

Indian Academy of Pediatrics (IAP)



# STANDARD TREATMENT GUIDELINES 2022



**Under the Auspices of the  
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## Hypothyroidism

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# Hypothyroidism

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## Congenital Hypothyroidism

### Introduction

- ✓ Congenital hypothyroidism (CH) is the most common cause of preventable mental retardation.
- ✓ Incidence of CH is more common in India than in west = 1:1,000 to 1:1,500 live births. Early detection and treatment of CH through neonatal screening prevent irreversible neurodevelopmental delay and optimize developmental outcome.

- ✓ Either cord blood or postnatal sample at 48–72 hours should be collected for screening.
- ✓ Strategy of second screening may be required in the following conditions: Preterm neonates (<37 weeks); low birth weight (LBW) and very low birth weight (VLBW) neonates; ill and preterm neonates admitted to neonatal intensive care unit (NICU); specimen collection within the first ½–24 hours of life; and multiple births, particularly in cases of same-sex twins. The repeat specimen should be collected after 2 weeks of age, or 2 weeks after the first screening test was carried out.
- ✓ Primary thyroid-stimulating hormone (TSH) screen is more sensitive and specific for the diagnosis of primary CH compared to T4 screen. Primary TSH screening may fail to detect central CH (incidence is 1: 16,000 to 1: 30,000 live births).
- ✓ The TSH measured from a dried blood spot (DBS) is expressed in whole blood units while the venous TSH is expressed in serum units. ( $2.2 \times$  whole blood units = Serum units).

### Screening for Congenital Hypothyroidism

### Imaging

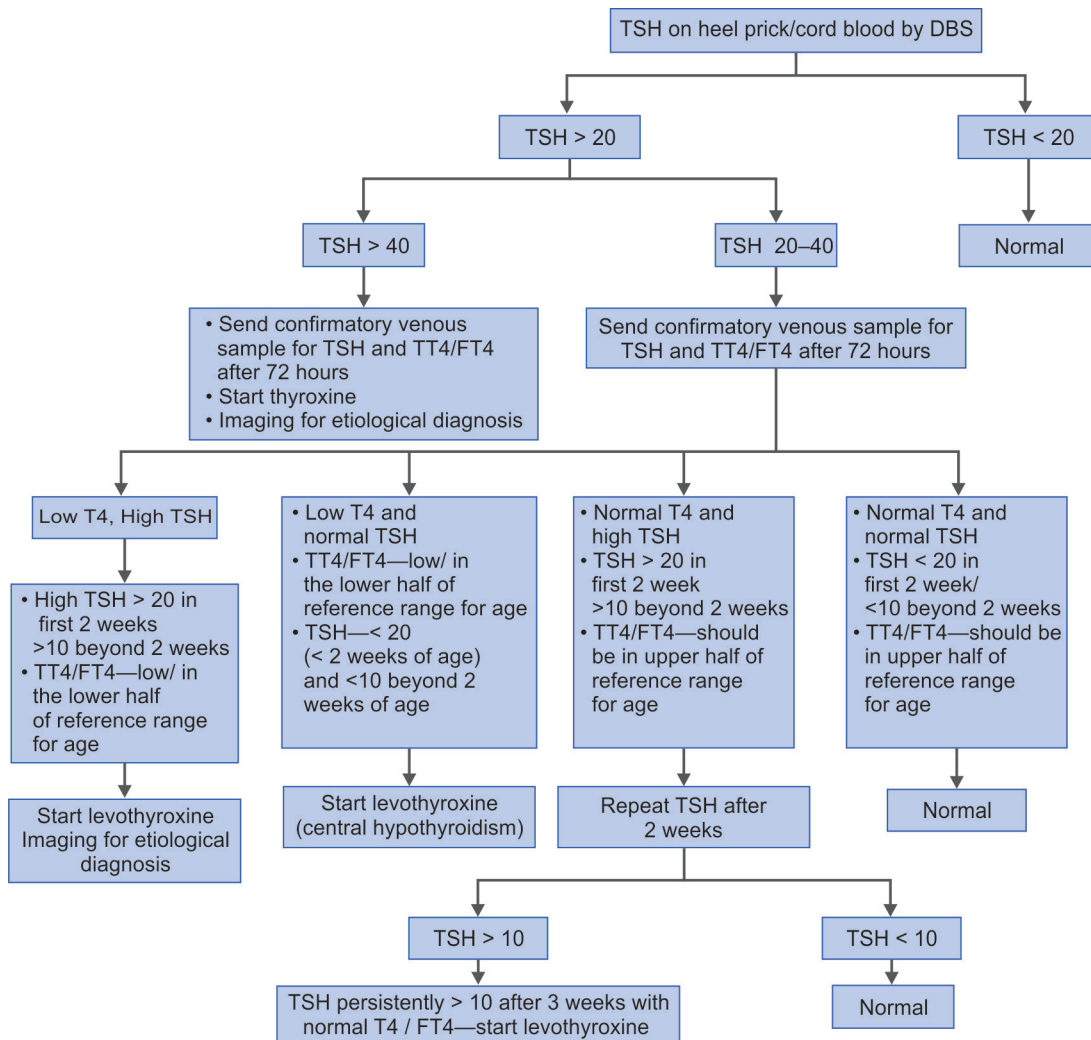
- ✓ Imaging (ultrasound and scintigraphy) should be done after CH is biochemically confirmed. Scintigraphy can be done up to 7 days after start of levothyroxine (if TSH is high).
- ✓ A thorough physical examination should be carried out in all neonates with high TSH concentrations for the detection of congenital malformations, particularly those affecting the heart.

Treatment with thyroxine should be started as soon as possible, and no later than the first 2 weeks of life. Initial thyroxine dose is 10–15 µg/kg/day. In dysmorphonogenetic CH, treatment can be stopped for 4 weeks at 3 years of age to reassess whether it is transient or permanent CH. Structural thyroid abnormalities causing CH require lifelong thyroxine replacement.

- ☑ Follow-up T4/FT4 after 2 weeks and T4/FT4 and TSH after 4 weeks. Target T4/FT4 should reach the upper half of reference range by 2 weeks and TSH should reach lower half of reference range by 4 weeks.
- ☑ *Thyroid function test (TFT) for follow-up:* 1–2 monthly until 6 month and 2–4 monthly from 6 to 36 months; further thyroxine doses are adjusted based on TFT.
- ☑ Repeat hearing test should be carried out before school age and as required.

Congenital Hypothyroidism

**Flowchart 1:** Congenital hypothyroidism.



(DBS: dried blood spot; FT4: free T4; TSH: thyroid-stimulating hormone; TT4: total T4)

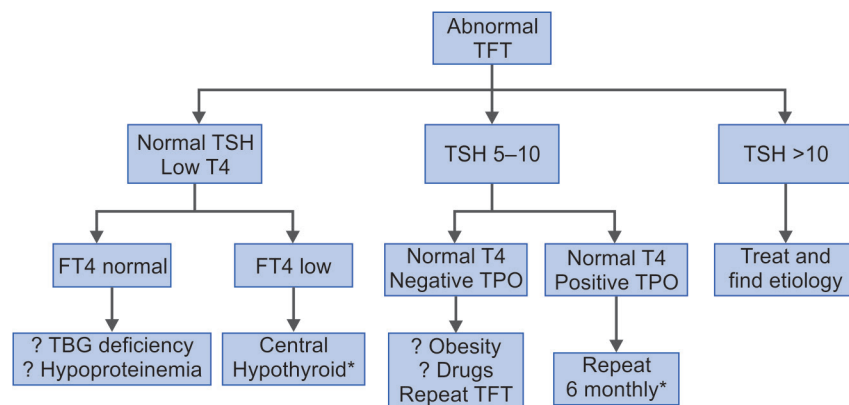
Clinical features that would raise possibility of acquired hypothyroidism (AH) are as follows

Short stature	Pseudo-precocious puberty
Poor growth velocity	Macroorchidism
Goiter	Weight gain (edema)
Dry skin	Calf muscle hypertrophy
Constipation	Galactorrhea
Sluggishness	Cardiomyopathy/effusions

Common causes of AH are as follows

- ☑ Autoimmune (Hashimoto's) thyroiditis
- ☑ *Drugs*: Anticonvulsants, amiodarone, lithium, chemotherapy, and radiotherapy
- ☑ Iodine deficiency
- ☑ Central hypothyroidism: Trauma, tumor, and tuberculosis
- ☑ *Miscellaneous*: Post-ablative, post-thyroidectomy, etc.

**Flowchart 2:** Approach to acquired hypothyroidism.



\*Refer directly to endocrinologist

(FT4: free T4; TBG: thyroxine-binding globulin; TFT: thyroid function test;  
TPO: thyroid peroxidase; TSH: thyroid-stimulating hormone)

## Diagnosis

- ☑ Clinical features
- ☑ Biochemistry
- ☑ Essential = TSH + total T4/free T4; optional = antithyroid peroxidase/antithyroglobulin antibody titers
- ☑ *Imaging*: Ultrasound (if necessary) for primary hypothyroidism and MRI brain for central hypothyroidism

Oral levothyroxine dose can be started based on weight of the child or body surface area (BSA) and should be continued lifelong.

100 µg/m<sup>2</sup> BSA (OR)

- ☑ *Age 1–3 years*: 4–6 µg/kg body weight
- ☑ *Age 3–10 years*: 3–5 µg/kg
- ☑ *Age 10–16 years*: 2–4 µg/kg

Further dose adjustments are adjusted to maintain TSH and total T4/FT4 in range.

*Caveat*: For long-standing full-blown untreated hypothyroidism, thyroxine should be started at a lower dose and gradually stepped up over several weeks to reach full dosing.

## Treatment

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- ☑ van Trotsenburg P, Stoupa A, Léger J, Rohrer T, Peters C, Fugazzola L, et al. Congenital Hypothyroidism: A 2020–2021 Consensus Guidelines Update—An ENDO-European Reference Network Initiative Endorsed by the European Society for Pediatric Endocrinology and the European Society for Endocrinology. *Thyroid.* 2021;31:387-419.