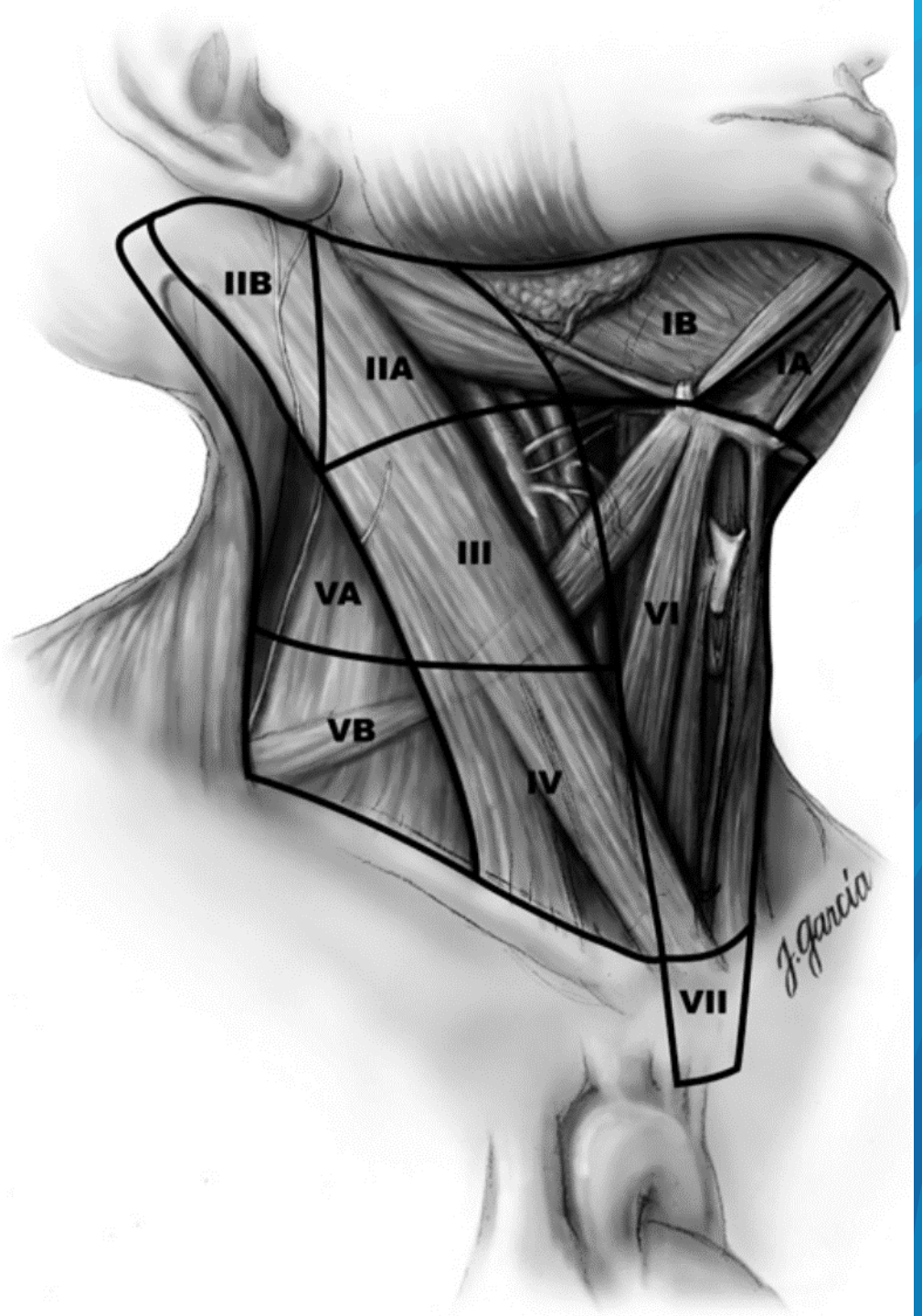
Table 5. Extent of Initial Thyroid Surgery for DTC

Clinical stage		Extent of thyroidectomy
cT1N0M0 (Unilateral)	≤2cm	Lobectomy
cT1 (m) N0M0 (Bilateral)	≤2cm	Total thyroidectomy
cT2N0M0 (Unilateral)	>2cm but ≤4cm	Lobectomy or Total thyroidectomy
cT2 (m) N0M0 (Bilateral)	>2cm but ≤4cm	Total Thyroidectomy
cT3-4 or cN1 or cM1		Total Thyroidectomy

Clinical stage based upon AJCC 8th edition. AJCC, American Joint Committee on Cancer.

If surgery chosen for initial therapy. (m) multifocal tumor.

Lateral neck compartment: **Levels IIA, III, IV, and VB** . Dissection of Levels I, IIB, and VA are not regularly performed.



Central neck compartment: Central neck lymph nodes include **Levels VI and VII**

Lymph node dissection? (REC 19,20)

Prophylactic central-compartment lymph node dissection should not be performed for most small, noninvasive, clinically node-negative PTC (cT1-T2, cN0), maybe consider for who have advanced primary tumors (T3 or T4)

Therapeutic central-compartment neck dissection: when clinically involved central nodes (cN1a)/for patients with clinically involved lateral neck lymph nodes (cN1b).

Therapeutic lateral-compartment neck dissection (typically including Levels IIa, III, IV and Vb): obvious metastatic lateral compartment cervical lymphadenopathy.

What are the basic principles of histopathologic evaluation of thyroidectomy samples?(REC 27)

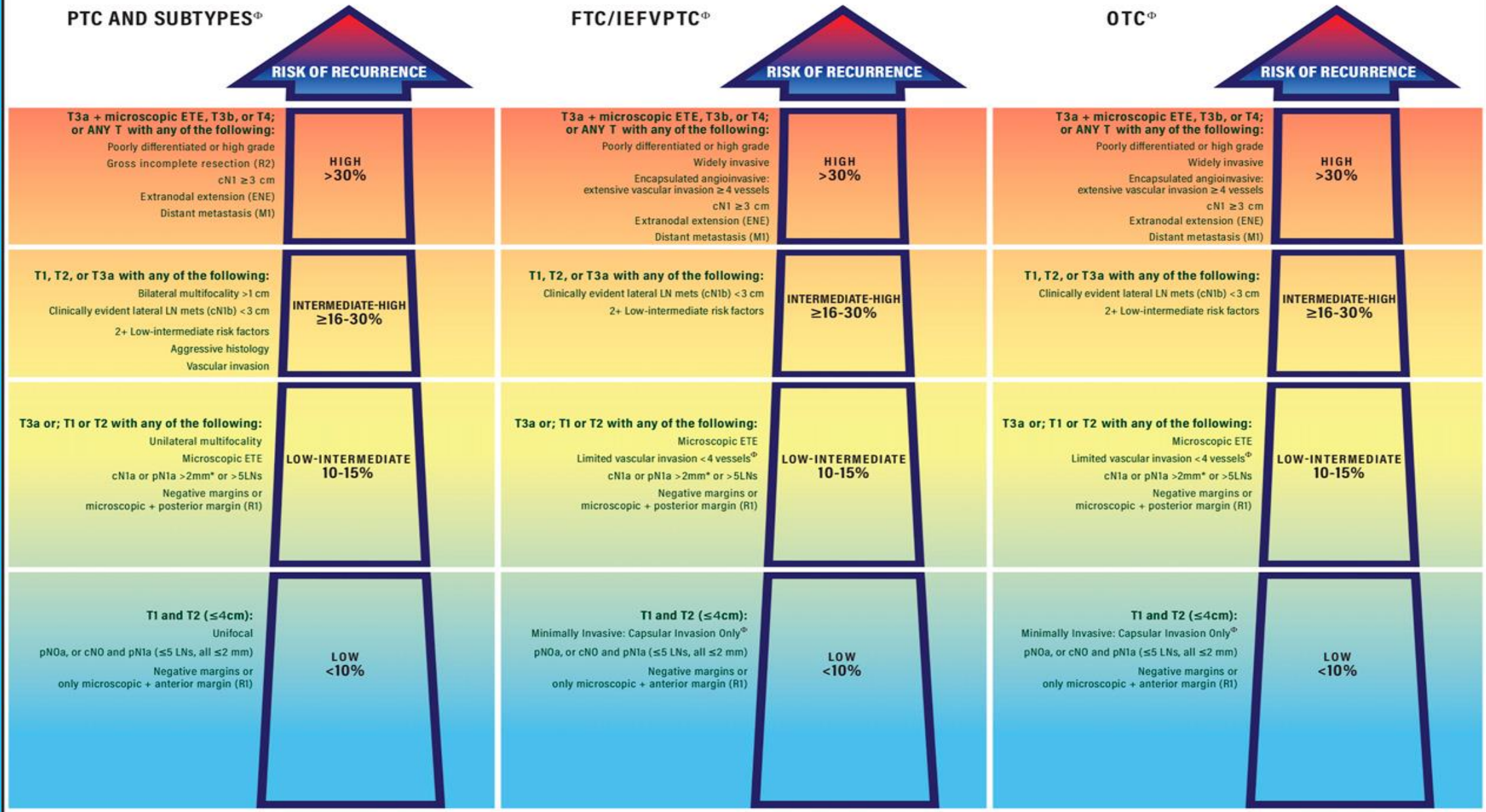
Pathology reports: should include additional information helpful for risk assessment.

The presence of vascular invasion and the number of invaded vessels.

Number of lymph nodes examined and involved with tumor, size of the largest metastatic focus to the lymph nodes.

Presence or absence of extranodal extension of the metastatic tumor.

Estimated Risk of Structural Recurrence



*No clear cutoffs for LNs between low-intermediate and high-intermediate risk groups. In general, smaller size and fewer lymph node metastases are associated with lower risk of recurrence.

LEGEND: PTC: Papillary Thyroid Carcinoma FTC/IEFVPTC: Follicular Thyroid Carcinoma/Invasive Encapsulated Follicular Variant of Papillary Thyroid Carcinoma OTC: Oncocytic Thyroid Carcinoma [Φ]: WHO 2022 definition

RAI? (rec 32)

Table 10. Summary of Recommendations for Initial RAI Following Thyroidectomy

Risk category	Typical RAI recommendation	Recommended 131I activity level	Goals of therapy
Low	No	1.1–1.85 GBq (30–50 mCi)	None or remnant ablation
Intermediate-low and intermediate-high	Consider	1.1–3.7 GBq (30–100 mCi)	Remnant ablation +/- adjuvant therapy
High	Yes	3.7–5.55 GBq (100–150 mCi)	Remnant ablation and adjuvant therapy
Distant metastases	Yes	3.7–7.4 GBq (100–200 mCi) or consider dosimetry	Treatment of known disease, remnant Ablation

RAI administration: RadioActive Iodine (rec 34-42)

Remnant ablation: Eliminate residual benign thyroid tissue in the thyroid bed to facilitate treatment monitoring.

Adjuvant therapy: Additional RAI administered to reduce the risk of recurrence.

Preparation for RAI therapy:

Goal of **TSH >30 mIU/L** in preparation for RAI therapy or diagnostic testing : **LT4 should be withdrawn for 3–4 weeks.**

A low-iodine diet for approximately 1–2 weeks should be used.

Patients should have a baseline complete blood count and assessment of renal function.

RAI administration: RadioActive Iodine (rec 34-42) WBS (whole body scintigraphy)?

Postoperative diagnostic 123I or low-dose 131I WBS may be considered before RAI treatment: **provide useful information about (i) the retained activity in the thyroid bed and (ii) the presence of regional or distant metastatic disease.**

Post-RAI therapy WBS should be performed generally **2–10 days after treatment**: Since larger activities of 131I are administered at the time of therapy compared with the pre-treatment diagnostic scan, **additional sites of disease may be identified on posttherapy scanning** (6,3%-13% post-treatment scans had abnormal uptake not identified on pre-therapy scan, despite negative serum Tg measurements).

The appropriate degree of TSH suppression? (rec 45,46)

Patients with high risk disease may be more likely to benefit from a **TSH in the subnormal range.**

How long should TSH suppression to below the reference range be maintained?

aggressive suppression (undetectable to subnormal TSH**), moderate suppression (**subnormal to normal TSH**), and non-suppression (**normal to elevated TSH**).**

After thyroid lobectomy, Thyroxine therapy is most frequently started in **the first 2 years**

DTC cells express the TSH receptor on their membranes and respond to TSH stimulation by increasing the expression of several thyroid-specific proteins (Tg, NIS) and by increasing the rates of cell growth. Suppression of TSH using supra-physiological doses of LT4 to decrease the risk of recurrence or reduce the rate of disease progression.

Disease progression defined as tumor volume increase ≥50%, size increase ≥3 mm, or new lymph node metastases.

The appropriate degree of TSH suppression? (rec 45,46)

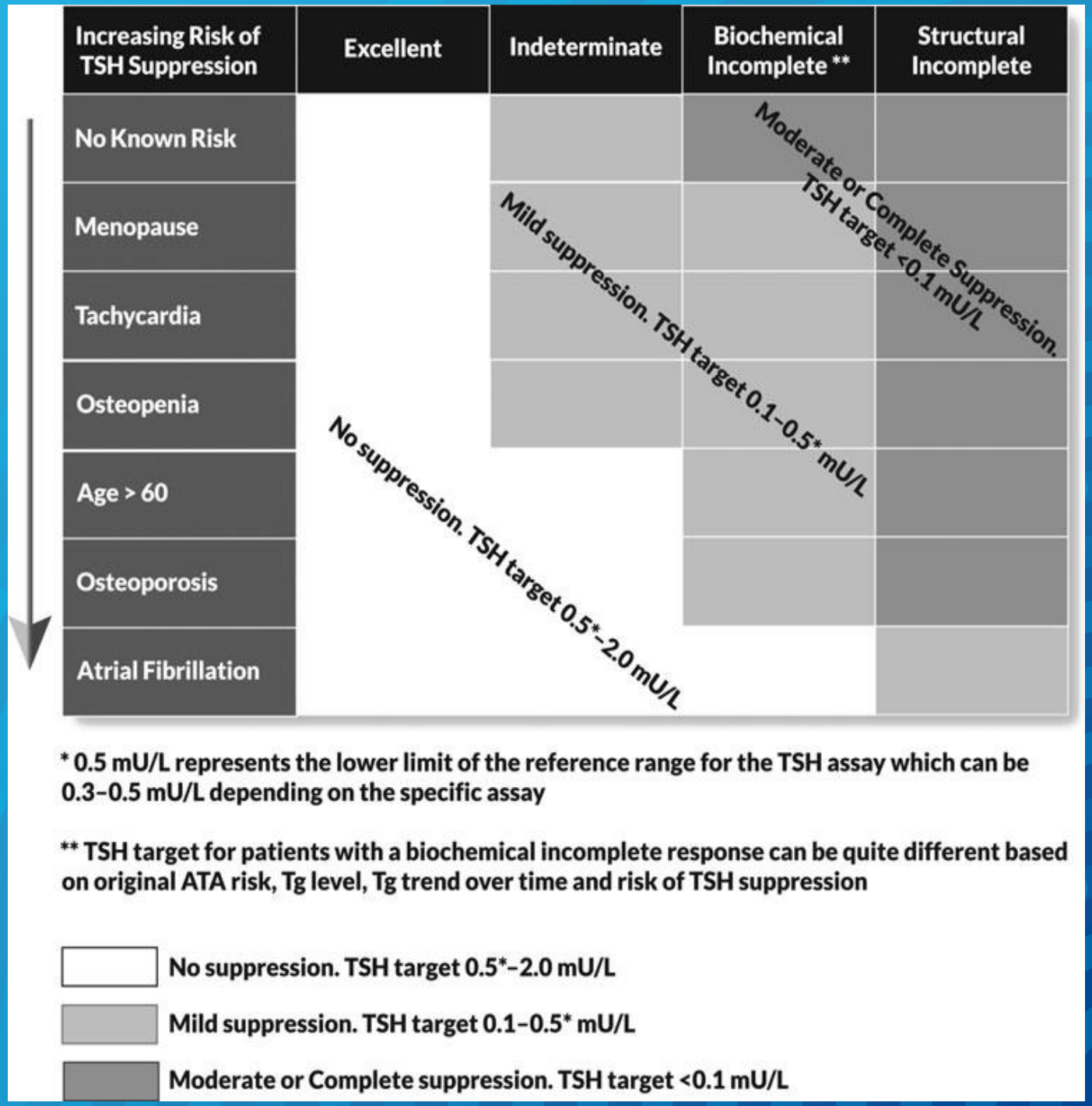
Low or intermediate risk: after a total thyroidectomy/after a thyroid lobectomy:
The TSH goal is in the normal reference range.

Risks versus benefits of TSH suppression and TSH goals should be **re-evaluated over time.**
Benefit is greater in patients at high-risk for recurrence or death.

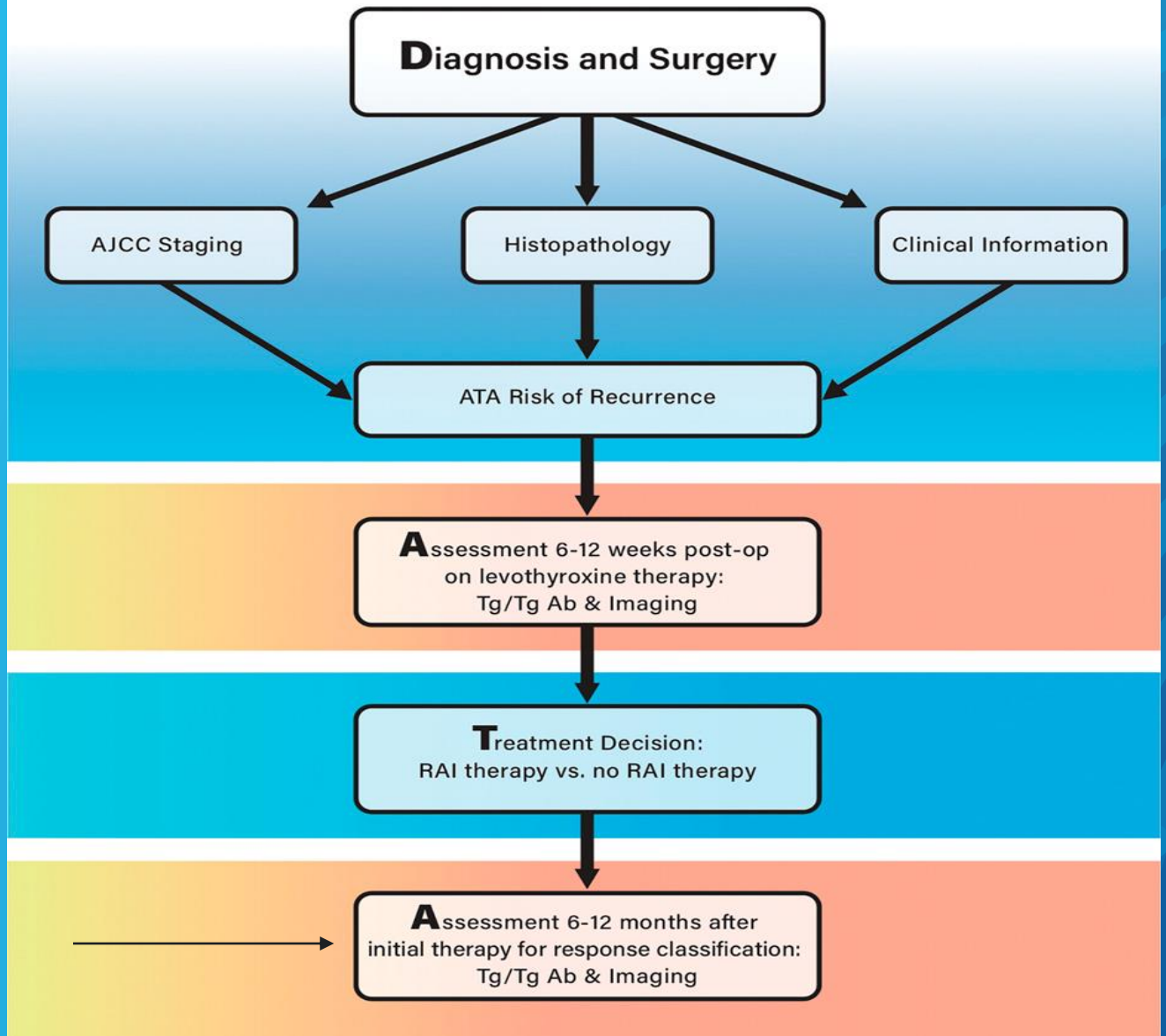
Risks: subclinical thyrotoxicosis may exacerbate some existed medical conditions: cardiovascular diseases (angina, atrial fibrillation, stroke), osteoporosis and fracture in postmenopausal women.

Optimal TSH goals for individual patients.

Thyrotropin Targets for Long-Term Thyroid Hormone Therapy



DATA Framework for Initial Therapy



The role of serum Tg measurement in the follow-up of DTC? (rec 47)

Measure serum Tg (on thyroxine therapy): **to monitor for response to therapy and to determine recurrence.**

After total or near-total thyroidectomy with or without RAI:

Post-op 6-12 weeks.

Then every 6–12 months after initial therapy (More frequent for ATA intermediate-high or high-risk patients).

After lobectomy during initial follow-up is not recommended routinely (more limited)

Most studies have shown that a **basal serum Tg on LT4 in patients after total thyroidectomy is adequately sensitive.**

TgAb are present in about 20% of patients with DTC. **TgAb positive patients**, in comparison to TgAb negative patients, **had a higher risk of lymph node metastases and cancer persistence.**

Diagnostic RAI WBS? (rec 49)

WBS can be performed with 123I or low activity 131I.
123I is preferred generally over 131I because it delivers lower radiation doses to the body and provides better-quality images.

Lobectomy or total thyroidectomy without RAI: should not undergo surveillance radioiodine WBS.
Low / low-intermediate risk of recurrence/excellent response to therapy: do not require routine diagnostic radioiodine WBS during follow-up.
Intermediate-high and high risk of recurrence: can be used if there is clinical suspicion for recurrence

Following RAI ablation or adjuvant therapy: A subsequent diagnostic WBS may be indicated primarily in three clinical settings:
(i) for patients with abnormal uptake outside the thyroid bed on post-therapy WBS.
(ii) for patients whose post-therapy WBS is of limited use because large thyroid remnants with high uptake of obscure the detection of lower uptake in neck lymph nodes.
(iii) for patients with rising or elevated TgAb levels (who are at risk of false negative Tg measurement) even when neck ultrasound does not show any suspicious findings.

Diagnostic RAI WBS?

Scintigraphy (131I or 123I): **Because of the lack of anatomical landmarks on planar images of whole body, it may be difficult to differentiate:**

(i) uptake in remnants of normal thyroid from lymph node metastases (especially when the remaining native thyroid is large).
(ii) uptake in lung metastases from rib lesions.
(iii) accumulation of RAI in intestine or bladder from a pelvic bone lesion.

The sensitivity of 124I PET for the detection of residual thyroid tissue and/or metastatic DTC is generally higher than that of a diagnostic planar WBS (99% vs. 66%, respectively).

124I PET/CT is promising but not yet widely available for clinical use.

18FDG-PET/CT scanning? (rec 50)

18FDG uptake may be present in sites with or without 131I uptake.

In patients **with high-risk DTC with elevated serum Tg levels (generally >10 ng/mL), particularly those who have negative RAI imaging**, 18FDG-PET/CT is primarily employed.

The sensitivity: 86, specificity: 0.84.

However, 18FDG-PET/CT for patients with recurrent 131I-avid disease has not been widely undertaken, and so its benefit is uncertain.

Finally, 18FDG-PET is insensitive for detecting brain metastases and that standard imaging stops in the mid-thigh → brain MRI and extension of images to the feet.

Monitoring and categorizing Response Criteria (REC 28-31)

Assessment 6-12 weeks post-op on levothyroxine therapy: **Tg/Tg Ab** and imaging.

Cervical ultrasound to evaluate the thyroid bed and central, lateral cervical lymph node compartments

If the serum Tg is above the excellent response range and/or there are Tg Ab(+): cervical ultrasound and/or cross-sectional imaging should be performed prior to administering RAI.

Assessment 6-12 months after initial therapy(surgery ± RAI):

When **Tg/TgAb levels rise** following total thyroidectomy, and **cervical ultrasound** demonstrates **no** structural disease or only minimal tumor burden, **additional cross-sectional imaging** to evaluate common metastatic sites (e.g. lungs and bone) should be performed.

Suspicious lymph nodes or lesions <8–10 mm in shortest dimension: followed without FNA unless they grow or threaten vital structures (such as the recurrent laryngeal nerve, trachea, esophagus, or great vessels).

≥8–10 mm: should be assessed with FNA for cytology and measurement of Tg in the needle washout fluid.

Response to therapy

Response assessment is performed **after intervention, either for initial or clinically persistent/recurrent disease.**

Excellent response: No biochemical or structural evidence of persistent thyroid cancer (i.e., remission).

Indeterminate response: The presence of nonspecific findings on imaging; mildly elevated serum Tg levels; or positive, but stable TgAb levels in persons who have undergone total thyroidectomy with or without RAI. Most patients in this category prove to have a “good” clinical response to therapy.

Biochemically incomplete response: Elevated serum Tg concentrations or rising TgAb levels without radiological evidence of structural recurrence in persons who have undergone total thyroidectomy with or without RAI.

Structurally incomplete response: Structural evidence of disease recurrence (by imaging or biopsy), usually in conjunction with elevated Tg and/or TgAb levels.

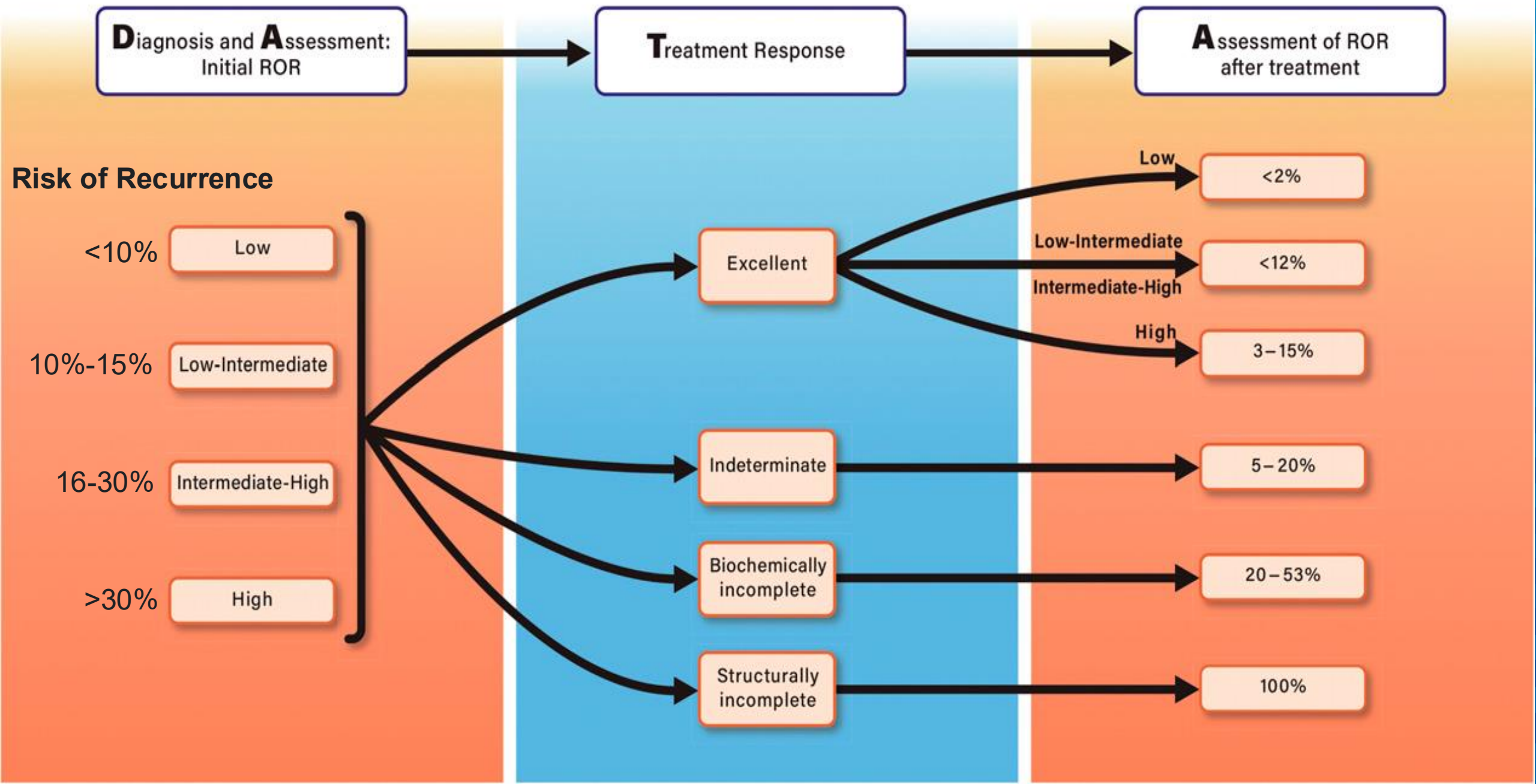
TABLE 9. RESPONSE CRITERIA AFTER INITIAL THERAPY BASED ON TYPE OF INTERVENTION

Response to therapy	*Post total thyroidectomy and/or neck dissection with RAI ablation or therapy*	*Post total thyroidectomy and/or neck dissection without RAI ablation*	*Post hemithyroidectomy*	*TSH goal*
Excellent	Nonstimulated Tg <0.2 or stimulated Tg <1 and negative imaging	Nonstimulated Tg <2.5	Normal or low-risk nodules in the contralateral lobe, or contralateral lobe nodules with benign biopsy AND no abnormal lymph nodes on imaging	TSH within normal reference range
Indeterminate	Nonspecific findings on imaging studies or nonstimulated Tg 0.2–1 or stimulated Tg 1–10 or stable/ declining TgAb levels	Nonspecific findings on imaging studies or nonstimulated Tg 2.5–5, or stable/ declining TgAb levels	N/A[a]	TSH within normal reference range[b]
Biochemically incomplete	Non-stimulated Tg >1 or stimulated Tg >10 or increasing TgAb levels and negative imaging	Nonstimulated Tg >5 or increasing TgAb levels and negative imaging	N/A[a]	TSH below normal reference range[c]
Structurally incomplete	Structural evidence of disease (suspicious imaging or biopsy proven local or distant metastatic disease)	Structural evidence of disease (suspicious imaging or biopsy proven local or distant metastatic disease)	Structural evidence of disease (suspicious imaging or biopsy proven local or distant metastatic disease)	TSH below normal reference range[c]

[a]See Recommendation 48 for specific comments regarding Tg levels (ng/mL) in patients treated with hemithyroidectomy.
[b]Data on optimal TSH target range are inconclusive.
[c]Data on optimal TSH target range are inconclusive and/or conflicting. If there is progression of residual disease or development of new recurrence, targeting a TSH below normal reference range may be reasonable. However, comorbidities such as atrial fibrillation and osteoporosis should be factored into the decision making process.

RAI, radioactive iodine; Tg, thyroglobulin; TgAb, anti-thyroglobulin antibody; TSH, thyrotropin.

Dynamic Risk Stratification



Is ongoing risk stratification useful in guiding long-term disease surveillance and therapeutic management decisions? (rec 51)

Ongoing risk stratification (dynamic risk assessment), in combination with the initial risk of recurrence → provide individualized management recommendations while risk estimates evolve over time.

Dynamic risk stratification, which assesses response to therapy over time, has been shown to correlate with initial risk category and initial response to therapy; it can predict future recurrence.

Dynamic risk assessment

What mean of patients' risk of long-term recurrence?

At the time of diagnosis:

the initial risk of recurrence (ROR) (Low, Intermediate, High) is based on pathology, preoperative and postoperative imaging, and Tg/TgAb levels if applicable.

to predict overall risk of recurrence and to help guide therapeutic decision-making: additional surgery, RAI, or more extensive treatment.

After therapy:

dynamic risk can be assessed (response to therapy) at every visit and may change over time for monitoring

Dynamic risk assessment

Initial ROR1 and ROR2 after treatment.

For patients treated **with total thyroidectomy and RAI:**
1. Excelllent response:
ROR1: low-risk → ROR2: 0.2-2%
ROR1: intermediate-risk → ROR2: 1-12%
ROR1: high-risk → ROR2: 3-15%
→ de-escalation of monitoring with continued excellent response to therapy

2. Indeterminate response: ROR2: 5-20%
3. Biochemically incomplete response: ROR2: 20-53%
→ continue biochemical and imaging follow-up.
Those with stable Tg and/or TgAb levels should have ongoing imaging
Those with rising Tg or TgAb titers →additional imaging, including cross sectional imaging or PET/CT to evaluate for progressive structural disease

4. Structurally incomplete responses: ROR2: 85-100%

Dynamic risk assessment

For those who had total thyroidectomy/lobectomy without RAI:
All are low- or intermediate-risk.

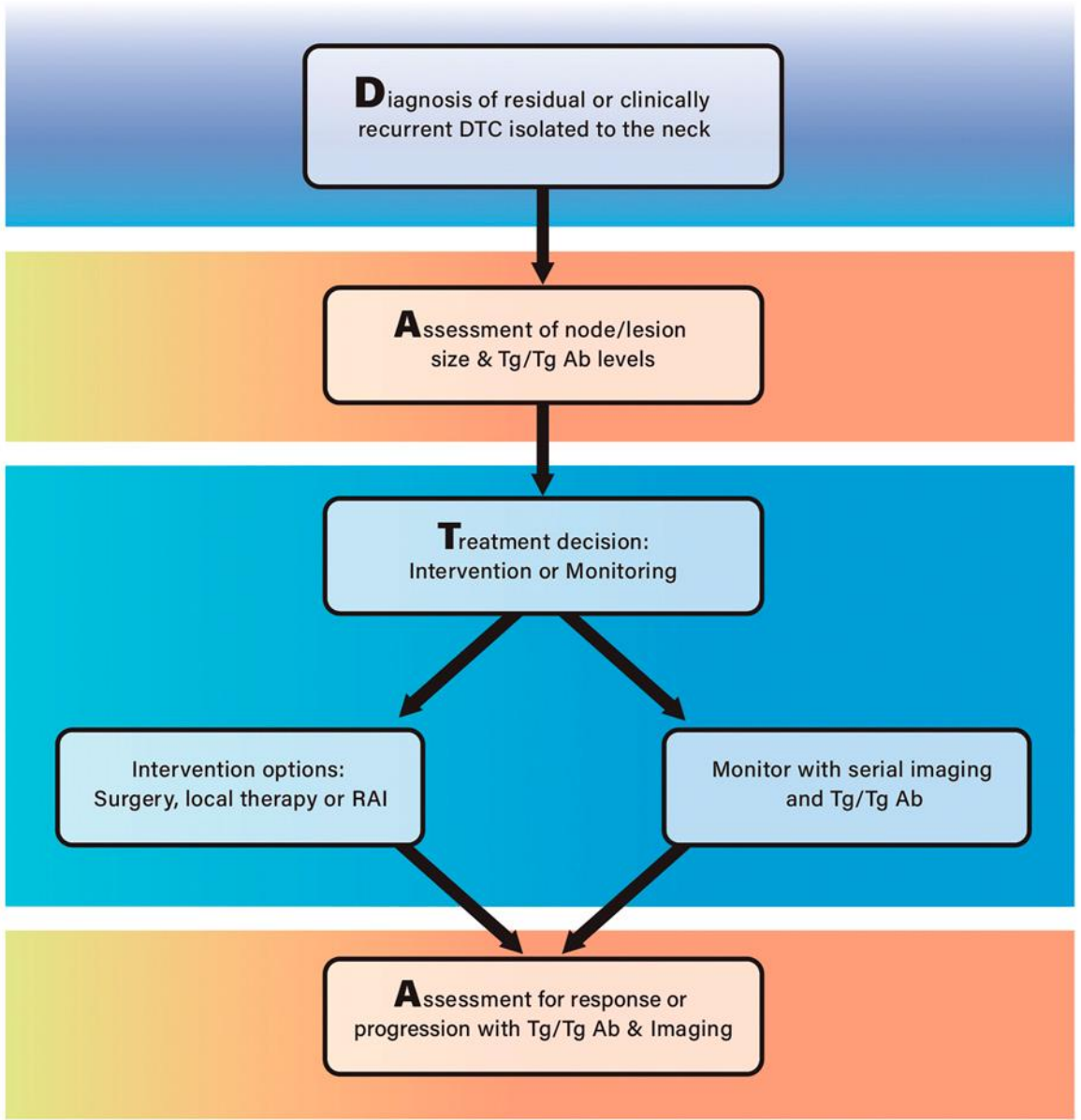
excellent response: ROR2: 0-1.6%

indeterminate response: ROR2: 0-5.6%

Biochemically incomplete response: ROR2: 0-31.6%

structurally incomplete response: ROR2: 100%

DATA Framework for Persistent/Recurrent Disease



Persistent/recurrent disease: definitions

Clinically persistent disease:

Biochemical or structural evidence of disease within 90 days of initial therapy (or intervention for persistent disease).

Clinically recurrent disease:

Biochemical or structural disease subsequently **identified in patients previously deemed to have an excellent response following therapy**. Clinically recurrent disease likely represents progression of residual disease that is below the lower limits of detection.

When and what type of treatment should be performed when there is evidence for locoregional residual, clinically recurrent, or progressive DTC? (rec 52-53)

Therapeutic compartmental or focused central and/or lateral **neck operation** in the reoperative setting should be based on a combination of factors: **extent of prior operation(s), size and anatomic location of new disease, pace of growth, patient factors and preference, and context to overall disease management.**

In patients at high risk for complications from reoperation: RFA, percutaneous ethanol ablation may be considered an alternative therapy for recurrent or residual thyroid cancer.

Additional RAI therapy for identified isolated cervical lymph node metastases may be considered after local therapy has been performed or if local therapy is not feasible.

Can monitoring be de-escalated or discontinued in patients with low-risk DTC? (rec 48)

Total thyroidectomy and/no RAI:

excellent response 5–8 years after initial therapy: routine ultrasound can be discontinued, biochemical markers alone every 1–2 years.

excellent response for 10–15 years: complete remission: do not require continued routine biochemical monitoring.

Lobectomy:

if initial ultrasound is negative and postoperative Tg is not markedly elevated: additional Tg testing is not recommended routinely**, ultrasounds should be performed every 1–3 years for 5–8 years**. Nodules in the residual lobe should be monitored as per ATA thyroid nodule guidelines.

"Complete remission" is the term used in oncology to define the disappearance of all signs of cancer in response to treatment. **This does not always mean that cancer has been cured or will not return.** Identifying patients to be in complete remission offers psychological, financial, and medical value to both patients and clinicians.

Can monitoring be de-escalated or discontinued in patients with low-risk DTC?

Patients who have a history of clinical or radiographical recurrence and those with indeterminate or suspicious results on biochemical or imaging assessments should continue to undergo ultrasound monitoring.

DTC recurrence in the low-risk category is uncommon. When it occurs, the overwhelming majority occurs in the first 5 years after surgery.

All patients with structural recurrences had an elevated Tg level.

Cost analyses of thyroid cancer surveillance have found that the cost to detect recurrence in low-risk patients is up to seven times higher than that performed for intermediate- and high-risk patients.

TABLE 11. LOW-RISK DTC WITH EXCELLENT RESPONSE TO THERAPY DE-ESCALATION RECOMMENDATIONS

Treatment and response to therapy	*Unstimulated thyroglobulin*	*TSH*	*Suggested frequency of neck ultrasound*
Hemithyroidectomy	Once postoperatively (see **Recommendation 48**)	Normal	[a]Every 1–3 years for 5–8 years
Total thyroidectomy, no RAI Excellent response	<2.5 ng/mL with undetectable TgAb	Normal	Every 1–3 years for 5–8 years, then discontinue unless Tg level rises or TgAb becomes newly detectable
Total thyroidectomy + RAI Excellent response	<0.2 ng/mL with undetectable TgAb	Normal	Every 1–3 years for 5–8 years and then discontinue unless Tg level rises or TgAb becomes newly detectable

Recommendations on ultrasound monitoring in low-risk patients after total thyroidectomy with excellent biochemical response and no suspicious features on imaging. Imaging is indicated in patients with rising thyroglobulin (Tg), new development of anti-thyroglobulin antibodies (TgAb), concerning physical exam, or symptoms. Type and location of imaging depends on the histological type of thyroid cancer and other pathology features. Use of Tg levels following hemithyroidectomy, and use of neck ultrasound in patients with FTC and OTC require further study.

[a]Assuming no nodules in residual lobe requiring monitoring as per ATA thyroid nodule guidelines.

ATA, American Thyroid Association.

Pregnant patients with DTC? (rec 81)

In most pregnant patients, surgery can be safely delayed until after delivery. Exceptions for **significant disease progression**. If necessary, surgery may be performed in the second trimester of pregnancy.

Monitoring with neck ultrasound at least once in early second trimester and more often if clinically indicated is appropriate. MRI may be performed in selected cases.

TSH goals for post-op pregnant patients: less TSH suppression if there are concerns that excess thyroxine may have an adverse impact on the pregnancy. **TSH should be monitored approximately every 4 weeks.**

Monitoring using neck ultrasound and Tg is appropriate for pregnant patients who have an incomplete response to therapy.

Pregnant patients in excellent or indeterminate response categories should be monitored as for nonpregnant patients.

Active surveillance (REC 11-14)

Active surveillance may be offered as an appropriate management option for some patients with **cT1aN0M0 PTCs** (Conditional recommendation, Low certainty evidence).

Neck ultrasound should be used to monitor disease progression. (Good Practice Statement).

Routine measurement of serum Tg and/or TgAb levels is not recommended. (Good Practice Statement).

Surgical resection is indicated if there is evidence of new biopsy-proven lymph node metastases, growth of the primary tumor by ≥3 mm, distant metastases, evidence of extrathyroidal extension, posterior growth, when there is patient anxiety, inability to follow-up, and/or expressed preference for surgery. (Good Practice Statement).

Ultrasound-guided percutaneous ablation? (rec 11,52,53)

Thermal ablation using radiofrequency (RFA), microwave (MWA), and laser (LA) and ethanol ablation may be considered as an alternative to active surveillance or resection **for cT1aN0M0 PTC in selected patients**. Shared clinical decision-making between the patient and clinical team regarding risks and benefits of this approach is essential. (Conditional recommendation, Low certainty evidence)

In patients at **high risk for complications from reoperation**: RFA, percutaneous ethanol ablation may be considered an alternative therapy for recurrent or residual thyroid
cancer.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THANK YOU FOR YOUR ATTENTION