

Child With Suspected Hyperthyroidism

| Suggestive history and physical findings | Initial laboratory and/or radiologic work-up can include: | When to refer | Items useful for consultation | Additional information |
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| <p><u>Symptoms:</u> Anxiety, restlessness, mood swings, panic attacks, behavioral problems, deterioration in school performance, inability to concentrate and sleep disturbances. Palpitations, heat-intolerance, fatigue, muscle weakness, development of new onset tremors Increased appetite, diarrhea, changes in weight [usually weight loss], and menstrual irregularity in girls.</p> <p><u>Family history:</u> History of thyroid or other autoimmune disorder</p> <p><u>Physical signs:</u> Vital signs: tachycardia, normotensive/hypertensive,</p> | <p><u>Blood tests:</u></p> <ul style="list-style-type: none"> • TSH • Free T4 (FT4) • T3 • Thyroid peroxidase antibody • Thyroglobulin antibody • Thyroid stimulating immunoglobulin (TSI) • Thyroid receptor antibodies (TRAb). <p><u>Other tests to consider after consultation with Pediatric Endocrinologist:</u></p> <ul style="list-style-type: none"> • CBC with differential • CMP • Thyroid ultrasound • Radioactive iodine uptake | <p><u>Urgent:</u> All cases of hyperthyroidism should be considered a medical urgency and referred to pediatric endocrinologist as early as a possible. The exception to the rule: thyroid storm which is a medical emergency and patients should be transferred to the emergent care center for initial stabilization</p> <p>Onset of fever and altered mental status is ominous and may indicate a thyroid storm.</p> <p>Find a Pediatric Endocrinologist</p> | <p>Previous growth data/growth charts</p> <p>Pertinent medical records</p> <p>Recent laboratory and radiologic studies</p> | <p>Additional Information</p> <p>Hyperthyroidism: A Guide for Families</p> <p>References</p> |

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| <p>wide pulse pressure Skin: warm, clammy Tremors: tongue fasciculation, tremors of extremities Eye changes: prominent stare, lid lag, and variable degrees of proptosis Thyroid: firm goiter [no tenderness] +/- bruit. Musculo-skeletal system: variable degree of muscle weakness Neurological: Hyper alert, restless, normal to exaggerated deep tendon reflexes.</p> <p><u>Differential Diagnosis</u></p> | | | | |
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Differential diagnosis for hyperthyroidism

- Graves' disease,
- Thyrotoxic phase of thyroiditis,
- Surreptitious ingestion of levothyroxine
- Rare causes in children:
 - TSH- dependent hyperthyroidism including pituitary TSH-secreting tumors
 - Resistance to thyroid hormone
 - Toxic multinodular goiter
 - Solitary thyroid nodule

Additional Information

Laboratory Abnormalities:

- Typical pattern: Free T4, T3 levels will be elevated and TSH will be suppressed in the hyperthyroid state [other than in the uncommon TSH-dependent hyperthyroid states like pituitary tumors].
- Anti-thyroid antibodies [thyroid peroxidase antibody, thyroglobulin antibodies, thyroid receptor antibodies, thyroid stimulating immunoglobulin] are useful for etiological diagnosis.
- Liver function and total white count abnormalities are not uncommon in individuals with hyperthyroidism; ESR may be elevated in non- autoimmune thyroiditis.
- Thyroid ultrasound may reveal a hyper-vascular, enlarged thyroid gland with or without any dominant nodules
- Other tests: Complete metabolic panel, complete blood count, and ESR
- Radiological studies:
 - Thyroid ultrasound : hyper-vascular, enlarged thyroid gland with or without any dominant nodules
 - radioactive iodine uptake: increased uptake

Treatment of Hyperthyroidism requires close supervision and involves:

- Decrease the production of thyroid hormones:
 - Medications to decrease thyroid hormone production: methimazole, propylthiouracil, carbimazole
 - Definitive therapy to consider
 - Radioactive iodine ablation (can be done in older children)
 - Surgical thyroidectomy (Need an experienced thyroid surgeon)
- Supportive care can include β -blockage to control the adrenergic effects associated with hyperthyroidism, avoidance of excessive activity, and close monitoring of cardiovascular, musculoskeletal and neurological status.

Link to patient education material from Pediatric Endocrine Society

https://www.pedsendo.org/assets/patients_families/EdMat/Hyperthyroidism.pdf

Suggested References and Additional Reading

- Bahn Chair RS, Burch HB, Cooper DS, Garber JR, Greenlee MC, Klein I, et al. Hyperthyroidism and other causes of thyrotoxicosis: management guidelines of the American Thyroid Association and American Association of Clinical Endocrinologists. *Thyroid* : official journal of the American Thyroid Association. 2011;21(6):593-646. Epub 2011/04/23. doi: 10.1089/thy.2010.0417. PubMed PMID: 21510801. <http://online.liebertpub.com/doi/full/10.1089/thy.2010.0417>
- Bauer AJ. Approach to the pediatric patient with Graves' disease: when is definitive therapy warranted? *The Journal of clinical endocrinology and metabolism*. 2011;96(3):580-8. Epub 2011/03/08. doi: 10.1210/jc.2010-0898. PubMed PMID: 21378220. <http://press.endocrine.org/doi/pdf/10.1210/jc.2010-0898>.

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