

Thyroid Diseases and the Heart

Understanding How Thyroid Disorders Affect Cardiovascular Health



The Connection

The thyroid gland produces hormones (T3 and T4) that regulate metabolism, heart rate, blood pressure, cardiac contractility, and circulation. Both an overactive thyroid (hyperthyroidism) and an underactive thyroid (hypothyroidism) can significantly affect the heart.

How Thyroid Hormones Affect the Heart



Heart rate
Regulate how quickly the heart beats



Contractility
Affect the strength of heart contraction



Cardiac output
Influence the amount of blood pumped per minute



Blood pressure
Modify vascular resistance and circulation



Electrical conduction
Affect heart rhythm



Cholesterol metabolism
Influence LDL cholesterol levels

Hyperthyroidism

When the Heart Works Too Hard



Excess thyroid hormones (T3 and T4)

Common Causes

- Graves' disease
- Toxic multinodular goiter
- Toxic thyroid adenoma
- Thyroiditis
- Excessive thyroid hormone replacement

Common Symptoms

- Weight loss
- Heat intolerance
- Excessive sweating
- Tremors and nervousness
- Insomnia
- Muscle weakness

Cardiovascular Effects



Sinus tachycardia

Persistent fast heart rate and palpitations



Atrial fibrillation (AF)

Increased risk, especially in older adults



Increased cardiac output

Higher heart rate and contractility



Systolic hypertension

Elevated systolic blood pressure and widened pulse pressure



Heart failure

May result from sustained tachycardia, AF, or underlying heart disease

Hypothyroidism

When the Heart Slows Down



Insufficient thyroid hormones (T3 and T4)

Common Causes

- Hashimoto thyroiditis
- Thyroid surgery or radioactive iodine
- Iodine deficiency
- Certain medications (e.g., amiodarone, lithium)
- Congenital hypothyroidism

Common Symptoms

- Weight gain
- Cold intolerance
- Constipation
- Fatigue
- Dry skin and hair loss
- Depression or impaired concentration

Cardiovascular Effects



Sinus bradycardia

Slower heart rate and reduced exercise tolerance



Reduced cardiac output

Decreased contractility and impaired relaxation



Diastolic hypertension

Increased systemic vascular resistance



Hyperlipidemia

Increased LDL cholesterol and potential atherosclerosis



Pericardial effusion

Fluid around the heart, more common in severe cases

Hyperthyroidism vs. Hypothyroidism: Key Cardiovascular Differences

Feature	Hyperthyroidism	Hypothyroidism
Heart rate	Increased (tachycardia)	Decreased (bradycardia)
Cardiac output	Increased	Decreased
Blood pressure	↑ Systolic	↑ Diastolic
Pulse pressure	Widened	May be narrowed
Arrhythmias	Sinus tachycardia, AF	Bradycardia, QT prolongation
Cholesterol	Often decreased	Increased LDL
Heart failure	High-output or tachycardia-mediated	Reduced cardiac performance
Pericardial effusion	Uncommon	Possible in severe disease

Diagnosis and Evaluation



Laboratory Tests

- TSH (screening test)
- Free T4 and T3
- Thyroid antibodies
- Lipid profile



Cardiac Evaluation

- Electrocardiogram (ECG)
- Echocardiogram
- Holter monitoring (if needed)
- Blood pressure assessment

Treatment and Management



Hyperthyroidism

- Antithyroid medications
- Beta-blockers (for heart rate control)
- Radioactive iodine or surgery (when indicated)
- Manage arrhythmias and stroke risk



Hypothyroidism

- Levothyroxine replacement
- Monitor heart rate, blood pressure, and lipids
- Start with lower doses in patients with heart disease
- Regular follow-up and dose adjustment

Key Take-Home Messages

- ✓ Thyroid hormones directly affect heart function, blood pressure, and rhythm.
- ✓ Hyperthyroidism commonly causes tachycardia and increases risk of atrial fibrillation.
- ✓ Hypothyroidism may cause bradycardia, elevated LDL cholesterol, and reduced cardiac performance.
- ✓ Early diagnosis and appropriate treatment can prevent or reverse many cardiac complications.
- ✓ Thyroid testing is important in patients with unexplained cardiovascular abnormalities.



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