

Infant With Suspected Hyperthyroidism (Neonatal Graves')

Suggestive history and physical findings	Initial laboratory and/or radiologic work-up can include:	When to refer	Items useful for consultation	Additional information
<p>Symptoms: Irritability, poor feeding, poor weight gain, diarrhea, poor sleep.</p> <p>Family history: Maternal history of Graves' disease (past or present)</p> <p>Physical signs: Supraventricular tachycardia, normotensive/hypertensive, wide pulse pressure, cardiomyopathy and congestive heart failure Warm and clammy skin Tongue fasciculation, tremors of extremities Hepatosplenomegaly, jaundice and thrombocytopenia Craniosynostosis, exophthalmos Firm goiter +/- bruit. Muscle weakness Hyper alert, restless, normal to exaggerated deep tendon reflexes.</p> <p>Differential Diagnosis</p>	<p>Blood tests:</p> <ul style="list-style-type: none"> • TSH • Free T4 (FT4) • T3 • Thyroid stimulating immunoglobulin (TSI) and Thyroid receptor antibodies (TRAb). <p>EKG should be done and cardiac monitoring if SVT is detected</p> <p>Other tests to consider after consultation with Pediatric Endocrinologist</p> <ul style="list-style-type: none"> • Thyroid ultrasound • Radioactive iodine uptake 	<p>Urgent: All cases of Neonatal Graves should be considered a medical emergency and referred to a Pediatric Endocrinologist immediately Neonatal Graves can be LIFE-THREATENING.</p> <p>Find a Pediatric Endocrinologist</p>	<p>Pertinent medical records (birth history), including pertinent maternal/OB history (need maternal thyroid tests and thyroid antibodies)</p> <p>Recent laboratory and radiologic studies</p>	<p>Additional Information</p> <p>References</p>

Differential diagnosis for neonatal hyperthyroidism

- Neonatal Graves – usually self-limited
- Congenital hyperthyroidism (TSH receptor activating mutations)

Additional Information

- Neonatal Graves can cause cardiac failure and thyroid storm (hyper metabolic state induced by excessive thyroid hormone release) which are medical emergencies.
- Infants born to mothers with active Graves' disease can be euthyroid, hypothyroid or hyperthyroid depending on maternal treatment with antithyroid drugs, and presence of stimulating and inhibitory maternal antibodies. Signs and symptoms of hyperthyroidism in infants born to mothers on antithyroid drugs can be delayed.
- Thyroid stimulating immunoglobulin (TSI) and Thyroid receptor antibodies (TRAb) cross the placenta, and can be present for 3-12 weeks in the neonate.
- Neonates at highest risk of neonatal Graves' are born to mothers with very high TSI. Measuring maternal TSI or TRAb during pregnancy can stratify risk to the newborn.
- Laboratory Abnormalities:
 - 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]. Note that FT4 and TSH levels are normally higher in the neonate.
 - 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
- Treatment of Neonatal Graves requires close supervision and involves:
 - Decrease the production of thyroid hormones:
 - Methimazole is given at dose 0.25- 1 mg/kg/day divided every 8 hours.

- Lugol's solution of potassium iodide 1 drop (8mg) orally every 8 hours to block thyroid hormone synthesis.
- Supportive care: include β -blockage to control the adrenergic effects associated with hyperthyroidism and close monitoring of cardiovascular, musculoskeletal and neurological status.
- Close biochemical and clinical monitoring of the neonate to ensure appropriate treatment and limit overtreatment is important. This often includes biochemistry (TSH, FT4, FT3) every 3-5 days.
- Usually self-limiting.

Suggested References and Additional Reading:

- Abbasoglu A, Ecevit A, Tugcu AU, Erdogan L, Kinik ST, Tarcan A. Neonatal thyrotoxicosis with severe supraventricular tachycardia: case report and review of the literature. J Pediatr Endocrinol Metab. 2015;28(3-4):463-6.
- Levy-Shraga Y, Tamir-Hostovsky L, Boyko V, Lerner-Geva L, Pinhas-Hamiel O. Follow-up of newborns of mothers with Graves' disease. Thyroid : official journal of the American Thyroid Association. 2014;24(6):1032-9.

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