

Thyroglobulin Testing – Differentiated Thyroid Carcinoma

Indications for Ordering

- Aid in decision to use radioiodine therapy for patients following differentiated thyroid carcinoma tumor resection
- Monitor patients with history of differentiated thyroid carcinoma for recurrence following surgery or radioiodine ablation

Test Description

- Quantitative chemiluminescent immunoassay (CIA)
- Reflexes to high performance liquid chromatography-tandem mass spectrometry (HPLC-MS/MS) if antithyroglobulin antibodies are identified

Tests to Consider

Typical testing strategy

Risk assessment

- Patients with palpable thyroid nodule, enlarged thyroid, or abnormal cervical lymph nodes
 - Thyroid Stimulating Hormone with Reflex to Free Thyroxine

Staging

- Patients with abnormal cervical lymph nodes or thyroid nodules with suspicion/confirmed diagnosis of differentiated thyroid carcinoma
 - Thyroglobulin, Fine Needle Aspiration (FNA)

Surveillance

- Patients with proven differentiated thyroid carcinoma who require surveillance for recurrent/residual thyroid disease following treatment
 - Thyroglobulin, Serum or Plasma with Reflex to LC-MS/MS or CIA

Primary tests

[Thyroglobulin, Serum or Plasma with Reflex to LC-MS/MS or CIA 2006685](#)

- Reflexes to LC-MS/MS if antithyroglobulin antibody is present

Related tests

[Thyroglobulin by LC-MS/MS, Serum or Plasma 2006550](#)

- Recommended test for quantifying thyroglobulin in patients with antithyroglobulin antibodies

[Thyroid Stimulating Hormone with reflex to Free Thyroxine 2006108](#)

- Assess thyroid function
- Identify risk in patients with palpable thyroid nodules
- Includes reflex to free thyroxine for thyroid stimulating hormone results outside the reference range

[Thyroglobulin, Fine Needle Aspiration \(FNA\) 0020753](#)

- Use with FNA biopsy of thyroid nodules to diagnose benign or malignant nonmedullary thyroid nodules

Disease Overview

Incidence of thyroid cancer – 13.5/100,000

- Differentiated carcinoma comprises ~95% of all thyroid carcinomas

Age of onset – peaks in 40s; M<F, 1:2

Symptoms

- Enlarged thyroid or thyroid nodule
- Hoarseness or enlarged cervical adenopathy suggests metastasis

Physiology

- Thyroglobulin is synthesized by follicular cells within the thyroid
 - Stored in colloid and used to make thyroid hormones – triiodothyronine (T3) and thyroxine (T4)
- Small amounts of thyroglobulin are released into circulation
- Differentiated thyroid cancers (papillary or follicular types) secrete thyroglobulin in excess
 - Thyroglobulin is a good marker for monitoring return of thyroid cancer

Monitoring

- Antithyroglobulin antibodies
 - Can confound CIA testing, leading to falsely decreased or elevated levels
 - May be increased in patients with Hashimoto thyroiditis or Graves disease AND differentiated thyroid carcinoma
- Thyroglobulin quantitation in specimens with antithyroglobulin antibodies should be performed using HPLC-MS/MS

Test Interpretation

Sensitivity/specificity

Identification of metastatic carcinoma in lymph nodes

- Clinical sensitivity – 100%
- Clinical specificity – 96.2%

Results (posttreatment by thyroid ablation or removal)

- Positive
 - Thyroglobulin detected – ≥ 0.1 ng/mL (CIA) or ≥ 0.5 ng/mL (LC-MS/MS)
 - Suggests possible residual/recurrent differentiated thyroid carcinoma
- Negative
 - No thyroglobulin detected – < 0.1 ng/mL
 - Suggests patient is free of residual/recurrent differentiated thyroid carcinoma

Limitations

- Limit of detection with LC-MS/MS – 0.5 ng/mL
- Results obtained with different test methods or kits cannot be used interchangeably
- Thyroglobulin results, regardless of concentration, should not be interpreted as absolute evidence for the presence or absence of papillary or follicular thyroid cancer
- Not recommended for use as a screening procedure to detect the presence of thyroid cancer in the general population