Thyroid nodules - medical and surgical management

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Thyroid nodules - prevalence

Thyroid nodules
common, increase with age

30-60% of thyroids have nodules at autopsy

Palpation: 5-20% (>1cm)

U/S: 15-50% (>2mm)

Thyroid cancer - prevalence

Thyroid cancer rare

Prevalence estimated
<0.1% in USA

1.5% of all new cancers

0.2% of cancer deaths

Occult thyroid cancer also rare:

~4% incidental finding at autopsy

Thyroid nodules - pathogenesis

Histology:

adenoma - follicular, Hürthle cell

cyst

colloid nodule

lymphocytic thyroiditis

thyroid cancer

lymphoma

Iodine deficiency, radiation

TSH-R and Gsα mutations (cAMP signal pathway)

Clinical signs - important features

Age, iodine status, radiation exposure

Thyroid status

Presence of goitre, ?multinodular disease

Pressure symptoms

Mobility, skin tethering

Lymph nodes

RLN palsy

Evaluation of thyroid nodules

Frequent benign disease, low risk of malignancy

Which nodules to evaluate?

Solitary nodules >1cm in euthyroid patients

(rule out Graves, Hashimoto's; ↑ risk in children)

Dominant nodules >1.5cm in MNG

Once subjected to FNA:

10-20% risk of suspicious cytology, therefore → thyroid surgery

95% of histology will be benign, and surgery "unnecessary"

Diagnostic approach - isotope scan

cold nodules: higher risk of malignancy

but 80% of nodules are “cold”
small cold nodules may be missed
hot nodules may be malignant

...therefore rarely used for evaluation

Diagnostic approach - FNA

22-25 gauge needle

10-20cc syringe

syringe holder?

plain glass slides,
frosted end

technique: liaison
with cytologist!

U/S guided FNA?

Diagnostic approach - FNA outcome

Unsatisfactory

inadequate cellularity: 5-20%

Benign

~70%: usually colloid nodules

Suspicious

10-20%: “follicular neoplasm”...

could be adenoma or carcinoma

Malignant

5%, mostly papillary carcinoma

rarer: MTC, lymphoma, metastasis

Diagnostic approach - ultrasound

Identifies solid v. cystic nodules

Identifies MNG

May aid FNA

Does not exclude malignancy

Diagnostic approach - other tests

Calcitonin

very high results diagnostic for MTC

risk of borderline false positives

not for routine use

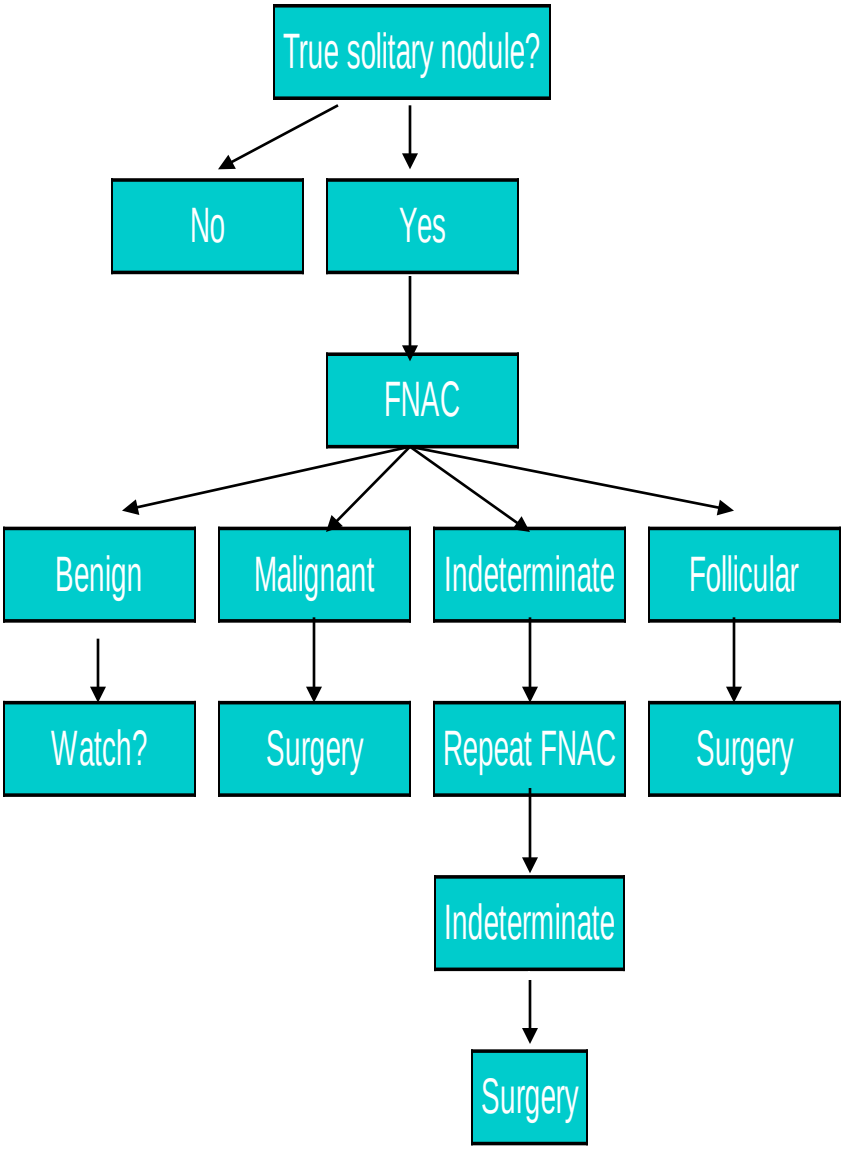
Thyroglobulin

not helpful for exclusion of carcinoma:

overlap with benign disease

best for follow-up after thyroidectomy

Management of the solitary nodule



Surgical strategy for the solitary nodule

- Undiagnosed / uncertain or follicular on FNAC

Total lobectomy and isthmusectomy

Frozen section ???

Leave contralateral ‘virgin’

THYROID MALIGNANC

TYPE	AGE	FREQUENCY	SURVIVAL
PAPILLARY	20-30	50-60%	99%
FOLLICULAR	40-50	20%	50%
MEDULLARY	35-50	5%	40%
ANAPLASTIC	50+	5%	0%
LYMPHOMA	40-50	10%	50%

Papillary carcinoma

Age 20-30
Often indolent and slow growing.
Lymph node metastases early
Lateral aberrant thyroid!
Multicentricity the rule
Excellent prognosis
?TSH dependent

Follicular carcinoma

Age 40-50

5 year survival 50-70%

Blood spread (bones and lungs)

Not multifocal

?TSH dependent

Medullary carcinoma

Variable age (Sporadic/MEN)

Parafollicular cells

Calcitonin

Associated with phaeochromocytoma etc.

Spread by blood and lymph

Anaplastic carcinoma

More elderly (50-60)

Rapid progression

Rapid local invasion

Surgery not usually possible

High mortality, most die < 1 year

Thyroid lymphoma

Any age

Isolated or generalised

Early local invasion is usual

Radiotherapy / chemotherapy treatment of choice

Management of thyroid carcinoma,
a) Papillary carcinoma

Total thyroidectomy

Central neck clearance

Block dissection if lateral neck nodes palpable

I^{131} scan

- Clear, no action
- Hot spot, ablative dose I^{131}

Why do a total thyroidectomy in papillary carcinoma?

Disease is multifocal, bi-lobar in 30-70% cases.

Value of thyroglobulin

Increased efficacy of radio-ablation

Morbidity of surgery should not be increased

Management of thyroid carcinoma,
b) Follicular carcinoma

Total thyroidectomy

Central neck clearance

Block dissection if lateral neck nodes palpable

I^{131} scan

- Clear, no action
- Hot spot, ablative dose I^{131}

Management of thyroid carcinoma;
c) Medullary

Total thyroidectomy (disease often multifocal)

Slightly more extensive central neck clearance (nodes involved in 75%)

Management of thyroid carcinoma;
d) Lymphoma

Surgery to establish diagnosis

Radiotherapy

Chemotherapy

MACIS score for Papillary thyroid carcinoma

Index	Calculation	Score
Age	+ 3.1 for <39 0.08 x age for > 40	
Size	0.3 x size (cm)	
Incomplete Resection	+1	
Local invasion	+1	
Distant metastases	+3	
TOTAL		

Predictive value of MACIS score

Score	20 year survival
<6	99%
6.00 – 6.99	89%
7.00 – 7.99	56%
> 8.00	24%

TNM classification of thyroid cancer

Primary tumour

- T1 < 1cm
- T2 1-4 cm
- T3 > 4 cm
- T4 Beyond thyroid capsule

Regional Lymph nodes

- NX Not assessable
- N0 No regional nodes
- N1 Regional nodes involved
  - * N1a Ipsilateral cervical nodes
  - * N1b bilateral, contralateral, midline nodes

Distant metastases

- Mx Cannot be assessed
- M0 None
- M1 Present

Complications of surgery?

1. Haemorrhage
2. Hypothyroidism
3. Hypocalcaemia
4. RLN palsy
5. Infection
6. Mortality

Thyroid surgery- technical hints

- Always identify recurrent nerve throughout
- Avoid ‘bulk ligation’ of superior pedicle
- Never divide trunk of inferior thyroid artery
- Unless malignant, dissect on the capsule
- Always preserve parathyroids
- Auto-transplant if necessary

PEARLS

50% of solitary nodules are not

90% of thyroid swellings are benign

Never assume

Solitary nodules in men more often malignant

Children < 14 with solitary nodule, 50% malignant

What are the standards set for thyroid surgery?

- The indications for operation, risks and complications should be discussed with patients prior to surgery
- Fine needle aspiration cytology should be performed routinely in investigation of solitary thyroid nodules
- Recurrent laryngeal nerve should be routinely identified
- All patients scheduled for re-operative thyroid surgery should have ENT examination
- All with post-operative voice change should have vocal cords examined
- Permanent vocal cord palsy should be < 1%
- Post-operative haemorrhage should be <5%
- All cancer should be treated by a multi-disciplinary team

What operative experience is necessary for accreditation in endocrine surgery?

Must spend one year in accredited unit

	Performed	Assisted
Thyroid lobectomy	20	30
Parathyroid	10	20

What is necessary to be recognised as a training unit in endocrine surgery?

- Approved by BAES
- One or more surgeons with declared interest in endocrine surgery
- An annual operative throughput of >50 patients
- On site cytology and histopathology
- At least one consultant endocrinologist, at least 1 endocrine clinic/week
- Nuclear Medicine on site
- MRI and CT on site