Hyperthyroidism & thyrotoxicosis

- **Thyrotoxicosis** refers to ALL causes of excess circulating thyroid hormone (T3 and/or T4)
- **Hyperthyroidism** (increased secretion of thyroid hormone from the thyroid gland) is the main cause of thyrotoxicosis. Causes are **Graves' disease** (most common, associated with other autoimmune conditions), multinodular goiter and toxic adenoma
- Other causes of thyrotoxicosis are drugs (excess thyroxine, amiodarone, lithium) and rarer causes e.g. thyroiditis
- Lifetime risk is 1% in males and 2% in females and increased in patients on HAART
- Untreated thyrotoxicosis is associated with osteoporosis and raised mortality

Symptoms and signs of thyrotoxicosis (whatever the cause)*

Cardiovascular:	Tachycardia, palpitations, AFib (common)
	Hypertension, heart failure, dyspnoea, CAD, stroke, normocytic normochromic anaemia
Nervous system:	Fatigue, low mood, anxiety, poor concentration, hyperreflexia, insomnia, tremor
Hair, skin, nails:	Hair loss, heat intolerance, perspiration, palmar erythema
	Pretibial myxoedema (Graves' disease, skin changes anterior lower leg); finger clubbing (rare, Graves')
Thyroid:	Neck swelling (lump or goitre), compressive symptoms: dysphagia, orthopnoea, voice changes
Eyes:	Soreness/grittiness, stare, lid lag; Graves' disease: lid retraction, periorbital oedema, proptosis
Gastrointestinal:	Increased appetite, unintentional weight loss, diarrhoea
Reproductive system:	Oligo/amenorrhoea, reduced libido, subfertility, gynaecomastia, adverse pregnancy outcomes
Musculoskeletal:	Osteoporosis, fractures, proximal muscle weakness

*older people often have fewer symptoms

Possible hyperthyroidism - check TSH* (if high clinical suspicion, check T4 also)

- signs/symptoms (see table)
- new onset AFib
- Type 1 DM or other autoimmune disorder
- depression/anxiety
- abnormal growth (children)
- unexplained changes behaviour/school performance (children)

*not accurate during an acute illness

SEVERE SYMPTOMS OR UNSTABLE → **TRANSFER TO CASUALTY!**

STABLE

TSH normal
check for other causes of symptoms

TSH low

1. Careful clinical assessment - general appearance, vitals, CV system, neck, lungs, legs, ?ECG
2. Complete Burch-Wartofsky Point Scale (MDCalc or see p3) – **transfer to casualty** if score ≥25
3. Does patient require consultant review (see red box)?
4. Speak to lab to add T4 urgently & arrange payment (no need for new sample)
5. Further bloods (if not already done):
   CBC (pernicious anaemia? baseline <carbimazole)
   HbA1c
   (ALT if risk factors for liver disease)
   (CRP if tender thyroid)

TSH low, T4 high
HYPERTHYROIDISM (primary)

Further evalaation

1. Check LMP and contraception in females of child-bearing age
2. **Ultrasound** – ideally in all patients with hyperthyroidism, especially if mass palpated. Discuss with consultant if solitary nodule, unilateral swelling, airway compression

TSH low, T4 normal
SUBCLINICAL HYPERTHYROIDISM

- If signs or symptoms d/w consultant
- Otherwise, recheck TSH 6 monthly
- If normal x 2, can stop checking

Discuss with consultant

- Clinically unwell or signs/symptoms of thyrotoxic crisis (tachycardia, AFib, fever, heart failure, vomiting, dehydration, jaundice, agitation, delirium, coma) **TRANSFER TO CASUALTY!**
- Evidence of tracheal compression
- Solitary thyroid nodule
- Voice change
- Lymphadenopathy
- Patients <18y, >65y
- Pregnant or considering pregnancy
- Tender thyroid gland ?thyroiditis
- Secondary hyperthyroidism
- Carbimazole 20mg BD not achieving control
- Management unclear

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Initial management: If no worrying features on ultrasound and no other red flags, can treat initially in OPD

1. Commence betablocker to control symptoms: initially propranolol 40mg 3-4 times daily
2. Start carbimazole 10mg BD (contraindication liver disease; ensure highly effective contraception in woman of child-bearing age)
3. Review in 1-2w if very tachycardic (> 110) to titrate up betablocker, target pulse 90bpm (propranolol max dose 320mg). Do not check TSH/T4 until 6w
4. Review at 6w and check TSH, T4 (if cost of tests is a problem, prioritise T4 at this stage). Adjust carbimazole dose as per table below
5. Discuss long-term management options

Long-term management - 3 options:

Carbimazole	Use in initial stages and consider for long-term management if no indications for surgery (most likely to work if mild, uncomplicated Graves' disease): 1. Check TSH, T4 every 6w and adjust carbimazole dose until TFTs normal*: - ***if still hyperthyroid (low TSH, high T4)*** increase the dose of carbimazole slightly (e.g. 15mg BD) and review in 6w. If not controlled at 20mg BD, **discuss with consultant** before increasing dose further (max 30mg BD) - ***if partial response (low TSH, normal T4)*** continue with current carbimazole dose, review in 6w - ***if normal thyroid function (normal TSH, normal T4)*** reduce carbimazole dose by 30-50% until at maintenance dose (usually 5-15mg/day) 2. Once normal thyroid function, check TSH every 3m 3. Consider taper to stop carbimazole if thyroid function normal at 18 months 4. Once stopped, check TSH in 6w, then every 3m for 1y 5. Longterm monitoring – annual TSH **If cost of tests is a problem, T4 is more useful initially and then TSH later, once T4 is normal*	**Major side effects:** **Agranulocytosis** (5 in 1000): advise all patients taking carbimazole to get an urgent CBC and stop medication if they develop a sore throat, fever or mouth ulcers **Hepatotoxicity** **Pancreatitis (rare)** **Teratogenic –** ensure highly effective contraception in women of child-bearing age
Surgery	Often preferred in Kijabe due to the cost of monitoring with medical management About KSh 100,000 for surgery Refer to general surgery Continue with medical management while waiting for surgery, aiming for normal T4 pre-op If total thyroidectomy (Graves, multi-nodular goitre) - need lifelong levothyroxine afterwards (annual TSH once stable) If hemithyroidectomy (e.g. toxic nodule) will require post-op monitoring and annual TSH longterm	Leaves a scar Small risk of surgical complications (recurrent laryngeal nerve palsy, hypoparathyroidism – 4-6%)
Radioactive iodine	First-line recommendation for Graves' in many countries Available in Nairobi, but expensive (need thyroid uptake scan first - 40-45k; then radioactive iodine - 200k) Discuss with consultant Results in euthyroidism or hypothyroidism in 70-90% Longterm monitoring – TSH every 6m	Contraindicated in pregnancy and breastfeeding and pregnancy must be avoided (6m women, 4m men) after treatment Must avoid close contact wth children or pregnant women for 3w afterwards Can worsen Graves' eye disease

Burch-Wartofsky Scoring system

Thermoregulatory dysfunction	points
Temperature °C	
37.2-37.7	5
37.8-38.2	10
38.2-38.8	15
38.9-39.4	20
39.5-39.9	25
≥ 40	30

Cardiovascular	points
Tachycardia (bpm)	
100-109	5
110-119	10
120-129	15
130-139	20
≥ 140	25

Atrial Fibrillation	
Absent	0
Present	10

Congestive cardiac failure	
Absent	0
Mild	5
Moderate	10
Severe	20

Gastrointestinal-hepatic dysfunction	points
Manifestation	
Absent	0
Moderate (diarrhea, abdominal pain, N&V)	10
Severe (jaundice)	15

CNS disturbance	points
Manifestation	
Absent	0
Moderate (delirium, psychosis, extreme lethargy)	20
Severe (seizure, coma)	30

Precipitating event	points
Status	
Absent	10
Present	0

Total score
>45 Thyroid storm
25-45 Impending storm
<25 Storm unlikely

References: NICE 2023, NG145, JAMA 2023;330:1472, Red Whale summary Thyrotoxicosis, https://www.postersessiononline.eu/173580348_eu/congresos/BES2022/aula/-P_366_BES2022.pdf