Abnormal TFT Results Guidance

This guidance has been developed from published guidance, in collaboration with local Endocrinologists, in response to frequently asked questions on interpreting TFTs.

This guidance is to assist GPs in decision making and is not intended to replace clinical judgment.

### Abnormal Thyroid Function Tests

<table>
<thead>
<tr>
<th>TSH high</th>
<th>T4 normal</th>
<th>T3 normal</th>
<th>Subclinical hypothyroidism</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH high</td>
<td>T4 low</td>
<td>T3 low or normal</td>
<td>Hypothyroidism</td>
</tr>
<tr>
<td>TSH low</td>
<td>T4 normal</td>
<td>T3 normal</td>
<td>Subclinical hyperthyroidism</td>
</tr>
<tr>
<td>TSH low</td>
<td>T4 high/normal</td>
<td>T3 high/normal</td>
<td>Hyperthyroidism (unless on T4 treatment)</td>
</tr>
<tr>
<td>TSH low</td>
<td>T4 low/normal</td>
<td>T3 low/normal</td>
<td>Non-thyroidal illness (rarely secondary hypothyroidism)</td>
</tr>
</tbody>
</table>

### Thyroid dysfunction in pregnancy / postpartum

<table>
<thead>
<tr>
<th>TSH</th>
<th>Pulsatile release, peaks during night</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Takes 4-6wks for TSH to reflect circulating thyroid hormone levels</td>
</tr>
<tr>
<td></td>
<td>Abnormal TSH can persist for several months after achieving clinical euthyroid</td>
</tr>
<tr>
<td></td>
<td>Following thyroxine replacement wait 6-8wks before measuring TSH</td>
</tr>
<tr>
<td></td>
<td>After treating hyperthyroid wait 3mths</td>
</tr>
<tr>
<td></td>
<td>If on thyroxine treatment, ↓TSH, ↑T4 can also be:</td>
</tr>
<tr>
<td></td>
<td>Over replacement in 1° hypothyroidism</td>
</tr>
<tr>
<td></td>
<td>Expected in 2° hypothyroidism (after surgery, radiotherapy) - discuss</td>
</tr>
</tbody>
</table>

#### British Thyroid Foundation Patient Information

**Who to test**
- Symptoms? Suspected goitre?
- AF, Dyslipidaemia, Osteoporosis, Subfertility, Type 1 Diabetes

**Check TFT annually:**
- Down / Turner syndrome
- Previous postpartum thyroiditis
- Previous neck irradiation

**Healthy populations – no evidence for screening**
- Target case-finding in individuals with symptoms

**NB Congenital hypothyroidism**
- Incidence 1:4000
- Commonest treatable cause mental retardation
- UK national screening programme but not done worldwide

**Drugs affecting thyroid hormones:**
- Lithium ↓ 6mthly TSH
- Amiodarone can ↑ or ↓ 6mthly TSH, T3, T4
- Estrogens can ↓ T4 (by ↑TBG)
- Androgens, Corticosteroids can ↑ T4 ( ↓TBG)
- Methadone can ↑ T3,T4

**Nodules & Multinodular Goitre**
- Patients with a thyroid nodule or a multinodular goitre who have normal TFTs may have thyroid cancer and must be referred to a specialist for further evaluation / consideration of FNA

### References

**UK Guidelines for the Use of Thyroid Function Tests**

Refer to current BNF or Summary of Product Characteristics for full medicines information

Comments & enquiries relating to medication: NHS Camden Medicines Management Team

Camdenccg@nhs.net

Clinical Contact for this Pathway: Alex Warner awarn@nhs.net

Pathway Created by Alex Warner & Sarah Morgan March 2013

Reviewed June 2015

Review due June 2018

V1.52 Feb 2016
Hypothyroidism

Prevalence 1-2%
10:1 female: male

Results in hypothyroidism
- TSH, fT4
- TPO Antibody -/+ 
- B12 so MCV
- LDL, Cholesterol
- Na

Secondary hypothyroidism
- Low T4
- TSH low, normal or slightly raised

Refer these patients
Can differentiate from non-thyroid causes by history, TSH/FT4/FT3 + other anterior pituitary tests
9am cortisol needs to be >200nmol/l before thyroxine replacement

Causes of Hypothyroidism
- 99% Primary, <1% deficiency
- Chronic autoimmune
- Eg. Hashimoto’s thyroiditis
- Most common, Goitre, Anti TPO abs 90%, Anti thyroglobulin abs 20-55%
- Destructive treatment for hyperthyroidism
- Postpartum

Symptoms non-specific
- Dry skin
- Brittle hair
- Weight gain
- Tiredness
- Constipation
- Muscle aches
- Bradycardia
- Cold intolerance
- Depression
- Memory Loss
- Menorrhagia
- Hoarseness

Subclinical hypothyroidism
- Prevalence 1.3-17.5%
- Asymptomatic
- Normal T3,T4
- Repeat 3-6mths after excluding non-thyroidal illness or drug effect
- Treat if any cardiac disease, >60 or osteoporosis
- Otherwise, could consider trial of treatment on individual patient basis

Check TPO Antibodies

TPO Antibodies Raised
5% per year become hypothyroid
Monitor TSH annually

TPO Antibodies Normal
Monitor TSH every 3 years

Hypothyroidism - Who to refer?
Unresponsive to therapy
- TSH not in normal range despite ≥ 200mcg of Levothyroxine and compliant with treatment, or
- Symptoms continue despite apparently adequate thyroid replacement

Age under 16yrs, Pregnant or postpartum
Undergoing fertility investigation / treatment
Presence of nodular goitre, Other pituitary disease, Others where specialist input on management helpful
Eg. IHD, drug treatment with Amiodarone, Lithium

Indications for T4 replacement
Asymptomatic TSH > 10
Symptomatic TSH > 5
Pregnant/TTC TSH > 5
Goitre TSH > 5

TSH 5 - 10
No symptoms
Symptoms
FT4 Normal or Low

TSH > 10

Treat with Levothyroxine
- Start at 50-100mcg OD then in 25-50mcg increments increasing every 3-4 weeks
- Maintenance dose 100-200mcg OD
- If older (eg. >50) or IHD consider commencing at 25mcg OD to avoid cardiac complications
- Maintenance dose 50-200mcg OD

Titrate Levothyroxine against TSH
- whilst assessing clinical wellbeing
- Monitor TSH & FT4 every 8wks until within reference range
- (FT4 may be slightly above ref range)
- Then annually or if develops symptoms

Hypothyroidism - Who to refer?
Unresponsive to therapy
- TSH not in normal range despite ≥ 200mcg of Levothyroxine and compliant with treatment, or
- Symptoms continue despite apparently adequate thyroid replacement

Age under 16yrs, Pregnant or postpartum
Undergoing fertility investigation / treatment
Presence of nodular goitre, Other pituitary disease, Others where specialist input on management helpful
Eg. IHD, drug treatment with Amiodarone, Lithium

Goitre

TSH > 10

TSH > 10

TSH > 10

TSH > 10

TSH > 10

TSH > 10

TSH > 10

TSH > 10
**Hyperthyroidism**

- 0.5-2% women
- 10:1 female: male

- TSH 0.1 – 0.4
- TSH < 0.1

- Check FT4, FT3

- Refer Endocrinologist
  - If symptomatic consider beta-blocker eg. Propranolol 10-40mg tds
  - + consider initiating Carbimazole after discussion with endocrinology (Warn re rash, agranulocytosis)

- Anti-thyroid medication
- Radio-iodine therapy
- Surgery

- Check TFT every 1-3mths on antithyroid drugs until stable (Yearly if on long-term)

**Causes of Hyperthyroidism**

- 99% Primary
- Graves disease most common cause.
- Anti-TSH antibodies +ve in 80%
- Toxic nodular disease single or multiple nodules, usually older age group
- T3 thyrotoxicosis (5%) clinically hyperthyroid but normal fT4
- NB Atrial Fibrillation (5-10%)
- Osteoporosis risk
- Subfertility

**Results in hyperthyroidism**

- ↑↑ fT4 or fT3
- ↓↓ TSH
- ↓Hb (normocytic)
- Mild leukopenia
- ↑ESR
- ↑LFT / ALP
- ↑Ca2+
- ↓Albumin
- ↓Cholesterol

**Non-thyroidal causes**

- Thyroid changes during systemic illness in absence of intrinsic thyroid disease
- Acute, reversible
- Common after surgery, starvation, many febrile illnesses
  - Usually ↓fT3, fT4
  - Any abnormal levels possible
  - TSH either slight ↓(0.1-0.3mU/L) or ↑(5-20mU/L)

- Occurs 15% of hospitalised patients (non-thyroid illness / drugs)
  - 2% have TSH <0.1mU/L or >20mU/L but less than half have underlying thyroid disorder
Thyroid dysfunction in pregnancy

- Undetected subclinical hypothyroidism during pregnancy may adversely affect neuropsychological development & survival of fetus
- Associated ovulatory dysfunction + infertility

### Hypothyroidism in pregnancy
- Ideally measure TSH, FT4:
  - Pre-conception
  - At diagnosis pregnancy
  - At Antenatal booking
  - At least once in 2nd, 3rd trimesters 2-4 weeks postpartum
- Dose increase usually required
  - May need to increase Levothyroxine dose by at least 50mcg daily to maintain TSH 0.4 – 2.0 and FT4 in upper reference range
  - Maintenance dose 100-200mcg OD
- Recheck TFT 2-4wks postpartum
  - Dose can usually be reduced to previous

### Thyroid function in pregnancy
- ↓TSH normal 1st trimester (if FT4 normal)
- 3 factors affect thyroid function in pregnancy:
  - Transient ↑HCG in 1st trimester can stimulate TSH receptors → Gestational transient thyrotoxicosis, Hyperemesis Gravidarum
  - Oestrogen induced ↑TBG – 1st trimester sustained during pregnancy affecting FT4, FT3
  - Alterations in immune function – onset, exacerbation or improvement underlying autoimmune thyroid dysfunction

### Women with hyperthyroidism
- Should be seen by a specialist
- May be switched from Carbimazole to PTU (possible risk congenital defects with Carbimazole, lowest possible dose of PTU is used)
- Will require frequent TFT monitoring

### Postpartum thyroiditis
- In 5-10% women
- If past history, screen prior to pregnancy and 6-8wks postpartum + offer annual TSH check

### Women with Type 1 Diabetes
- 3x risk of postpartum thyroid dysfunction, should have TFT & TP ab status preconception, booking, 3mths postpartum