

Autoimmune Thyroid Disease - Thyroiditis

Clinical Background

Thyroiditis is an inflammation of the thyroid gland; it has multiple etiologies.

Epidemiology

- Prevalence – 5-15% of population is affected
- Age – peaks in 20s-40s
- Sex – M<F

Classification

- Autoimmune thyroiditis – Graves disease, Hashimoto disease
- Subacute – viral, transient hyperthyroidism
- Silent – includes postpartum
- Focal thyroiditis
- Acute – bacterial, tuberculosis, fungal, radiation-induced

Risk Factors

- Family history
- Iodine deficiency

Clinical Presentation

- Hashimoto disease (thyroiditis)
 - Firm goiter
 - Slowly progressive disease
 - May cause hypothyroidism related to glandular destruction
 - Usual symptoms are related to hypothyroidism due to gland destruction
- Graves disease
 - 60-80% of thyrotoxicosis cases are caused by Graves disease
 - Constitutional
 - Weight loss, heat and cold intolerance, fatigue
 - Cardiovascular
 - Tachycardia, high output heart failure
 - Ophthalmologic
 - Ophthalmopathy
 - Proptosis, usually bilateral
- Autoimmune polyglandular syndrome, Type II
 - Presence of autoimmune adrenal insufficiency, autoimmune thyroid disease or autoimmune diabetes mellitus type 1
 - Other associated conditions – vitiligo alopecia, myasthenia gravis, chronic atrophic gastritis (with or without pernicious anemia)

Diagnosis

- Indications for testing – signs of hypo- or hyperthyroidism with family history of thyroid disease
- Laboratory testing
 - Thyroid stimulating hormone (TSH) – establish if hypo- or hyperthyroidism is present
 - If patient is hypothyroid and TSH is elevated and T4 is low – most likely Hashimoto
 - If patient is hyperthyroid and TSH is low and free T4 is elevated – most likely Graves disease

Differential Diagnosis

- Toxic nodular goiter
- Thyroid cancer
- Thyrotoxicosis factitia
- Viral, subacute thyroiditis
- Pituitary tumor

Screening

- Antibody screening – if thyroid disease identified
 - Thyroid peroxidase (TPO) antibody
 - Also known as thyroid microsomal antibody
 - Presence of antibody denotes autoimmune thyroid disease
 - Generally found in Hashimoto disease and in Graves disease, postpartum thyroiditis and subacute thyroiditis
 - If found in euthyroid patients, may indicate a risk for autoimmune thyroid disease
 - Presence of TPO antibodies may be associated with
 - Vitiligo
 - Pernicious anemia
 - Diabetes mellitus type 1
 - Hypoparathyroidism
 - Celiac disease
 - Hypophysitis
 - Addison disease
 - Thyroglobulin antibody (TgAb)
 - Less useful antibody compared to TPO in diagnosing autoimmune thyroid disease, but is diagnostic of Hashimoto disease if present
 - Presence may predict postpartum thyroiditis
 - Presence of Tg antibodies may be associated with
 - Vitiligo
 - Pernicious anemia
 - Diabetes mellitus type 1
 - Hypoparathyroidism
 - Celiac disease
 - Hypophysitis
 - Addison disease
 - Thyroid stimulating hormone receptor antibody (TRAb)
 - Presence is diagnostic for Graves disease with hyperthyroidism
 - Thyroid stimulating immunoglobulin (TSI)
 - Presence is indicative of Graves disease

Monitoring

- TPO antibodies
 - No recommended use in monitoring Hashimoto disease
- TgAb antibodies
 - No role in detection of malignancy
 - Role in post-surgery monitoring for thyroid cancer
- TRAb

- High level predictive of relapse after withdrawal of drug therapy
- Positive antibodies should be monitored each trimester in pregnant women – positivity at end of pregnancy indicates likely fetal involvement
- TSH
 - TSH followed by free T4 to assess thyroid status
 - Monitor change in medication dosing
 - In pregnant women with positive thyroid peroxidase autoantibodies (TPO Ab), use monthly TSH to monitor for development of hypothyroidism

Lab Tests

Indications for Laboratory Testing

Tests generally appear in the order most useful for common clinical situations. For test-specific information, refer to the test number in the ARUP Laboratory Test Directory on the ARUP Web site at www.aruplab.com.

Test Name and Number	Recommended Use	Limitations	Follow Up
Thyroid Stimulating Hormone 0070145 Method: Electrochemiluminescent Immunoassay	Establish if hypo- or hyperthyroidism is present		
Thyroxine, Free (Free T4) 0070138 Method: Electrochemiluminescent Immunoassay	Assess and monitor thyroid status		
Thyroglobulin, Serum or Plasma 0070421 Method: Chemiluminescent Immunoassay	Monitor thyroid cancer Differentiate patients with silent (painless) thyroiditis from those with thyrotoxicosis factitia which results from surreptitious thyroid hormone intake Evaluate therapeutic response to treatment of nontoxic, diffuse and nodular goiter	Limiting factor of serum thyroglobulin (Tg) measurements is presence of Tg autoantibodies which may cause false highs or lows Results obtained with different assay methods or kits cannot be used interchangeably	
Thyroglobulin Antibody 0050105 Method: Chemiluminescent Immunoassay	Aid in diagnosing Hashimoto thyroiditis Substantiate thyroid disease in patients with non-thyroidal illness Predict postpartum thyroiditis		

Thyroid Stimulating Hormone Receptor Antibody (TRAb) 2002734 Method: Electrochemiluminescent Immunoassay	Discriminate between Graves disease and toxic nodular goiter Determine appropriate course of therapy after diagnosis		
Thyroid Peroxidase (TPO) Antibody 0050075 Method: Chemiluminescent Immunoassay	Aid in diagnosis of Hashimoto chronic thyroiditis		
Thyroid Antibodies 0050645 Method: Chemiluminescent Immunoassay	Test for thyroid peroxidase (TPO) antibodies and thyroglobulin antibodies Diagnose Hashimoto thyroiditis Substantiate thyroid disease in patients with non-thyroidal illness Predict progression of chronic thyroiditis Diagnose patients with idiopathic hypothyroidism and Graves disease		
Thyroid Stimulating Immunoglobulin 0099430 Method: Bioassay/ Chemiluminescence	Detect Graves disease		

Additional Tests Available

Test Name and Number	Comments
Thyroxine Binding Globulin 0070410 Method: Chemiluminescent Immunoassay	

Guidelines

National Academy of Clinical Biochemistry Laboratory Medicine Practice Guidelines: Laboratory Support for the Diagnosis and Monitoring of Thyroid Disease. Published Guidelines. [Accessed: 28 Apr 2009]

Screening for thyroid disease: recommendation statement. United States Preventive Services Task Force - Independent Expert Panel. 1996 (Revised 2004 January 20).

General References

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Klecha AJ, Barreiro Arcos ML, Frick L, Genaro AM, Cremaschi G. Immune-endocrine interactions in autoimmune thyroid diseases. *Neuroimmunomodulation*. 2008; 15 (1) :68-75.

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References from the ARUP Institute for Clinical and Experimental Pathology®

La'ulu SL, Slev PR, Roberts WL. Performance characteristics of 5 automated thyroglobulin autoantibody and thyroid peroxidase autoantibody assays. *Clin Chim Acta*. 2007; 376 (1-2) :88-95.

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Diagnostic Algorithm(s)

PDF algorithm(s) available at www.arupconsult.com.

Thyroid Disorders Testing Algorithm

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