

SOLITARY NODULE OF THE THYROID GLAND

M. Shuja Tahir

Abstract: Solitary thyroid nodule is the presence of a single nodule in thyroid gland. 50% of the clinically diagnosed solitary nodules are degenerated portion of multinodular goitre. Smaller nodules are present but these may not be palpable and only one large nodule presents as solitary nodule. The majority of nodules are benign, usually representing part of spectrum of multinodular goiter. Smaller nodules are present but these may not be palpable and only one large nodule presents as solitary nodule.

Key words: Solitary thyroid nodule, Toxic adenoma thyroid cyst, Follicular Adenoma.

Solitary thyroid nodule is the presence of a single nodule in thyroid gland. It is present in approximately 4% of the individuals in USA.

True solitary nodules could be;

- Solitary nodular non-toxic goiter (SNNG).
- Toxic adenoma.
- Follicular adenoma.
- Malignant nodule.
- Autoimmune thyroiditis.

SIMPLE NODULE SOLITARY NODULAR NON TOXIC GOITRE (SNNG)

The solitary or single nodule of the thyroid

gland is a clinical or operative finding. It is also called solitary nodular non toxic goitre (SNNG).



Solitary Nodule

True solitary nodule is when no other nodule is present in the thyroid gland.

50% of the clinically diagnosed solitary nodules are degenerated portion of multinodular goitre¹.

Smaller nodules are present but these may not be palpable and only one large nodule presents as solitary nodule.

Most of the solitary nodules are due to

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adenomas or occasionally associated with thyroiditis.

These are four times more common in females. Male to female ratio is 1:4.

These are commonly present in 30-50 years age group people.

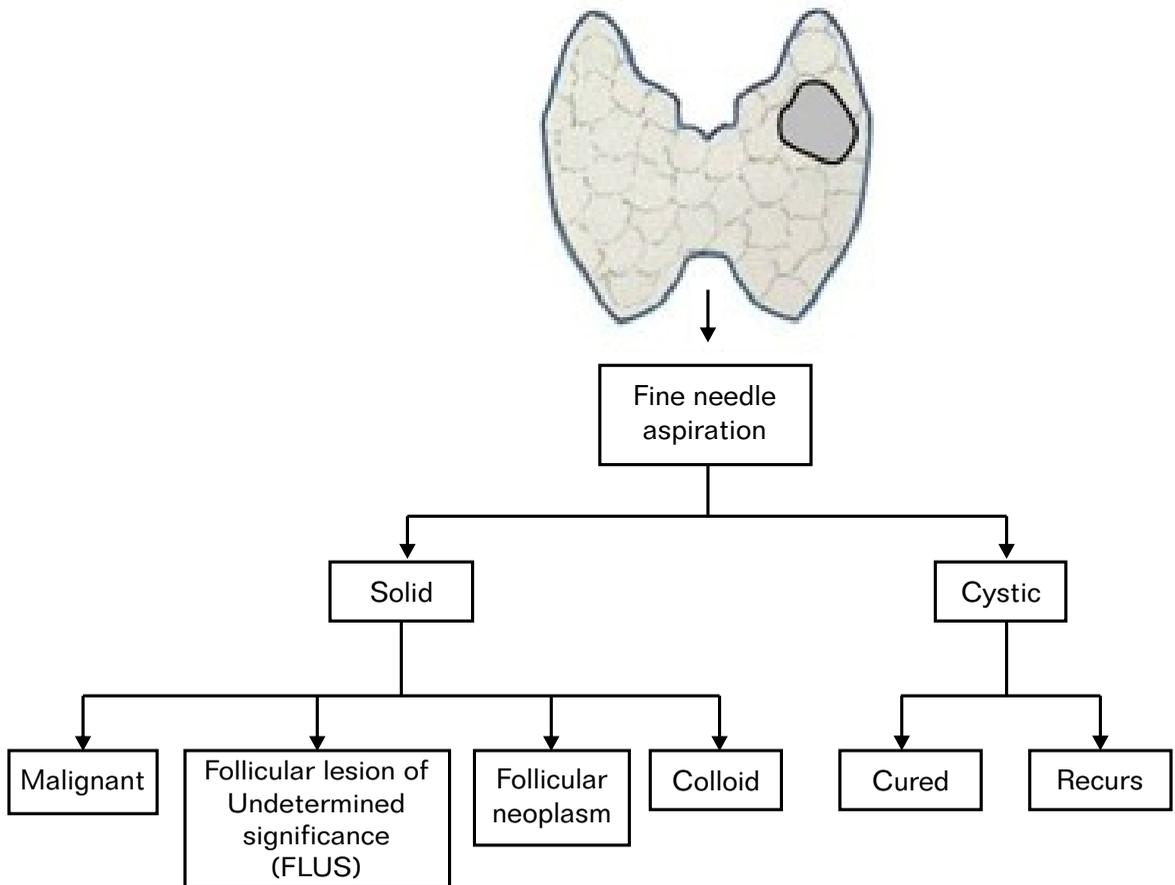
Twenty five percent of the true solitary nodules may be malignant. This is why it is essential to investigate all the solitary nodules very carefully. The incidence of the thyroid malignancy is about 40 cases per million. The incidence of malignancy in solitary nodule is much lower.

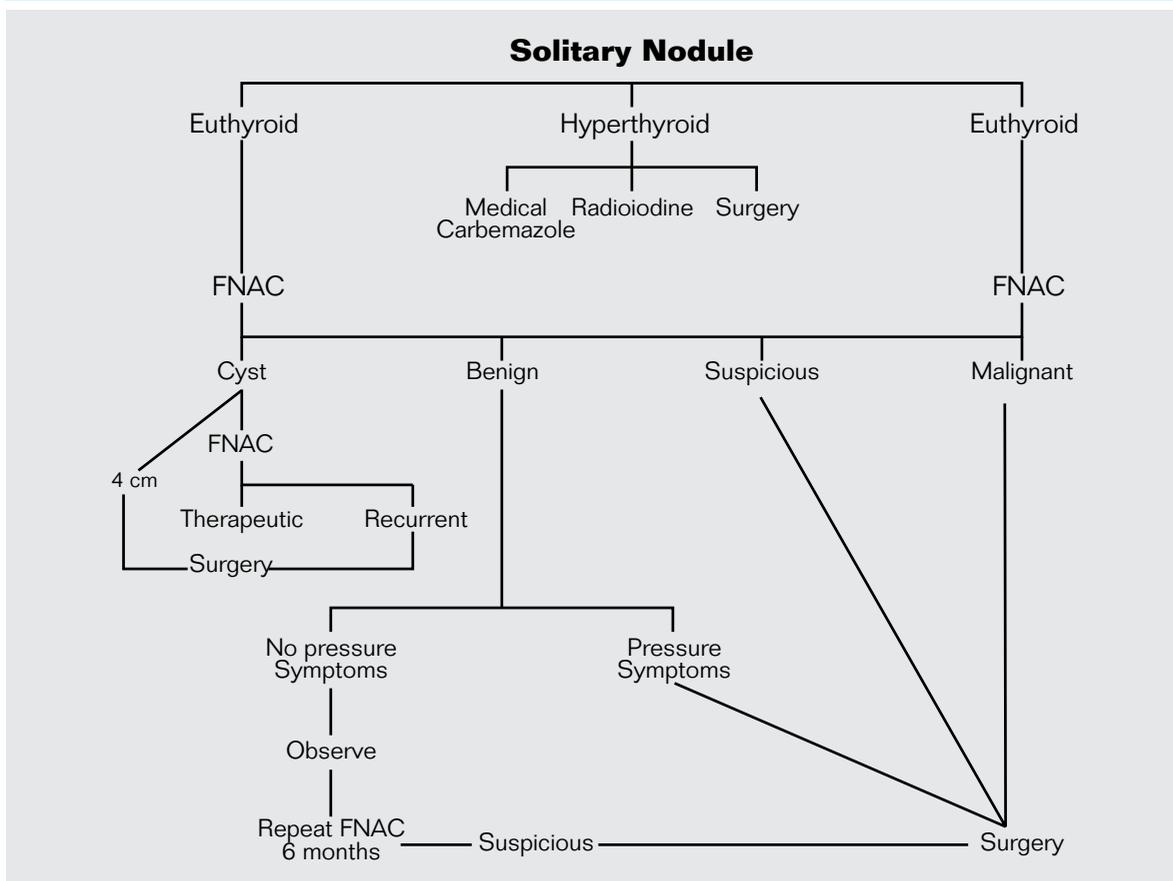
When any factor reduces the level of thyroid hormones necessary for normal metabolism, there is prolonged rise of the thyroid stimulating hormone (TSH) leading to diffuse hyperplasia of the thyroid gland.

If intermittent stimulation persists, the nodule formation is inevitable. Usually the nodules are multiple but occasionally only one nodule becomes enlarged and clinically palpable.

Sometimes other nodules may be either microscopic or too small to be palpable clinically.

The patient is euthyroid and the nodule is smooth and firm in consistency.





If the scan is done, nodule may not take up the isotopes. It is called cold nodule^{1,2}.

(which might necessitate treatment, even if benign)?

FNAC usually helps in the diagnosis. It has reduced the incidence of thyroid exploration by 25%. Its limitation is in the diagnosis of follicular adenoma from follicular carcinoma. Unless the cytology service is very reliable, total lobectomy should be performed.

The clinical history should therefore concentrate on eliciting any symptoms suggestive of thyroid dysfunction; risk factors for malignancy; symptoms suggestive of cancer; and compressive symptoms.

Clinical evaluation

Thyroid status

Assessment of thyroid nodules should aim to answer the following questions:

Symptoms of hyperthyroidism may include weight loss (typically with a normal or increased appetite), sweating, tremor, anxiety, tiredness/disturbed sleep, and palpitations (usually with a rapid heart rate). Conversely, hypothyroidism might be implied by unexplained weight gain, lethargy, dry

- What is the functional status of the thyroid?
- Is the nodule benign or malignant?
- Is the nodule causing any other symptoms

skin, and frequently a decline in cognitive function. It should be recognized, however, that symptoms might be lacking, even when thyroid function is abnormal, hence a biochemical assessment of thyroid function will always be necessary.

Symptoms suggestive of cancer

Few features of the history are specific for thyroid malignancy. However, the following raise suspicion:

Hoarseness of the voice: in association with a thyroid mass, this is suggestive of vocal cord palsy, secondary to invasion of the recurrent laryngeal nerve. Benign lesions almost never compromise this nerve (although hoarseness may be due to unrelated, benign disease).

A rapidly enlarging mass, growing steadily and swiftly over a few weeks: very suggestive of more aggressive forms of thyroid cancer, as detailed below. (In contrast, a lump appearing over 24e48 hours is likely to represent a bleed into a thyroid cyst, most of which are benign).

Symptoms of local invasion of structures in the neck: pain in the ipsilateral ear (referred otalgia), stridor, dysphagia or haemoptysis. Compressive symptoms Even benign thyroid masses, if large enough, can cause compression of the cervical oesophagus or trachea, causing difficulty swallowing, a sensation of tightness in the neck, or of difficulty/noisy breathing.

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Investigations

Thyroid function tests

A blood test for thyroid function should be performed. Serum thyroid stimulating hormone (TSH) alone is adequate, if the patient is clinically euthyroid, and there is no suspicion/history of pituitary disease. If TSH level is outside the reference range, free thyroxine (T4) and free tri-iodothyronine (T3) should be measured

Ultrasound of thyroid

Imaging of thyroid gland with ultrasound scan is helpful in assessment of the likelihood of malignancy. Features such as spongiform texture, cysts without solid components, isoechoogenicity, hypoechoic halo, avascular nodules are typically benign; whereas irregular margins, intranodular vascularity

, microcalcification and associated cervical lymphadenopathy are indicators of malignancy.

the sonographic features of thyroid nodules should be summarized in a U1-5 classification, as follows

U1	Normal thyroid
U2	Benign
U3	Equivocal
U4	Suspicious
U5	malignant

FNAC

The sample of cells from the nodule are aspirated with a 23 or 21 guage needle. The cytology can be classified in following grades.

Thy 1	inadequate
Thy 2	benign
Thy 3	Thy3a atypia, Thy3f follicular lesion
Thy 4	Suspicious malignancy
Thy 5	malignant

Management of solitary nodule thyroid

The combination of ultrasound and FNAC are used to facilitate conservative management of benign solitary nodules and also guiding the use of surgery for diagnosis and definitive therapy of those cases which prove to be malignant.

Surgery for thyroid nodule

Surgery may be necessary for diagnostic purposes, as outlined above, or as definitive therapy for thyrotoxicosis or primary thyroid malignancy.

For diagnostic purpose the procedure must be total ipsilateral resection and in case of

malignancy total thyroidectomy.

TOXIC ADENOMA

Occasionally the hyperthyroidism is due to an over-active thyroid nodule.

This is autonomous and not under the control of external stimulation. This nodule is in fact a benign endocrine tumour. It is called toxic or over-active nodule. It may be present in a multinodular goiter or may present as a single toxic nodule. The patient is thyrotoxic due to excessive production of thyroid hormones.

The patient is usually middle aged or elderly. Typical history of loss of weight, increased appetite, heat intolerance, sweating, palpitation, atrial fibrillation and cardiac failure may be present.

The scan shows excessive uptake of isotopes by the nodule. It is called hot nodule.

Another characteristic feature of toxic nodule is that its uptake of isotopes is not suppressed by giving tri-iodothyronine (T3).

The treatment is surgical excision such as subtotal lobectomy or subtotal thyroidectomy depending upon the site of nodule.

FOLLICULAR ADENOMA

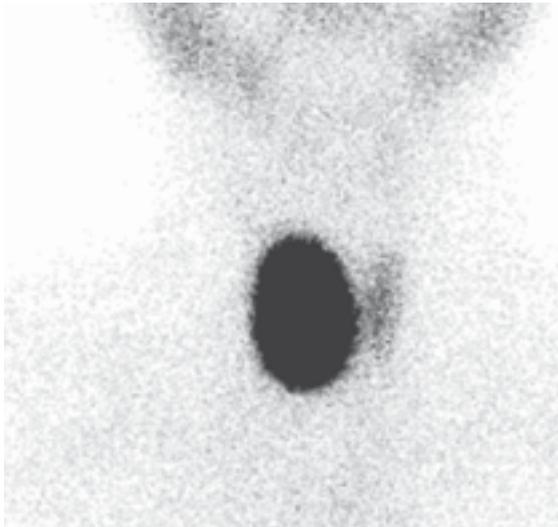
Most of the adenomas, unlike toxic adenoma do not produce excessive hormones. These are follicular adenomas.

Scan shows equal uptake of the isotopes by the nodule and the gland. It is called functioning or warm nodule.

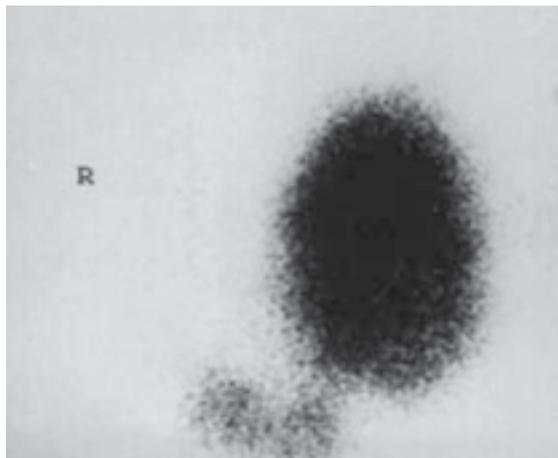
50% of the follicular adenomas do not secrete hormones and fail to uptake radioactive isotopes. These are called non functioning or

cold nodules.

The patient is euthyroid and nodule is smooth, firm and mobile.



Solitary Hot Nodule (isotope scan)



Solitary Cold Nodule (isotope scan)

Follicular adenoma resembles cystic and degenerated simple nodule.

The treatment is surgical excision such as subtotal lobectomy or subtotal thyroidectomy depending upon the site of nodule.

MALIGNANT NODULE

The malignant nodule is usually well differentiated follicular or papillary carcinoma present in the solitary nodules.

Papillary carcinoma can also present as a single, hard and irregular nodule.

The adenoma such as papillary adenoma is small encapsulated papillary carcinoma and have got good prognosis.

Follicular carcinoma usually appears as an encapsulated nodule.

Secondary growth may also present similarly but is very rare. Medullary carcinoma is irregular and hard.

FNAC of many goitres shows presence of psammoma bodies in the aspirate.

There is strong statistical associations of psammoma bodies with malignant neoplasms. Histological confirmation is mandatory in these cases³.

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