

# Congenital Hypothyroidism: When To Intervene ? (NNF-TALK)

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# Epidemiology

- Incidence 1 in approximately 1000 Indian newborns
- most common preventable causes of mental retardation
- Etiology:
  - Dysgenesis-85%
  - Dyshormogenesis-15%
- Transient or permanent

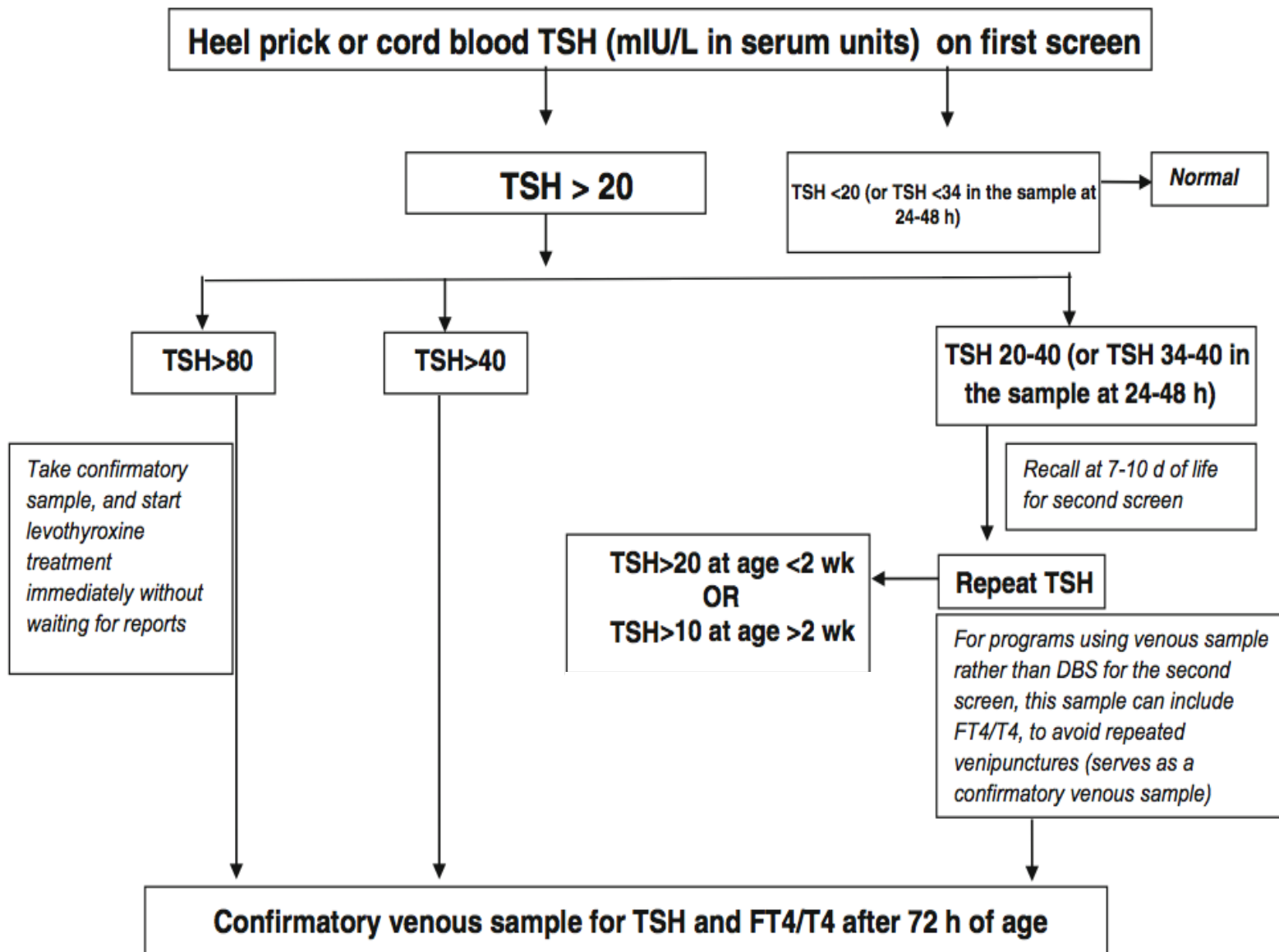
# CHANGES AT THE TIME OF BIRTH

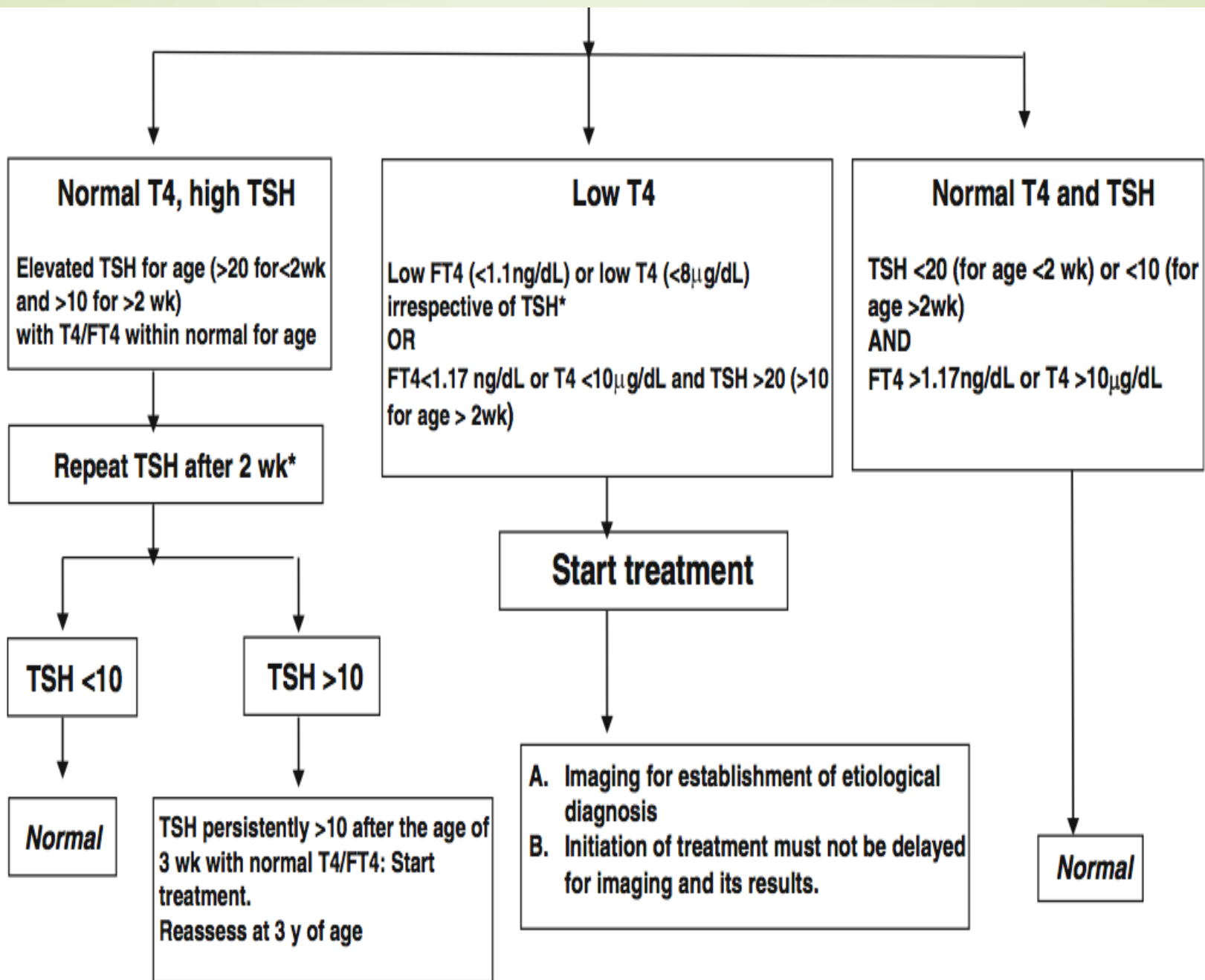
- TSH rises to 60-80mU/ml within 30 mins of birth ( cooling & stress )
- Followed by a 2-6 fold rise in  $T_4$  to 15-19  $\mu\text{g}/\text{dl}$  within 24 hours
- $T_3$  rises to about 300 ng/dl
- Stage of physiological hyperthyroidism
- TSH surge is short-lived
- Levels decline by 72 hours




# Biochemical criteria to initiate treatment (ESPE)

- ▶ If capillary TSH neonatal screening:  $\geq 40$  mU/L whole blood,
- ▶ Start treatment ( obtain sample), without waiting result,
- ▶ *Unless venous thyroid function test (TFT) results are available on the same day*
- ▶ Capillary TSH  $< 40$  mU/l of whole blood, may wait for TFT (provided results available the following day)







# Biochemical interventions (ISPAE)

- TSH  $>20$  mIU/L (serum units) is recommended cut-off for recall for cord blood and postnatal screen samples after 48 h of age.
- Screen TSH  $>40$  mIU/L: screen positive cases, immediate recall
- Mildly elevated TSH from 20 to 40 mIU/L should have a second TSH screen at 7 to 10 d of age.

# Criteria on initiation of levothyroxine therapy in term newborns

- ▶ Low T4 ( $<100$  nmol/L or  $8$   $\mu\text{g/dL}$ ) or low FT4 ( $<12$  pmol/L or  $<1.1$  ng/dL) irrespective of TSH.
- ▶ Mild low T4 ( $<128$  nmol/L or  $10$   $\mu\text{g/dL}$ ) or low FT4 ( $<15$  pmol/L or  $1.17$  ng/dL) in the presence of elevated venous TSH  $>20$  mIU/L if age is  $<2$  wk and  $>10$  mIU/L if age is  $>2$  wk.
- ▶ Normal T4/FT4 with persistently elevated TSH  $>10$  mIU/L at age  $>3$  wk.





# When to screen

- All newborns, preterm and LBW/VLBW infants should undergo routine screening for CH only at 48–72 h postnatal age, not earlier
- Sick neonates should be screened at least by 7 day of age.
- Second screen at 4 wk of age (or at 2 wk of age if discharged early).

# Radioimaging

- ▶ Ultrasonography
- ▶ Scintigraphy

$^{123}\text{I}$  /  $^{131}\text{I}$

Tc- pertechnetate

Required for etiological diagnosis


Improved diagnostic accuracy

Better to use both together (ISPAE)

Both scintigraphy and ultrasound in neonates with high TSH concentrations (ESPE)



# Dosing

- Standard dose of 10-15  $\mu\text{g}/\text{kg}/\text{d}$  should be initiated depending upon the severity of CH
  - Very low T4, the initial dose should be on the higher side
  - Administration at a consistent time of the day is more important than administration on an empty stomach.
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# Follow up

- ▶ Serum T4/FT4 is measured at 2 wk and TSH with T4/FT4 at 1 mth
- ▶ Then T4/FT4 and TSH are measured every 2 mo till 6mth of age
- ▶ Every 3mths during 6mth- 3y
- ▶ Every 3–6 mo thereafter, till completion of growth and puberty.

Thank you

