Thyroidectomy is the treatment for Goitre?

J.R. Botha
Wits DGMC
Johannesburg
Introduction

Benign Goitre presents with diffuse or nodular enlargement.

Euthyroid, Hypothyroid or Hyperthyroid

Congenital

Inflammatory

Infiltrative

Multinodular disease
What are we Arguing about?

Benigne Multinodular Goitre
Toxic Multinodular Goitre
Graves’Disease
Not Thyroid Malignancies
Nor Thyroiditis
Nor Congenital disease
Nor Infiltrative disease
There is NO argument!

Big MNG with obstruction = surgery

Graves’ disease with nodules, ophthalmopathy, pregnancy or the desire to fall pregnant, age, failed medical therapy, rapid cure is required = surgery

Patient preference

Total thyroidectomy! \(^1,2\)

---

Definition

A Multinodular goitre is defined as a diffuse or nodular enlargement of the thyroid, that is not the result of an inflammatory, infiltrative or neoplastic process.

Sporadic: < 5% Endemic: > 10%

Clinical & Pathological Diagnosis!

The Whole Gland is involved.
MNG --- Introduction

• Commonest pathology of thyroid
• More common in females
• Toxicity and Cancer increased
• Etiology incompletely understood
• Iodine deficiency
• Genetic factors play a major role
• Susceptibility + environmental factors

Etiology

Genetic predisposition & environmental factors
Goitrogens
Smoking
Pregnancy
Infections
Iodine Deficiency

There is a familial MNG - chromosome 14q
MNG - Presentation

- Asymptomatic enlargement
- Cosmetic problem in many
- Pressure symptoms
  - Trachea
  - Oesophagus
  - Nerves, veins & arteries
- Retrosternal
- Thyrotoxicosis and malignancy
Treatment of MNG

Optimal management debatable

Conventional strategies, aimed at relieving pressure symptoms and decreasing size, are:

1. T4 Suppression
2. Radio-active Iodine [ +/- R TSH ]
3. Thyroidectomy, Total & other
4. $R_x$ of Nodules – Ethanol, Laser & RF
Complications of T4 suppression

- Osteoporosis
- Cardiac side effects
- Subclinical thyrotoxicosis
- Recurrence after stopping
- Lifelong suppression
- Poor compliance!

Complications Radioiodine

- Hypothyroidism 22% - 45%
- Radiation thyroiditis 3% - 13%
- Transient hyperthyroidism 5%
- 2nd Dose needed 2% - 18%
- Failure 11%
- Autoimmune hyperthyroidism 4% - 5%
- Cancer Risk: lifetime 1.5%
Treatment of MNG

Optimal management debatable
Conventional strategies, aimed at relieving pressure symptoms and decreasing size, are:
1. T4 Suppression
2. Radio-active Iodine [ +- R TSH ]
3. Thyroidectomy, Total & other
4. $R_x$ of Nodules – Ethanol, Laser & RF
Surgical Treatment of MNG¹

1. Total Thyroidectomy not Subtotal, Dunhill op
2. MNIT - minimal neck incision Thyroidectomy
3. MIVAT - minimal invasive video-assisted Thyroidectomy
   Better cosmetically in 1st 3 months
   Less pain 1st 48hrs
   Less cost-effective
   Small volume disease
   No head to head prospective trials!!

ESNT- extracervical scarless neck Thyroidectomy

¹ Dralle, et al. Minimal invasive vs conventional thyroidectomy in MNG. Best Practice & Research Clinical Endocrinology & Metabolism. 28 (2014) 589-599.
Surgical Treatment of MNG\(^1\)

1. Total Thyroidectomy *not* Subtotal Dunhill op
2. MNIT - minimal neck incision Thyroidectomy
3. MIVAT - minimal invasive video-assisted Thyroidectomy
   - Better cosmetically in 1\(^{st}\) 3 months
   - Less pain 1\(^{st}\) 48hrs
   - Less cost-effective
   - Small volume disease
   - No head to head prospective trials!!

ESNT - extracervical scarless neck Thyroidectomy

---

US guided ablation of nodules

Ethanol ablation
Thermal ablation with Laser or Radiofrequency.

Percutaneous, local anaesthetic, outpatient procedure.
Nodules only - with 50% reduction in size
Can be repeated.

Does not treat underlying disease!*

Surgery - Negative

Bleeding < 1% ¹

Nerve Damage < 1% (0.4%) ¹

Hypoparathyroidism < 1% (0.75%) ¹

Total Thyroidectomy needs *Well Trained Surgeons* ²

---

Surgery - Positive

Rapid Cures most.

Can be done in Pregnancy / Eye disease

Cost Effective

Local / Regional Anaesthetic

Out Patient Procedure

Small Complication Rate (1%-2%)


Our approach at CM Hospital Thyroid Clinic

- **Observation** -- small asymptomatic goitre
- **T4 suppression** – almost never because of poor efficiency and compliance *
- **Surgery** – symptomatic, retrosternal glands, cosmesis & patient preference (30% ¹)
- **Radioiodine** – recurrent goitres, “sick” patient or those who refuse surgery.

Non pregnant Graves’ - eye disease

Conclusions

No Level I or II Evidence in Graves’ & MNG

Driven by Dr. preference – Informed pt must be part of Decision making !!

Total Thyroidectomy rapidly Cures 100%

Low Complication Rate (Expert Hands)

Not for the occasional Thyroidectomist

Operation can be taught


What are we Arguing about?

Benigne Multinodular Goitre
Toxic Multinodular Goitre
Graves’ Disease
Not Thyroid Malignancies
Nor Thyroiditis
Nor Congenital disease
Nor Infiltrative disease
Introduction

Benign Goitre presents with diffuse or nodular enlargement.
Euthyroid, Hypothyroid or Thyrotoxicosis.

Causes of Congenital Goiter

- Inborn errors of thyroid hormone production
  - Dysshormonogenesis
- Transplacental passage of maternal antibodies
  - TSH-receptor blocking antibodies
  - TSH-receptor stimulating antibodies
- Maternal ingestion of antithyroid drugs and other goitrogens
  - Propylthiouracil
  - Methimazole or carbamazole
  - Iodine and iodine-containing drugs
- Activating mutations of the TSH receptor
  - Congenital nonimmune hyperthyroidism
- Activating mutations of the G protein alpha subunit
  - McCune-Albright syndrome
- Thyroid hemiagenesis
- Thyroid tumors
Introduction

Benign Goitre presents with diffuse or nodular enlargement.

Euthyroid, Hypothyroid or Thyrotoxicosis.

Congenital

Inflammatory

Infiltrative

Multinodular

Common, without pain
- Hashimoto’s thyroiditis
- Subacute lymphocytic thyroiditis
- Sporadic painless thyroiditis
- Postpartum painless thyroiditis
- Subacute granulomatous thyroiditis
- Acute Suppurative thyroiditis
- Radiation thyroiditis [often painful]
Introduction

Benign Thyroid disease presents with diffuse or nodular enlargement.

Infiltrative

- Isolated or part of systemic disorder
- Progressive painless firm enlargement
  - Riedel’s thyroiditis
  - Amyloidosis
  - Sarcoidosis
  - Langerhans Histiocytosis
  - Sclerodema
  - Hereditary Hemochromatosis
MNG - Introduction

- Toxic MNG rare in iodine sufficient areas
- Toxic MNG commonest type of thyrotoxicosis in iodine deficient areas
- Goitre initially diffuse but later becomes nodular
- Nodules found 35-57% at autopsy studies
- Single nodule: if US 20-48% other nodules
- TSH normal in most. ? Chronic relative increase of TSH
Treatment of MN Goitre

Optimal management debatable

Conventional strategies, aimed at relieving pressure symptoms and decreasing size, are:

1. T4 Suppression
2. Radio-active Iodine
3. Surgery

Regular Observation

Minimally Invasive thyroidectomy
Treatment of MN Goitre

Optimal management debatable

Conventional strategies, aimed at relieving pressure symptoms and decreasing size, are:

1. T4 Suppression
2. Radio-active Iodine
3. Surgery

Regular Observation

Minimally Invasive thyroidectomy
Radioiodine Therapy

Safe and effective

Most reports from Europe, in elderly, big goitres, with compressive symptoms and poor surgical candidates.

• Size ↓ by 34% - 60% in most *

• Obstructive symptoms improved

  Dyspnoea  75%
  Dysphagia  88%
  Tracheal narrowing  36%
Surgery

- Bilateral subtotal standard practice
  Recent Studies show 10% - 60% recurrence rate – size remnant!

- Re-do operations dangerous
- Current weight of surgical opinion favours TOTAL THYROIDECTOMY
Complications of Surgery

- Parathyroids
- Recurrent Laryngeal nerves
- External branch of the superior LN
- Not for the occasional thyroid surgeon
Laboratory Thyroid Tests

- TSH
- Triiodothyronine [T₃] & Thyroxine [T₄]
- Thyroglobulin
- Antithyroid antibodies [peroxidase & micosomal]
- Calcitonin
Genetic Factors

- Mutations TSH & Guanyl nucleotide stimulatory \( [G_s\text{-alpha}] \) genes. Gain of function and growth
- Insulin growth factor-I \([\text{IGF-I}]\)
- Epidermal growth factor receptor \([\text{EGF}]\)
- Basic fibroblast growth factor
- Transforming growth factor \([\text{TGF}]\)
- Other H,K,N-ras proto-oncogenes mutations, c-jun, c-myc, c-fos overexpression
- Germline mutation chromosome 14q
TSH receptor and Gs-alpha are Oncogenes in Toxic Thyroid Nodules

TSHR = TSH receptor, Gs-alpha = the alpha subunit of the guanyl nucleotide stimulatory protein, AC = adenyl cyclase. GTP = Guanosine triphosphate, GDP = guanosine diphosphate.
Work up

- History
- Clinical examination
- TSH
- ? Thyroid antibodies
- ? Scintigraphy
- ? Ultrasonography
- FNAC

<table>
<thead>
<tr>
<th>Test</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH</td>
<td>100%</td>
</tr>
<tr>
<td>T3/T4</td>
<td>74%</td>
</tr>
<tr>
<td>TPO</td>
<td>65%</td>
</tr>
<tr>
<td>US</td>
<td>84%</td>
</tr>
<tr>
<td>Scan</td>
<td>76%</td>
</tr>
<tr>
<td>FNAC</td>
<td>93%</td>
</tr>
</tbody>
</table>
Controversial

TSH suppression by T4 Therapy

- 48%-60% vs 4%-10%

- Young do better than old patients
- Diffuse goitre better than nodular goitre
- Colloid, degenerative nodules do better than fibrotic, hyperplastic nodules

- 14 randomized trials 42% in size 4 trials no response
Multinodular Goitre

Colloid goitre

Physiological goitre

Pregnancy associated goitre

Simple goitre

other

Clinical & pathological Diagnosis!