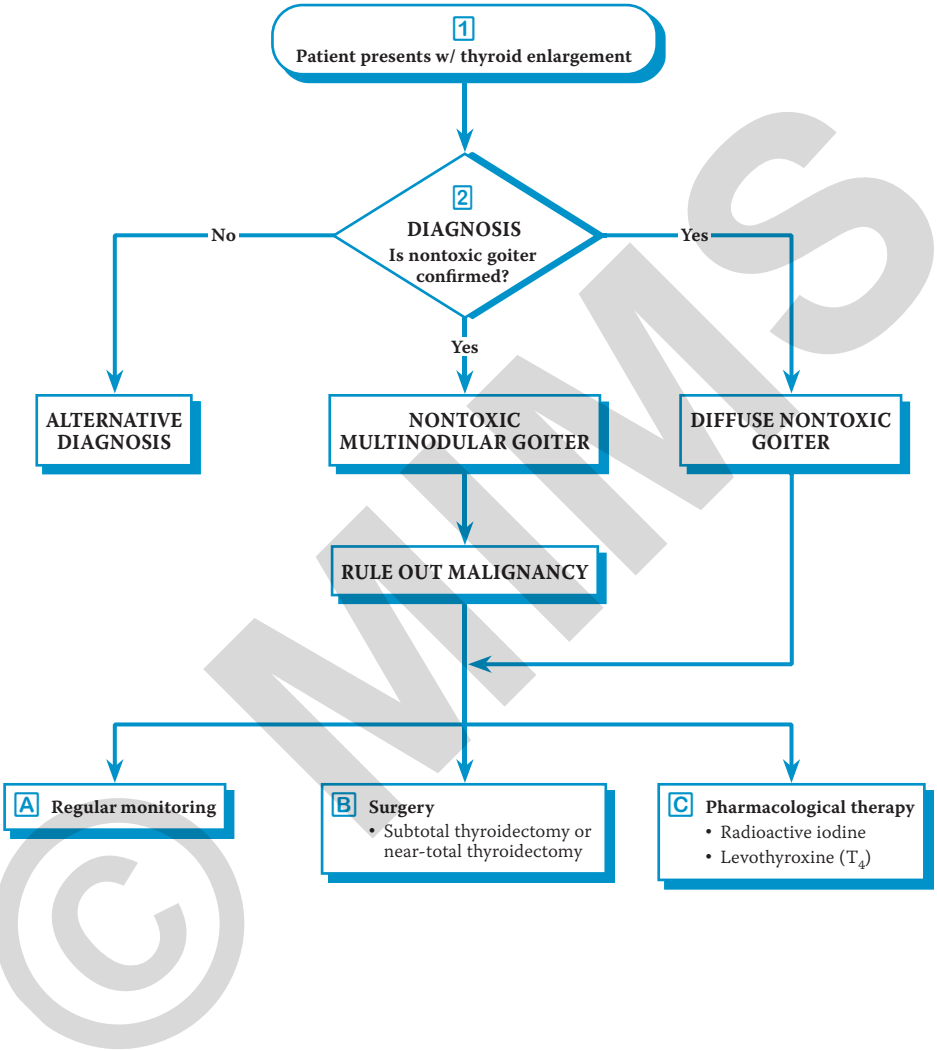
Goiter - Nontoxic (Simple): Diffuse & Multinodular (1 of 5)



Not all products are available or approved for above use in all countries.
Specific prescribing information may be found in the latest MIMS.

1 NONTOXIC GOITER

- Thyroid enlargement unrelated to hypothyroidism, hyperthyroidism, inflammation or neoplasia
- Etiology is usually unknown
  - Known causes include: Iodine deficiency, iodine excess, goitrogen ingestion, autoimmune disorders (eg Hashimoto's thyroiditis), thyroid hormone production defects & certain medications
- There is a female preponderance of nontoxic diffuse goiter
- Usually asymptomatic
- Symptomatic patient may present w/ the following:
  - Painless neck swelling
  - Cosmetic complaints
  - Shortness of breath
  - Sudden increase in goiter size w/ pain due to hemorrhage
  - Large goiter causing obstructive signs eg dysphagia, choking sensation, stridor, plethora (venous congestion)
  - Pemberton's sign - faintness w/ facial congestion, external jugular venous blockage when both arms are raised above head (an action that draws the thyroid into the thoracic inlet)

2 DIAGNOSIS

- Diagnosis of exclusion to rule out goiter due to hypothyroidism, hyperthyroidism, autoimmune thyroiditis, invasive fibrous thyroiditis, medications & iodine deficiency or excess

History

- Cosmetic complaints (disfigurement due to enlarged goiter), obstructive complaints, growth rate & family history

Physical Exam

- Inspect neck (check size, nodules & texture of goiter), detect obstructive signs (stridor, Pemberton's sign, plethora, etc)
  - Nontoxic multinodular goiter: Multiple, distorted nodules of varying sizes
  - Diffuse nontoxic goiter: Symmetrical, enlarged, non-tender, soft gland without nodules
- A retrosternal goiter may not be evident on physical exam

Lab Tests

Thyroid Function Tests

- Measure serum thyroid stimulating hormone (TSH) & free thyroxine (FT_4) levels [measure serum free triiodothyronine (FT_3) levels if FT_4 is normal & in nodular goiter] to exclude hyperthyroidism & hypothyroidism
  - Euthyroid state (normal serum FT_3 & FT_4 levels) may suggest diagnosis of goiter (simple/nontoxic)
  - TSH suppression may develop due to increasing goiter size
  - FT_3 toxicosis may occur in multinodular goiter
- Measure: Thyroid peroxidase (TPO) antibodies, thyroglobulin antibodies & TSH receptors antibodies to exclude autoimmune thyroid diseases

Fine Needle Aspiration Cytology (FNAC)

- Performed to rule out malignancy in cases of suspicious nodules
- Indicated if the patient has a history of rapid growth, pain, or tenderness, also if there is unusual firmness in one region of the goiter; or sonographically detected nodules w/ indeterminate or suspicious sonographic features
- May be performed w/ ultrasound guidance in cases of nonpalpable nodules w/ diameter of ≥1 cm

Pulmonary Function Tests

- Performed to determine the degree of airway obstruction

Diagnostic Procedures

Thyroid Ultrasound

- Preferred & most useful imaging modality to guide disease management & treatment of nodular goiter
- Gold standard for measuring thyroid size, identifying the structure & evaluating diffuse changes in the thyroid gland
- Recommended in patients w/ physical examination revealing thyroid asymmetry, focal firm consistency or tenderness, rapid growth of goiter, & goiter w/ normal TSH level & negative TPO antibodies
- Provides a measure of goiter growth rate over time & posttreatment
- Determines extent of nodularity

2 DIAGNOSIS (CONT'D)

Diagnostic Procedures (Cont'd)

Thyroid Scintigraphy

- Visualizes goiter, determines its inherent properties; identifies hot & cold nodules
- Recommended in patients w/ solitary thyroid nodule or multinodular goiter w/ low TSH levels

X-ray of the Neck & Upper Mediastinum

- Used to determine the presence of tracheal compression

Computed Tomography (CT)/Magnetic Resonance Imaging (MRI)

- Perform CT/MRI (to evaluate the anatomy of the goiter & the extent of substernal extension) if substernal goiters are suspected
  - Pemberton's sign, obstructive signs & symptoms suggest substernal goiter
  - Substernal goiter may obstruct thoracic inlet & compress trachea

A REGULAR MONITORING

- For patients who are asymptomatic, w/ normal thyroid functions & small goiters, & when the benefit of nontreatment outweighs the risk of treatment
- Monitor serum TSH regularly & maintain in a low detectable range
- Periodically evaluate w/ ultrasound measurements
- Risk of nontreatment: Goiter growth & progression, hyperthyroidism or hypothyroidism
- Based on clinical studies in the management of nontoxic goiter:
  - Goiter size increases yearly & large goiters w/ obstructive symptoms may develop
  - Goiter growth potential does vary greatly between patients
  - 10% of the patients develop hyperthyroidism/thyrotoxicosis after 7-12 years

B SURGERY

Subtotal Thyroidectomy or Near-Total Thyroidectomy

- Reserved for euthyroid, substernal, large goiters w/ compression or progressive obstructive symptoms, malignancy & when other forms of treatment are not applicable to patient
- Generally low morbidity when performed by experienced surgeon
- Potential complications: Recurrent laryngeal nerve palsy, hypothyroidism & hypoparathyroidism
- May administer low dose of T_4 after surgery to suppress regrowth of goiter if serum TSH is elevated

C PHARMACOLOGICAL THERAPY

Radioactive Iodine

- An alternative to surgery especially in the elderly, patients unfit for surgery or w/ TSH suppression or patients wanting to avoid surgery
- Reduces goiter size & reduces obstructive signs & symptoms (eg dyspnea & dysphagia)

Levothyroxine (T_4)

- May be an alternative to surgery & radioactive iodine therapy
- More suitable for patients without TSH suppression or w/ high serum TSH levels
- Has been used to prevent recurrences after surgery
- Suppresses TSH production causing goiter shrinkage
- Prolonged treatment w/ T_4 is required to maintain goiter size reduction & prevent recurrences
  - Prolonged TSH suppression by T_4 may also increase risk of bone loss & atrial fibrillation
- Not recommended for treatment of nontoxic multinodular goiter due to its low efficacy & risk of thyrotoxicosis

Dosage Guidelines

INORGANIC IODIDE		
Drug	**Dosage**	**Remarks**
Potassium iodide (KI)	100-200 mcg PO 24 hrly	**Adverse Reactions** • Rash, swelling of salivary glands, metallic taste, sore teeth & gums, allergic reactions which may be severe & require immediate medical attention

RADIOACTIVE IODINE		
Drug	**Dosage**	**Remarks**
I^{131}	75-400 microcurie or µCi/g tissue (2.8-14.8 MBq/g tissue)	**Administration** • Fixed dose based on goiter size & radioactive iodine uptake **Adverse Reactions** • Graves'-like hyperthyroidism (severe thyrotoxicosis may occur 3-6 mth after treatment), mild & transient radiation thyroiditis (may occur during 1st few wk of treatment), hypothyroidism, risk for radiation-induced cancer & rarely radiation-induced tissue swelling of the trachea (may worsen obstructive symptoms, glucocorticoid may be administered to counteract this effect) **Special Instructions** • Contraindicated in pregnant or breastfeeding women • Radiation safety precautions are necessary following treatment - Follow local protocol

All dosage recommendations are for non-pregnant & non-breastfeeding women, & non-elderly adults w/ normal renal & hepatic function unless otherwise stated.
Not all products are available or approved for above use in all countries.
Products listed above may not be mentioned in the disease management chart but have been placed here based on indications listed in regional manufacturers' product information.

Specific prescribing information may be found in the latest MIMS.

Dosage Guidelines

THYROID HORMONE		
Drug	**Dosage**	**Remarks**
Levothyroxine (T_4) (L-thyroxine, Thyroxine)	**Initial dose:** 75-200 mcg PO 24 hrly **or** 50-100 mcg PO 24 hrly **Maintenance dose:** 100-200 mcg 24 hrly **Prevention of recurrence after surgery:** 75-200 mcg PO 24 hrly	**Adverse Reactions** • CV effects (arrhythmias, angina, tachycardia, palpitations); GI effects (diarrhea, vomiting); CNS effects (headache, nervousness, insomnia, tremors); Other effects (bone loss, muscle cramps, fever, weight loss, heat intolerance & menstrual irregularities) • Prolonged T_4 administration increases risk for adverse reactions (eg bone loss, arrhythmias, etc) **Special Instructions** • Administer on empty stomach, 30 min before breakfast (due to irregular absorption) • Administer separately from other medications • Contraindicated in patients w/ untreated adrenal & pituitary insufficiency, untreated thyrotoxicosis, acute MI, acute pancarditis/myocarditis • If no regression after 6 mth of adequate TSH suppression, therapy should be stopped - Consider alternative therapies • Do not administer T_4 if pretreatment TSH is already subnormal • Adjust to the lowest effective dose based on clinical response & biochemical results (serum TSH & FT_3 levels) • Monitor serum TSH levels regularly to prevent risks associated w/ prolonged TSH suppression caused by long-term T_4 administration • Therapeutic equivalence varies w/ different brands of T_4, reassess serum TSH levels if there is a brand change

All dosage recommendations are for non-pregnant & non-breastfeeding women, & non-elderly adults w/ normal renal & hepatic function unless otherwise stated.
Not all products are available or approved for above use in all countries.
Products listed above may not be mentioned in the disease management chart but have been placed here based on indications listed in regional manufacturers' product information.

Specific prescribing information may be found in the latest MIMS.

Please see the end of this section for the reference list.