

	<b>Medical</b>	<b>Radioactive iodine</b>	<b>Surgery</b>
<b>Aim</b>	1-Restore the patient to the <b>euthyroid</b> state then 2- Prescribe a maintenance dose for a prolonged period hoping that <b>permanent remission</b> occur	<ul style="list-style-type: none"> <li>• Destruction of over active thyroid cells by radioactive iodine</li> </ul>	1- Reduction of overactive tissues ( in 1ry & 2 <sup>nd</sup> toxic goiter ) . 2- Complete removal of overactive tissues ( in solitary toxic nodule ) . 3- Reduction of thyroid stimulating antibodies .
<b>Indications</b>	1- Mild primary toxic goiter . 2- <b>Small</b> goiter . 3- Young patient below 18 years. 4- Preoperative preparation . 5- Postoperative recurrence . 6- Refusal of surgery . 7- Unfit for <b>surgery</b> . 8- First trimester of pregnancy& lactation. 9- Recent true exophthalmos .	1- Moderate primary toxic goiter . 2- Solitary toxic nodule . 3- Patient above 18 years . 4- Postoperative recurrence . 5- Refusal of surgery . 6- Unfit for surgery . 7-Side effects of medical treatment or inability to continue antithyroid drugs or medical supervision .	1-Severe 1ry. Toxic goiter . 2- 2 <sup>nd</sup> . Toxic goiter or Solitary toxic nodule . 3-Large goiter & pressure symptoms 4- Retrosternal goiter . 5-Suspicious of malignancy. 6-Failure of medical treatment & radioactive iodine 7-Side effects of medical treatment or inability to continue antithyroid drugs or medical supervision . 8-2 <sup>nd</sup> or 3 <sup>rd</sup> trimester of pregnancy .
<b>Contra- indications</b>	1- 2 <sup>nd</sup> . Toxic goiter or solitary toxic nodule 2- Large goiter → pressure symptoms 3- Retrosternal goiter . 4- Suspicious of malignancy. 5- Leucopenia or agranulocytosis 6-2 <sup>nd</sup> or 3 <sup>rd</sup> trimesters of pregnancy	1- Patient below 18 years . 2-Large goiter & pressure symptoms 3-Retrosternal goiter . 4-Suspicious of malignancy. 5-Pregnancy & lactation	1-Mild primary toxic goiter . 2-Small goiter . 3-Young patient below 18 years. 4-Recurrence after surgery. 5- Refusal of surgery or unfit for surgery 6- Recent true exophthalmos .

<p><b>Methods</b></p>	<p><b>I) Antithyroid drugs :</b></p> <ul style="list-style-type: none"> <li>• <b>Aim :</b> gradual control of thyrotoxicosis till euthyroid state is reached .</li> <li>• <b>Preparations :</b></li> </ul> <p><b>1) Carbimazole</b> ( Neomercazol is the commonest in Egypt )</p> <ul style="list-style-type: none"> <li>➤ <b>Action :</b> Block binding of iodine to tyrosine &amp; decrease thyroid antibody titre .</li> <li>➤ <b>Dose :</b> 10 mg TDS till euthyroid state is reached then 5mg TDS for 12-18 months . <ul style="list-style-type: none"> <li>▪ 0.1mg L-thyroxine with anti-thyroid drugs to avoid iatrogenic hypothyroidism or increase size of the gland .</li> </ul> </li> </ul> <p><b>2) Propyl thiouracil :</b></p> <ul style="list-style-type: none"> <li>➤ <b>Action :</b> Block binding of iodine to tyrosine &amp; decrease peripheral conversion of T4 to T3.</li> <li>➤ <b>Dose :</b> 100 mg TDS</li> </ul> <p><b>3) Iodides : ( Lugol's iodine )</b></p> <ul style="list-style-type: none"> <li>➤ <b>Action :</b> Decrease TSH effect on the</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Dose :</b> 160 micro-curi/1 gm of thyroid tissue (U/S detect the weight of the gland ) .</li> <li>• Improvement occurs after 2-3 months , if not a second dose may be needed after 3 months ( during this period medical treatment is used ) .</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Preoperative investigations :</b></li> </ul> <ol style="list-style-type: none"> <li>1. <b>Thyroid profile</b> to ensure euthyroid state before operation .</li> <li>2. <b>Serum Ca &amp; parathormone</b> level to exclude silent hypoparathyroidism .</li> <li>3. <b>Indirect laryngoscopy</b> to exclude silent vocal cord paralysis ( 3%)</li> <li>4. <b>Routine investigations</b> before major surgery : full blood picture , blood &amp; urine for DM, ECG , chest x-ray , liver functions and blood urea &amp; creatinine .</li> </ol> <ul style="list-style-type: none"> <li>• <b>Preoperative preparation :</b></li> </ul> <ul style="list-style-type: none"> <li>➤ <b>Aim:</b> The patient should be euthyroid during the operation to avoid thyrotoxic crises . A sleeping pulse 90/min is considered as effective preoperative preparation .</li> <li>➤ <b>Methods :</b></li> </ul> <ol style="list-style-type: none"> <li>1) <b>Routine method :</b> ( for severe cases ) <ul style="list-style-type: none"> <li>a- <b>Medical treatment :</b> propranolol &amp; neomercazol till euthyroid state .</li> <li>b- Rarely nowadays some surgeons add <b>iodides</b> ( lugol's iodine ) 10 days before the operation to decrease vascularity &amp; friability of the gland and render the it for firmer . <ul style="list-style-type: none"> <li>▪ <b>Disadvantages</b> of this routine method : It takes several weeks to prepare the patient .</li> </ul> </li> </ul> </li> <li>2) <b>Rapid method :</b> ( for mild cases ) <ul style="list-style-type: none"> <li>▪ <b>Propranolol</b> is given one week before the operation and continue for</li> </ul> </li> </ol>
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	<p>thyroid gland with decrease of vascularity &amp; friability of the gland .</p> <p>➤ <b>Dose</b> : 10 drops TDS on any juice for 2 weeks ( its action decline after 2 weeks ) before the operation .</p> <p>➤ <b>Indications</b> : Only used for preoperative preparation</p> <p><b>II) Beta-adrenergic blockers</b> as propranolol (40 mg TDS ) or long acting nodolol ( 160 mg once daily ).</p> <p>➤ <b>Action</b> : inhibit cardiogenic effects of thyroid hormones &amp; decrease peripheral conversion of T4 to T3.</p>		<p>one week after the operation .</p> <ul style="list-style-type: none"> <li>▪ <b>Aim</b> : rapid control of cardiovascular manifestations .</li> <li>• <b>Operation</b> :The following precautions should be considered in toxic goiter: <ol style="list-style-type: none"> <li>1- <b>Wide incision</b> with division of pretracheal muscles to avoid rough manipulation of the gland and <b>thyrotoxic crises</b> .</li> <li>2- Usually the commonest operation is <b>subtotal thyroidectomy</b> which consists of removal the gland leaving <b>only 4-5gm</b> on the postero-medial aspect on each side to <b>preserve</b> parathyroid glands , recurrent laryngeal nerves and to maintain <b>euthyroid</b> state.</li> <li>3- Many experienced surgeons perform <b>total thyroidectomy followed by L-thyroxine for life</b> to avoid recurrence of toxicity .</li> <li>4- <b>Perfect haemostasis &amp; free drainage to avoid thyrotoxic crises</b> .</li> </ol> </li> </ul>
<p><b>Advantages</b></p>	<ul style="list-style-type: none"> <li>• <b>Avoid</b> risks of surgery &amp; radioactive iodine</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Avoid</b> risks of surgery &amp; prolonged medical treatment</li> </ul>	<ol style="list-style-type: none"> <li>1- <b>Rapid cure with high rate of success</b> .</li> <li>2- <b>Avoid</b> risks of prolonged medical treatment &amp; radioactive iodine .</li> </ol>

<p><b>Complications</b></p>	<p><b>I) High recurrence rate</b> in 60% of cases within 2 years from stoppage of the treatment .</p> <p><b>II) Complications of carbimazol &amp; thiouracile :</b></p> <p>1- <b>Increase size &amp; vascularity of the gland (TSH )</b></p> <p>2- <b>May increase exophthalmos</b> because they may lead to production of exophthalmos producing antibodies .</p> <p>3- <b>Bone marrow depression → agranulocytosis ( weekly full blood picture is essential )</b></p> <p>4- Allergy , skin rash &amp; fever .</p> <p>5- Arthralgia .</p> <p>6- GIT upset .</p>	<p>1) <b>Hypothyroidism</b> due to <b>over dose</b> occurs in 80 % of cases within 10 years . (follow up for life is essential )</p> <p>2) <b>Recurrence</b> due to <b>low dose</b></p> <p>3) Theoretical risk of <b>malignancy</b> in the thyroid &amp; extra-thyroid tissues especially leukemia .</p> <p>4) Theoretical risk of <b>genetic</b> abnormalities in the future children .</p>	<p><b>I) Mortality &amp; morbidity</b> are negligible in experienced hand .</p> <p><b>II) Post-operative complications of thyroidectomy :</b></p> <p>1- <b>Injury of</b> important surrounding structures especially <b>RLN , external laryngeal nerve and rarely internal laryngeal nerve .</b></p> <p>2- <b>Parathyroid insufficiency ( less than 0.5 % ) .</b></p> <p>3- <b>Respiratory obstruction :</b></p> <ul style="list-style-type: none"> <li>• <b>Causes :</b> <ul style="list-style-type: none"> <li>➤ Bilateral incomplete recurrent laryngeal nerve injury .</li> <li>➤ Compression of trachea by haematoma .</li> <li>➤ Laryngeal oedema due to trauma by endotracheal tube or rough manipulation .</li> <li>➤ Tracheomalacia .</li> </ul> </li> <li>• <b>Treatment :</b> endotracheal tube or tracheostomy</li> </ul> <p>4- <b>Hypothyroidism ( 20-40% )</b></p> <p>5- <b>Recurrence ( 5% )</b></p> <p>6- <b>Haemorrhage : 1ry , reactionary and 2ry .</b></p> <p>7- <b>Wound infection</b> leading to subcutaneous or deep cervical abscesses .</p> <p>8- <b>Keloid .</b></p> <p>9- <b>Thyrotoxic crises is rare nowadays .</b></p>
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★ **Treatment of special problems in toxic goiter:**

**a) True Exophthalmos:**

1. Control thyrotoxicosis by **antithyroid drugs** until exophthalmos becomes stationary for 6 months followed by surgery ( fit patient ) or

Radioactive iodine ( patient unfit for surgery )

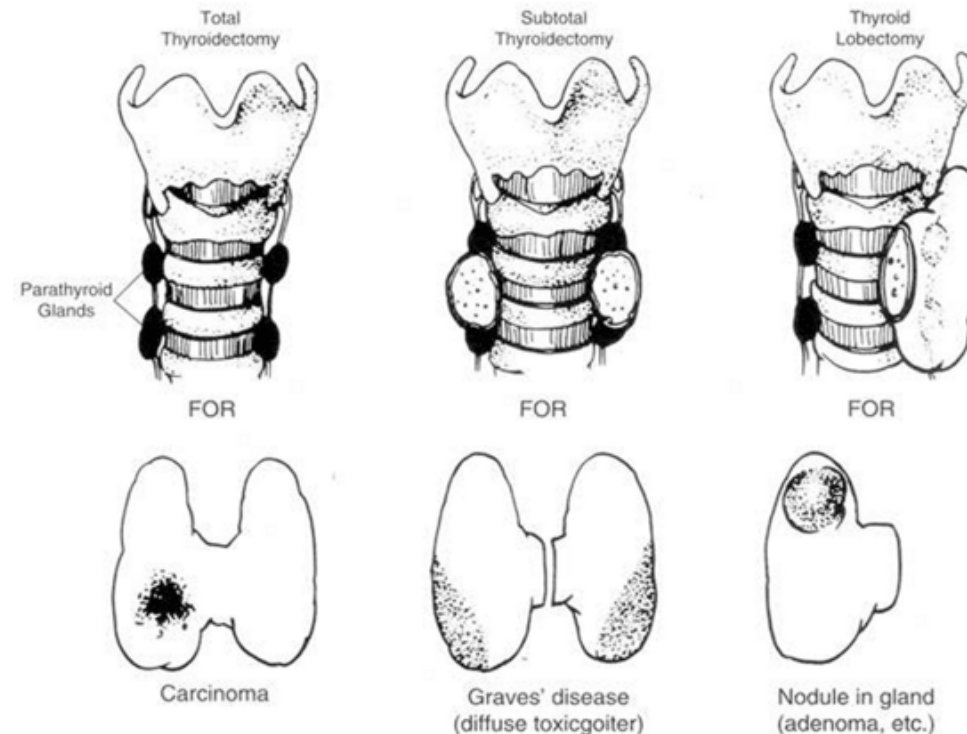
2. **Follow up** with exophthalmometer. **If the condition worsens:**

- ◆ **Corticosteroids** → decrease orbital oedema and lymphocytic infiltration.
- ◆ **Dark glasses & artificial tears .**
- ◆ **Tarsorrhaphy:** Suturing the eye lids together.
- ◆ **Orbital decompression :** In malignant exophthalmos, this is best and most easily done into the paranasal sinuses.

**b) Thyrotoxic crises:** Emergency.

1. IV fluid
2. Control hyperpyrexia with **ice packs.**
3. **Propranolol** I.V. drip + **Neomercazol.**
3. Hydrocortisone I.V.
4. O<sub>2</sub> inhalation.
5. Sedative .
6. Digoxin for H.F.

**Types of Thyroidectomies**



c) **Thyro-cardiac patient:**

- ◆ **Medical treatment** (as before) including **Propranolol** and **neomercazole** to control thyrotoxicosis then **Thyroidectomy** (fit patient) or **Radioactive iodine** for (for unfit patient).

d) **Pregnancy:**

- ◆ Radioactive iodine is **contraindicated** because it destroy fetal thyroid .
- ◆ **1st. trimester:** give the smallest effective dose of propyl thiouracile ( least teratogenic ) & propranolol .
- ◆ **2nd and 3rd trimester:** subtotal thyroidectomy is safely done.
- ◆ **During lactation :** propyl thiouracile is recommended as it excreted in very low harmless dose in milk .

e) **Children:** Radioactive iodine is contraindicated.

- ◆ **Medical treatment** until late teens.
- ◆ **In cairo university , radioactive iodine can be used after 18 years .**
- ◆ **Subtotal thyroidectomy** should be delayed as much as possible due to high incidence of recurrence because thyroid cells are highly active in this age.
- ◆ When thyroidectomy is undertaken it must be very radical.