Hyperthyroidism: Make proper decision

Case 1

- Tamsia Tabassum, 16 years old girl, came with complains of irregular menstruation, tremor and palpitation.

- On examination, she had tremor, pulse 98/min, proptosis present. Thyroid was mildly and diffusely enlarged.

Case 1 contd

Her TFT as following (13.03.2023)

- FT3 29.1 pmol/L (Normal 2.8-7.1)
- FT4 68 pmol/L (Normal 11.5-22.7)
- TSH 0.01 uIU/ml (Normal 0.27-4.20)

- Anti TG ab positive

Case 1 contd

- RAIU of thyroid gland came with the report “High uptake”
- She was diagnosed as a case of Grave`s disease
- Carbimazole started at dose of 45 mg/day
- On follow up in June, 2023: FT4 was 19.1 pmol/L (upper normal) and TSH 0.01 uIU/ml (low)
- Gradual tapering done with further follow ups

Case 2

- Mr Toriqul Islam, 30 years, came with complains of weight loss, tremor, palpitation, bulging of eyes and increased sweating for last few weeks.
- On examination he had tremor, pulse 104/min, proptosis more prominent in left eye, BP 130/80 mmhg. He also had mild goiter.

Case 2 contd

His Thyroid function tests showed:

- FT3 7.92 pg/ml (Normal: 1.8-4.7 pg/ml)
- FT4 25.1 pmol/L (9.01-19.04 pmol/L)
- TSH 0.01 uIU/ml

Case 2 contd

- He was advised to do RAIU of Thyroid gland in Nuclear medicine of BSMMU/DMCH
- Given symptomatic treatment (Propranolol) in the mean time
- He got appointment 1.5 months later and came again as his symptoms were increasing
- On the basis of eye sign and presence of goiter, Carbimazol started at a dose of 45 mg/day

Case 2 contd

On follow up after 6 weeks (14/07/2023)

- Symptoms much improved
- No tremor, pulse 76/min, weight increased 1 kg
- Report shows:

- FT3 3.67 pg/ml (Normal 2.30-4.20)
- FT4 1.01 ng/dl (Normal 0.78-2.19)
- TSH 0.015 uIU/ml (Normal 0.35-5.50)

Case 3

- Mr S, 29 years, came on 18th March 2023 with increased sweating and hair fall. His pulse was 98/min, mild tremor present. No eye sign.
- He gives history of upper respiratory infection, fever, throat and jaw pain and tenderness 1 week back
- FT4 2.08mg/dl (normal 0.71-1.85)
- TSH <0.01 uIU/ml (Normal 0.35-5.50)
- RAIU shows Low uptake

Case 3 contd

- The diagnosis is de Quervans Thyroiditis
- Started Prednisolone 40 mg then tapering over 4 weeks
- Propranolol twice daily
- Follow up after 6 weeks showed TFT normal
- Asked follow up after 4-6 weeks again

Case 4

- Mrs M, 58 years old lady, was diagnosed as a case of Grave`s disease 4 years back and was treated with Carbimazol with gradual improvement.
- But whenever the drug is tried to be tapered and stopped, her symptoms increase and TSH falls again

Case 4 contd

- She was referred for Radio ablation to Nuclear Medicine department of BSMMU
- Radio ablation done in June 2023 with 2 doses of RI
- She became Hypothyroid and now on Thyroxine 150 microgram daily
- Her thyroid function test is stable

Case 5

- Mrs T, 36 years old Nurse, was diagnosed as a case of Grave`s disease
- Carbimazole was started, counselling done about possible reactions and need of contraception
- As she had subfertility for many years with irregular menstruations, she never used any contraception before
- After 3 months, her periods became regular and symptoms improved, TFT improved to near normal
- At 5^{th} month, she became pregnant

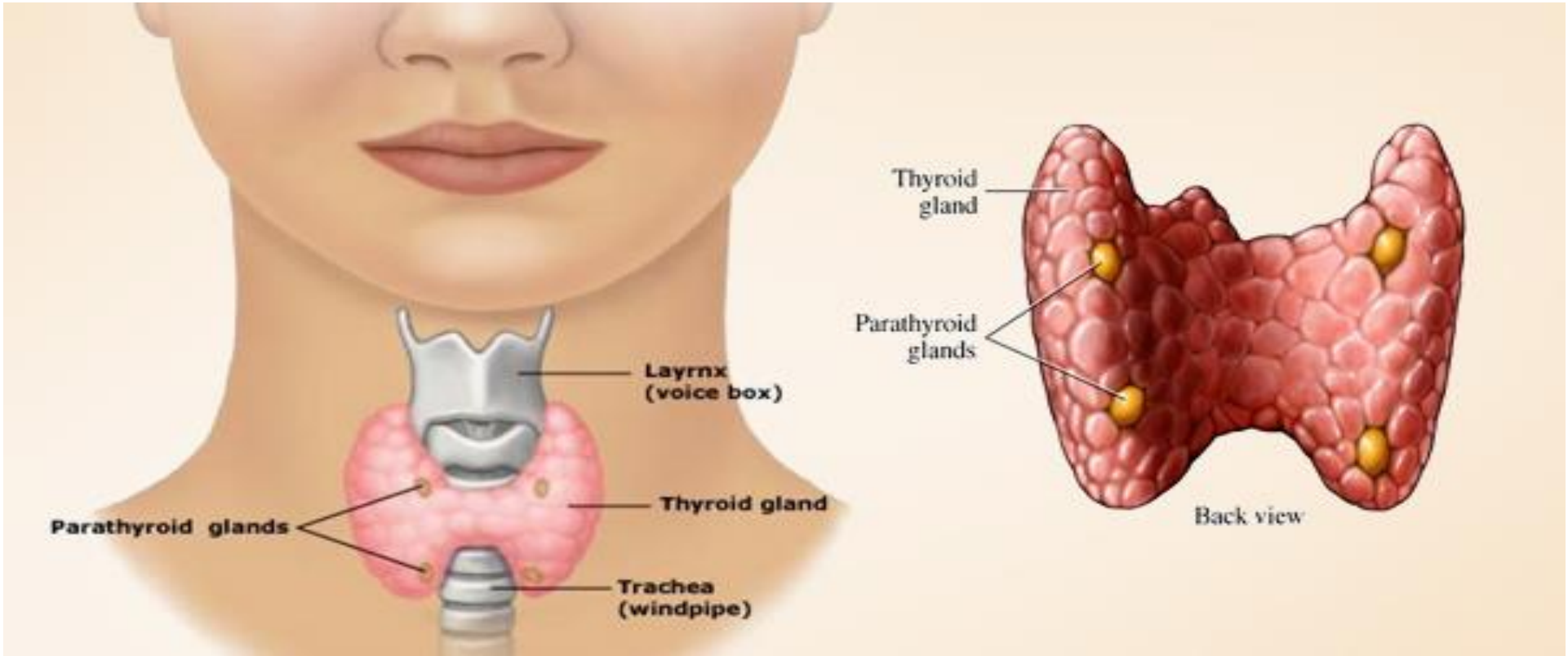
Case 5 contd

- Carbimazole was stopped and PTU started
- Counselling done again about possible consequences
- Her gynecologist insisted on termination but she decided to continue pregnancy
- Anomaly scan done at 20 weeks and showed normal fetus
- Her pregnancy and delivery was uneventful, TSH remained at lower normal range with PTU 300 mg daily
- She delivered a healthy baby, TFT of baby normal
- PTU continued in breast feeding period

HYPERTHYROIDISM

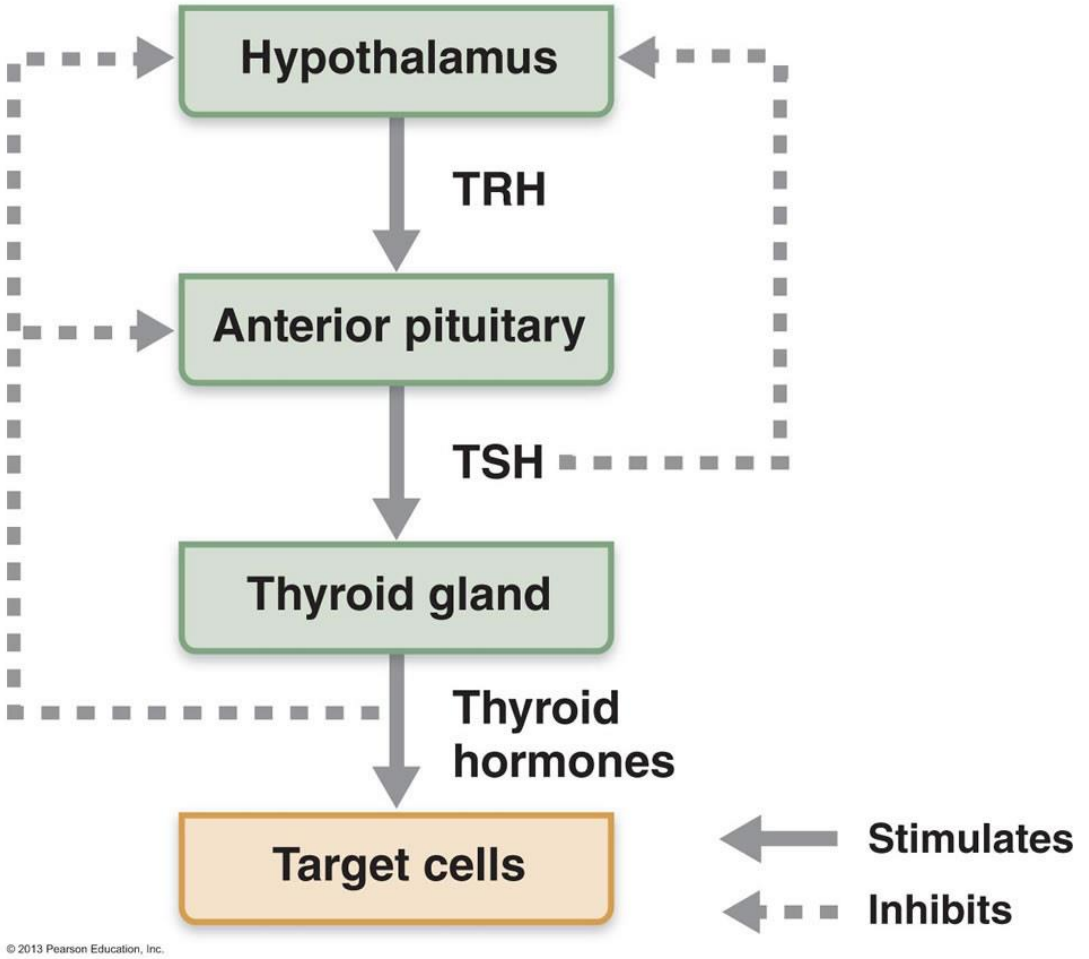
Elevated levels of
thyroid hormone

Thyroid gland is the largest gland of the body, in front of the neck, up to 5th and 6th tracheal cartilage.
It has 2 lobes: right and left, connected by isthmus.



Hyperthyroidism

- Elevated circulating levels of thyroid hormones.
- Pituitary TSH secretion is suppressed
- Serum T_3 and T_4 are elevated, TSH is low



Causes of Hyperthyroidism

- Graves disease
- Multinodular goiter
- Solitary toxic nodule
- Thyroiditis: Subacute (de Quervain`s) or post partum
- Drug induced, eg Amiodarone
- Extra thyroidal source: Struma ovarii, factitious
- TSH secreting pituitary adenoma

Thyrotoxicosis

Symptoms	SIgns
Weight loss despite normal or increased appetite	Weight loss Tremor
Heat intolerance	Palmar erythema
Palpitations	Sinus tachycardia
Dyspnoea	Lid retraction, lid lag
Irritability, emotional lability	
Fatigue, Sweating, Tremor	
Less common	
Osteoporosis, Diarrhoea, steatorrhoea	Goitre with bruit· Atrial fibrillation, HF
Muscle weakness, Pruritus, Ankle swelling Alopecia	Systolic hypertension/increased pulse pressure
Amenorrhoea/oligomenorrhoea Infertility, spontaneous abortion	Hyper-reflexia, Ill-sustained clonus, Proximal myopathy

- Diffuse goiter in Graves disease, irregular enlargement in MNG and single nodule in Toxic adenoma

- Usually only Graves disease cause periorbital oedema, conjunctival irritation, exophthalmos and diplopia.

- Pretibial myxoedema and thyroid acropachy are also specific for Graves.

Grave`s disease

Diagnosis of GD is likely and further evaluation may be unnecessary if:

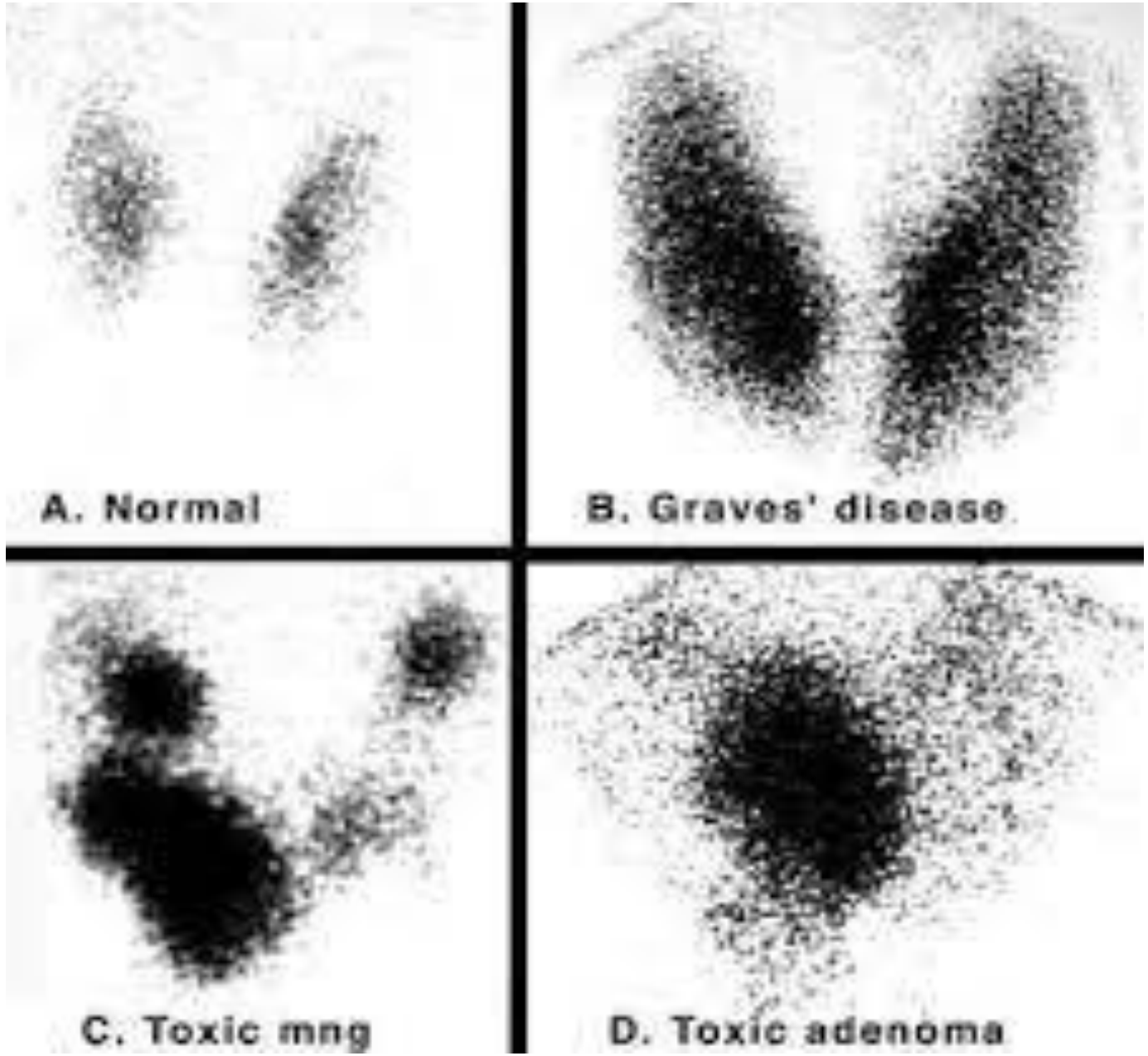
- Symmetrically enlarged thyroid
- Recent onset of orbitopathy
- Moderate to severe hyperthyroidism

Evaluation

- Thyroid function test: Low TSH, High T_3, T_4
- TRAb: positive in Graves
- RAIU scan
- ECG: sinus tachycardia/atrial fibrillation

RAIU

Normal/elevated RAIU	Near absent RAI uptake
Grave`s Disease	Subacute thyroiditis
Toxic adenoma	Silent (painless) thyroiditis
Toxic MNG	Amiodarone induced thyroiditis
TSH producing pituitary adenoma	Iatrogenic thyroiditis
Resistance to thyroid hormone	Factitious/ Struma ovarii


A. Normal
B. Graves' disease
C. Toxic mng
D. Toxic adenoma

TR Ab

- TR ab is cost effective
- If +ve it confirms GD
- Newer TR ab binding and bioassay have sensitivity of 96-97% and specificity of 99% for GD
- Can be -ve in very mild GD
- Also measures baseline disease activity, treatment response

Management

A. Symptomatic management:

- Beta adrenergic blockade recommended in all symptomatic patients with resting Heart rate>90 beats/minute

Management

hyperthyroidism treatment modalities:

- RAI therapy
- Anti Thyroid Drugs
- Thyroidectomy

RAI : who are candidates

- Patients with C/I for ATD use, failure to achieve euthyroidism with ATD, relapse
- Comorbidities increasing surgical risks
- Previously operated
- Women not planning for pregnancy in 6 months
- Patients with periodic thyrotoxic hypokalemic paralysis, right heart failure, pulmonary HTN or congestive heart failure

RAI: Contra indication

- Pregnancy and lactation
- Coexisting thyroid cancer or suspicion of cancer
- Unable to comply radiation safety guidelines
- Active and moderate to severe GO

RAI: things to remember

- Pretreatment with MMI prior to RAI needed
- Resume MMI 3-7 days prior to RAI
- A pregnancy test should be done within 48 hours prior to treatment
- F/U within 1-2 months after RAI with TFT, then 4-6 week intervals for 6 months until pt becomes hypothyroid
- If hyperthyroidism persists after 6 months following RAI, retreatment with RAI

ATD: candidates

- Pregnant and lactating women
- Elderly or others with comorbidities with high surgical risks
- Individuals with limited longevity
- Unable to follow radiation safety regulations
- Moderate or severe active Grave`s Opthalmopathy

ATD: Contraindication

Adverse reaction to ATDS

ATD: Things to remember

- Baseline CBC, Liver function test should be done
- Monitoring by FT4 and TT3 2-6 weeks after initiation, TSH may remain suppressed for several months
- Once euthyroid, the dose can be decreased by 30-50%
- ATDs should be continued for 12-18 months, then discontinued if TSH and TR ab normal
- If patient becomes hyperthyroid after completing course, consider RAI/Surgery

Surgery: candidates

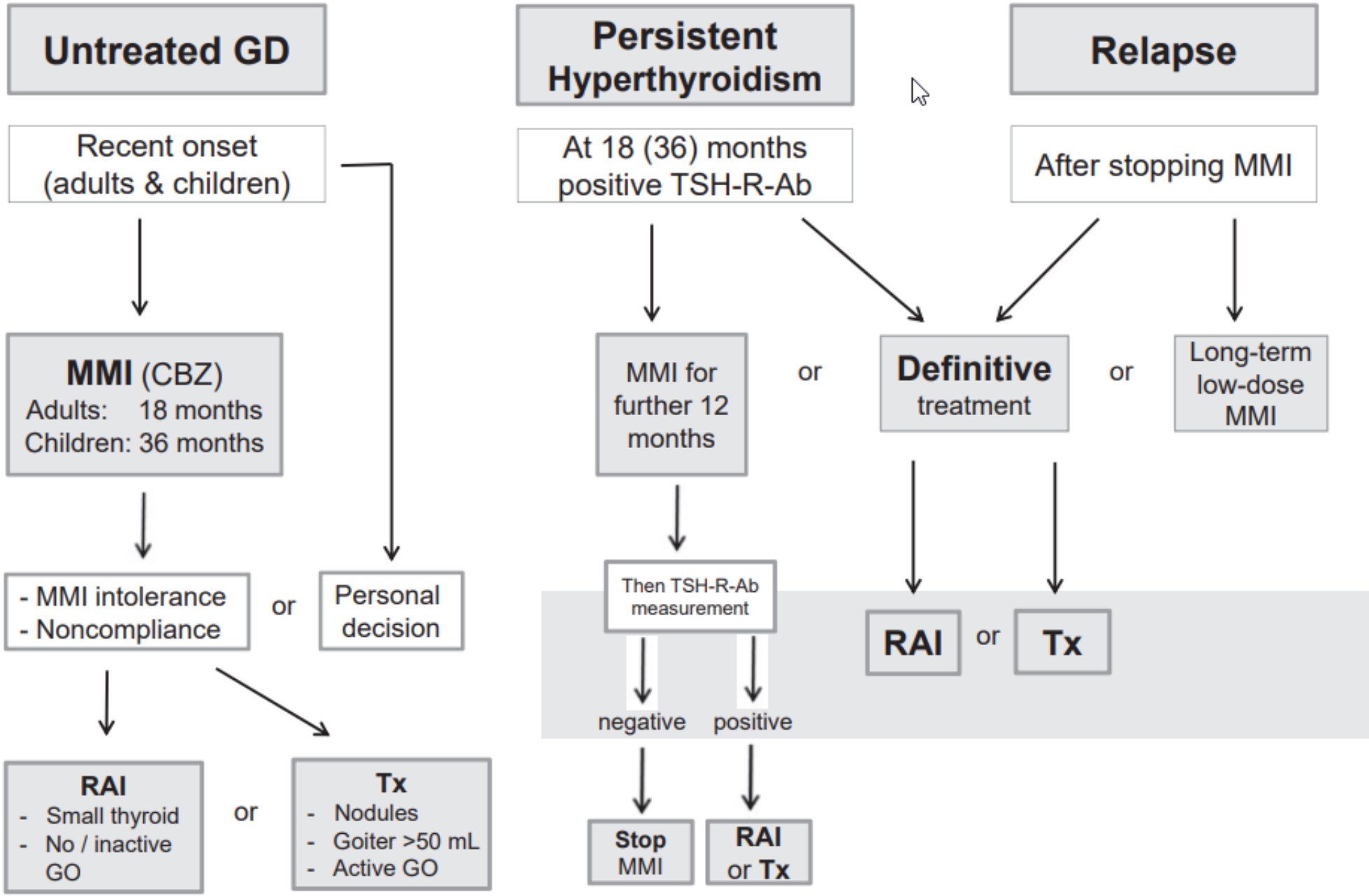
- women planning pregnancy in <6 months
- Symptomatic compression or large goiters (>80 g)
- When thyroid malignancy is suspected
- Large nodules >4 cm
- Coexisting hyperparathyroidism
- TR ab very high
- Moderate to severe GO

Surgery: Contraindications

- Comorbidity eg cardiopulmonary disease, end stage cancer or debilitating disorder
- Lack of access to experienced surgeon
- Pregnancy is relative C/I (best avoided in 1st and 3rd trimester)

Surgery: Things to remember

- Should be rendered euthyroid by ATD pretreatment with/without Beta blocker
- KI containing preparation should be given in immediate preoperative period
- Calcium and Vitamin D level should be assessed preoperatively and repleted
- Calcitriol supplement should be considered preoperatively


Untreated GD
Recent onset (adults & children)
MMI (CBZ)
Adults: 18 months
Children: 36 months
- MMI intolerance
- Noncompliance
or
Personal decision
RAI
- Small thyroid
- No / inactive GO
or
Tx
- Nodules
- Goiter >50 mL
- Active GO
Persistent Hyperthyroidism
At 18 (36) months positive TSH-R-Ab
MMI for further 12 months
or
Definitive treatment
or
Long-term low-dose MMI
Then TSH-R-Ab measurement
negative
positive
Stop MMI
RAI or Tx
Relapse
After stopping MMI
RAI
or
Tx

Hyperthyroidism in Pregnancy and Lactation

- RAI: contraindicated

- Surgery: relative contraindication. Best avoided in 2nd and 3rd trimester

  Can be performed in 2nd trimester (risk of preterm labor)

- ATDs: PTU in 1st trimester, then Carbimazol. Lowest possible dose of ATD needed to keep TSH below reference range for pregnancy and T4 and T3 values 1.5 times above non pregnant reference range in 2nd and 3rd trimester

Subclinical Hyperthyroidism

When TSH is persistently <0.1 mU/L, treatment is recommended if:

- Age>65 years
- Age <65 years with comorbidities like heart disease, osteoporosis, in post menopausal women who are not on bisphosphonate or HRT, in individuals with symptoms
- Age <65 years, asymptomatic: observe

Thyroiditis

- Classic triphasic course (Thyrotoxicosis>Hypothyroidism>Recovery)
- **De Quervain thyroiditis**: pain, tenderness, low grade fever, fatigue. Enlarged thyroid
- RAIU is low
- ESR/CRP high

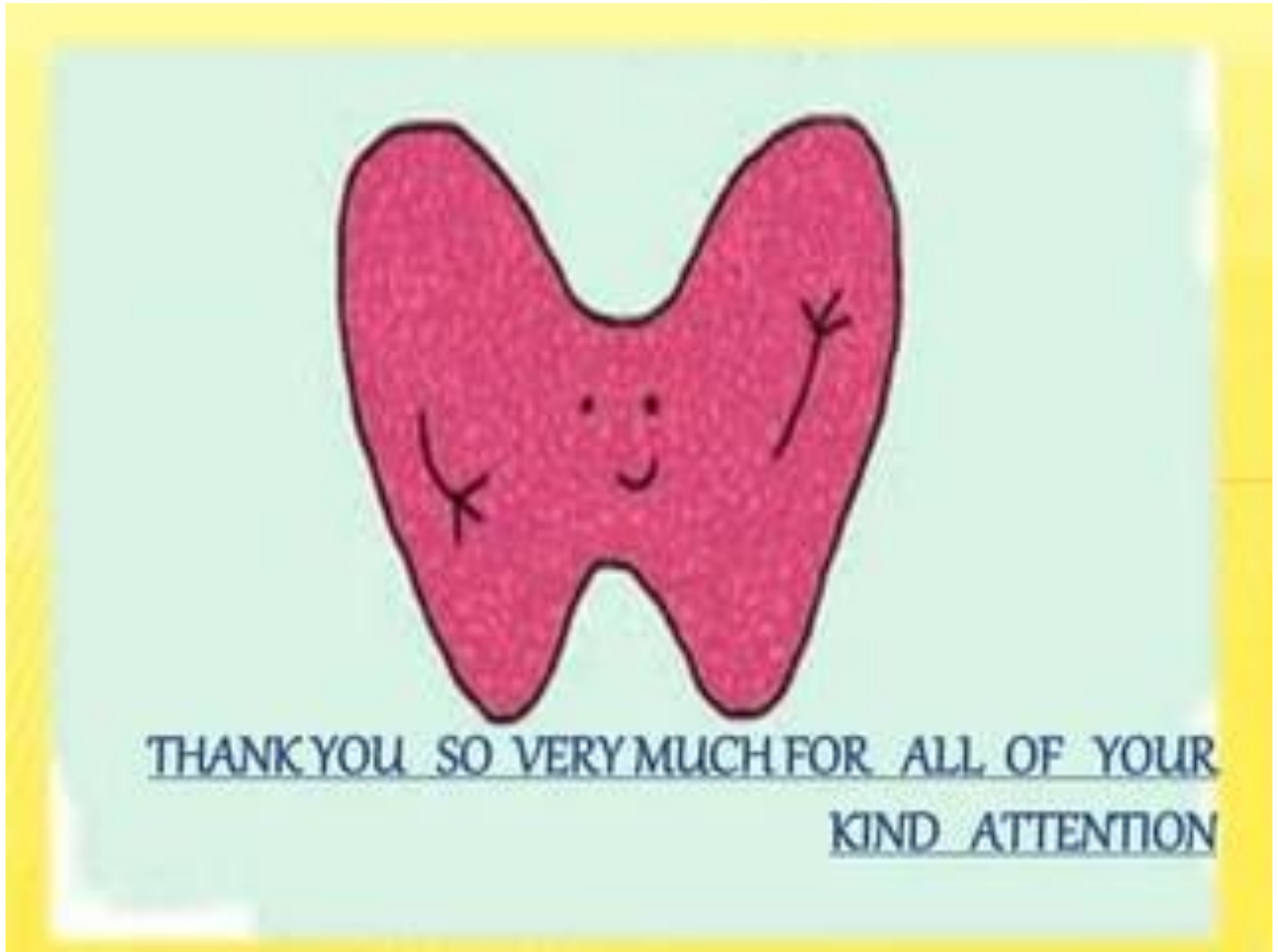
Thyroiditis

Treatment during thyrotoxic phase:

- Beta blockers
- NSAIDs
- Steroid: Prednisolone 40 mg daily for 1-2 weeks then tapered over 2-4 weeks

Treatment during Hypothyroid phase:

- Levothyroxine may be given but can be withdrawn after 3-6 months


THANK YOU SO VERY MUCH FOR ALL OF YOUR
KIND ATTENTION