

South West Neonatal Network Guideline

Guideline for the Management of Infant of Mother with Thyroid Disease

Main Author(s):	Christine Burren, Consultant Paediatric Endocrinologist (UHB) Agreed with: Paediatric Endocrine and Neonatal Consultants
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1. Overview - Flowchart for Management of Babies of Mother with Thyroid Disease

Antenatal:

Mothers type of Thyroid Disease

Hypothyroidism =
Underactive Thyroid

Hyperthyroidism =

- Overactive thyroid
- Thyrotoxicosis
- Graves' disease

To clarify whether mother has Hypothyroidism/Hyperthyroidism and hence whether screening of infant is required, often useful to ask about other diagnostic labels and treatment details.

Are you sure this is the diagnosis?

Only treatment is (and has ever been) one medication type ie thyroxine?

If any of:

- Currently on carbimazole / propylthiouracil
- Has had these medications in the past (ask if multiple different tablet types ie thyroxine + another thyroid medication)
- thyroid surgery
- radio-iodine

If any of:

- Family history of activating TSH receptor mutations
- Clinical Thyrotoxicosis in mother in 3rd trimester
- Signs of Foetal Thyrotoxicosis
- If TSH-Rab status known and strongly positive

Preferably inform Neonatologists antenatally as baby is at high risk of Neonatal Thyrotoxicosis

Hypothyroidism

Hyperthyroidism

Hyperthyroidism (High Risk)

Low Risk
Postnatal referral to Neonatal Staff not required.

(Occurrence of very small risk of Hypothyroidism in the baby will be picked up by routine Guthrie testing)

Medium Risk
Postnatal referral to Neonatal Staff.
At Postnatal discharge arrange:

- Day 10 - 14
Baby to come back for TFTs & examination

High Risk (Rare)
Neonatal Team to review baby.
At Postnatal discharge arrange:

- Day 5 – 7: Baby to have TFTs and examination
- Day 10 – 14: Baby to have TFTs and examination

Where high level of suspicion of Thyrotoxicosis advise parents to watch for poor feeding, panting for breath, excessive wakefulness

2. Management of Infant of Mother with Thyroid Disease

Be aware that normal ranges in first weeks differ from older children and differ with prematurity

The following is a guide. For more detail refer to Reference 2 and local laboratory standards.

Normal Ranges in infants	TSH (mU/L)	Free T4 (pmol/L)	Free T3 (pmol/L)
Term: Cord blood – 48 hours	3 – 120	16.7 – 48.3	2.5 – 9.3
Term: at 4-10 days postnatally	0.3 – 6	13.7 – 28	2.8 – 5.7
28-36 weeks: Cord blood – 48 hours	0.7– 27	11.3 – 24	1.2 – 7.3
28-36 weeks: 4-10 days postnatally	0.7– 27	10 – 30	1.2 – 4.9

It is common to find TSH and free T4 are **both** raised in the first few days of life. This is a normal acute phase response and is **not** hyperthyroidism. Thyrotoxicosis features **suppressed** TSH.

One in 70 babies whose mother has Graves' disease develops Neonatal Thyrotoxicosis, but there can be significant morbidity and risk of mortality. The decision of whether to treat is complex. **All cases where treatment is considered must be discussed with a Paediatric Endocrinologist.**

1. Infants with raised fT4 and suppressed TSH: Significant biochemical abnormalities indicate Thyrotoxicosis but depending on whether clinical signs are present treatment may be required (carbimazole alone).
2. Infants with abnormal biochemistry and adrenergic clinical signs: Tachycardia, wakefulness, tachypnoea should be treated with carbimazole and propranolol. Consider referral as below.
3. Infants with evidence of actual or incipient cardiac failure: Should be referred to St Michael's Hospital to facilitate clinical review by Paediatric Endocrinology Team. As well as carbimazole and propranolol, consideration should be given to Lugol's iodine and rarely prednisolone.

Drug Therapy Options

- **Carbimazole**: 250 micrograms/kg 3 times daily. (Severe thyrotoxic crisis may require higher dose). Blocks thyroid hormone synthesis by preventing organification and coupling of iodothyronine residues, but doesn't inhibit the release of preformed thyroid hormones.
- **Propranolol**: 250–500 micrograms/kg every 8 hours. Helps control symptoms due to adrenergic stimulation and inhibits T4 to T3 deiodination.

- **Lugol's Iodine solution:** (Rare) 1 drop 3 times daily. Usual duration 3 days, max 7. Promptly blocks preformed thyroid hormone release and reduces thyroid hormone synthesis.
- **Prednisolone:** 2mg/kg/day. (Rare). Inhibits thyroid hormone release and inhibits peripheral conversion of T4 to T3.

Prognosis

Excessively high dose of prolonged use of antithyroid treatment can lead to subsequent period of thyroid suppression ie hypothyroidism. Ensure 2 normal TFTs after withdrawal of treatment.

Rarely (if severe / prolonged duration of many months), there is a risk of craniosynostosis and developmental delay, so monitor head circumference growth and development in those cases.

3. Progress and Monitoring

- Aim is to abolish Hyperthyroidism without causing Hypothyroidism.
- Titrate treatment against clinical response. Stop propranolol once clinically euthyroid.
- Measure TFTs fortnightly. If fT4 in normal range, then reduce carbimazole dose by 25%.
- (TSH suppression often shows a 2-3 week lag, so don't wait for that in order to reduce dose).
- Continue this consideration of dose reduction according to TFTs fortnightly.
- Maternal antibodies have approximately 6 week half-life. Treatment may be needed for 8-12 weeks.
- FBC should be performed if clinical evidence of infection, not routinely. (Carbimazole may cause agranulocytosis in 0.03% of patients).

4. References

1. Neonatal thyroid disorders. Arch Dis Child Fetal Neonatal Edition 2002:87;F165.
2. Ogilvy-Stuart and Midgley. Practical Neonatal Endocrinology, Cambridge University Press 2006.
3. BNF for Children (2010-2011).
4. A Neonatal Vade Mecum, Third Edition: Chapter 3.
5. Robertson and Rennie. Textbook of Neonatology, Edition 3.