Neonatal Graves’ Disease: Follow-up until Resolution

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Neonatal Graves’ hyperthyroidism results from the transplacental passage of maternal Thyroid Stimulating Immunoglobulin (TSI).

Graves’ disease is present in:
- 0.2% of pregnancies
- Clinical hyperthyroidism occurs in only 1% of neonates

Although neonatal hyperthyroidism is usually self-limited, it can be severe, even life-threatening, and have deleterious effects on neural development.
BACKGROUND

◆ History
  – Maternal Hx, prematurity, hyperphagia, irritability
◆ Physical Findings
  – Microcephaly, warm, moist skin, tachycardia, hyperactivity, restlessness, tremor
◆ Laboratory evaluation
  – TSI, TSH, T3, T4
BACKGROUND

◆ Treatment
  – Anti-thyroid, β-blockers, T4 supplementation

◆ Major complications
  – Congestive heart failure (CHF)
  – Airway compression
  – Developmental delay
Our patient was a late-preterm female infant born at 36.3 weeks gestation born to a mother who underwent radioactive thyroid ablation therapy for Graves’ hyperthyroidism just prior to pregnancy.

DOL # 1 - Wt: 2595 g
- Euthyroid
- RRR
- + Moro, grasp, sucking
- Good muscle tone
- T4: 3.47 ng/dL and TSH < 0.01 mCIU/mL
CASE PRESENTATION

- DOL # 3 – Wt: 2440 g
  - Euthyroid
  - RRR
  - Normal tone
  - No tremors or jitteriness
  - T4: 7.05 ng/dL
  - T total: 34.9 mcg/dL
  - T3: 2.9 ng/mL
  - TSH: <0.01 mcIU/mL
  - TSI: 4.8
DOL # 12 – Wt: 2550 g
- Hyperthyroid
- Tachycardic with activity
- Some jitteriness; no tremors
- No flushing

Treatment:
Started on Propylthiouracil (PTU) 7.5 mg TID (10 mg/kg/day)
- T4: 7.26 ng/dL
- T total: 36.8 mcg/dL
- T3: 2.9 ng/mL
- TSH: <0.01 mcIU/mL
CASE PRESENTATION

- DOL # 21 – Wt: 2730 g
  - Prominent eyes
  - Cardiac hyperdynamicity
  - Normal tone; no jitteriness

- Treatment:
  Started on Propranolol 1 mg TID (1 mg/kg/day)

- T4: 3.68 ng/dL
- T total: 19.7 mcg/dL
- TSH: <0.01 mIU/mL
CASE PRESENTATION

◆ DOL # 38 – Wt: 3500 g
  – normal orbital aperture
  – RRR
  – No jitteriness

◆ Treatment:
  Started on Levothyroxine 25 mcg
  – T4: 1.26 ng/dL
  – T total: 8.7 mcg/dL
  – T3: 0.84 ng/mL
  – TSH: 0.02 mIU/mL
CASE PRESENTATION

- **DOL # 52 – Wt: 3430 g**
  - Euthyroid
  - RRR
  - No irritability

- **Treatment:**
  Levothyroxine decreased to 12.5 mcg

- **T4: 1.26 ng/dL**
- **TSH: <0.01 mU/mL**
- **TSI: 1.81**
At three months of age, she continued to gain weight and was no longer tachycardic. Her TSI level was now normal (<1.0).

Her propranolol was tapered down at this point.

At three and half months, gradual tapering of PTU was also started.
CASE PRESENTATION

- At 5 months of age TSH was 1.69, and free T4 was 0.83, approximately 1 month off of medications.
- Patient is clinically and developmentally appropriate and remains clinically euthyroid.
- The patient continues to thrive and display age-appropriate neurodevelopment, and no further complications secondary to neonatal thyrotoxicosis have been observed.
CASE PRESENTATION

The graph shows the changes in TSH, T4, T3, and TSI over different days of observation (DOL) and months (2.5 mos, 3.5 mos, 5 mos).

- **TSH**: Demonstrates a sharp decrease from DOL 1 to DOL 3, followed by steady decrease until DOL 38, then remains relatively stable.
- **T4**: Shows a significant increase from DOL 1 to DOL 3, with a gradual decrease until DOL 38, and then stabilizes.
- **T3**: Displays a notable increase from DOL 1 to DOL 3, followed by a decline until DOL 38, then stabilizes.
- **TSI**: Exhibits a sharp increase from DOL 1 to DOL 3, followed by a decline until DOL 38, then stabilizes.

The data suggests a significant fluctuation in thyroid hormone levels, particularly TSH, T4, and T3, with TSI showing a consistent increase.
CONCLUSIONS

- Neonatal Graves’ disease is a significant clinical condition which requires careful, patient-based management.
- The infant presented in this report was followed closely starting at birth:
  - Management was titrated according to her unique clinical and biochemical findings.
  - Resolution of disease was observed by 5 months of age, without adverse effects.
- As thyroid hormones are essential for growth and brain development, recent medical literature suggests that diagnostic effects should be moved from the neonatal to fetal period.
REFERENCES


