Surgical Treatment of Graves´ Hyperthyroidism

Bertil Hamberger
Karolinska Institutet
Stockholm, Sweden
**Forms of hyperthyroidism**

<table>
<thead>
<tr>
<th>Type</th>
<th>Etiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffuse toxic goiter, Graves´disease</td>
<td>Immunologic, TRAB (TSH-rec. ab) up</td>
</tr>
<tr>
<td>Toxic nodule-multinodular toxic goiter</td>
<td>Mutations in the TSH receptor, TRAB normal</td>
</tr>
<tr>
<td>Thyroiditis in active state</td>
<td>Leaking thyroid hormones, TRAB normal, TPO up</td>
</tr>
</tbody>
</table>

In addition there are several uncommon forms of hyperthyroidism: Factitial hyperthyroidism, treatment with drugs with high iodine content, ectopic T3 production, T3 resistance in hyperthyroid state and TSH-producing pituitary adenoma
Surgical treatment of hyperthyroidism

- The role of surgery is very controversial
## Choice of treatment for GD

*Weetman AP JRColl Physicians Lond 2000;34:374-80*

<table>
<thead>
<tr>
<th></th>
<th>Europe %</th>
<th>North America %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Small goitre</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATD</td>
<td>77</td>
<td>30</td>
</tr>
<tr>
<td>radioiodine</td>
<td>22</td>
<td>69</td>
</tr>
<tr>
<td>surgery</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Large goitre</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATD</td>
<td>32</td>
<td>18</td>
</tr>
<tr>
<td>radioiodine</td>
<td>17</td>
<td>75</td>
</tr>
<tr>
<td>surgery</td>
<td>51</td>
<td>7</td>
</tr>
</tbody>
</table>
Surgical treatment of hyperthyroidism

- The role of surgery is very controversial
- A contributing factor may be epidemiologic differences related to type and activity of the hyperthyroid patient, presence of ophtalmopathy etc
- The role of surgery is highly dependent on the quality of the procedure. Complication rates must be kept to a minimum
- The type of surgery (total or less than total) is controversial
Arguments against surgery

- No effect on underlying autoimmune disorder
- Risk for surgical complications.
- Side effects – scar, fear for surgery, hypothyroidism (?) etc.
- High costs !?
Arguments in favour of surgery

- Quick and effective method to terminate hyperthyroidism
- Safe with very few complications
- Does not cause aggravation of ophtalmopathy (maybe improve)
- Cost-effective
Preoperative drug treatment

- ATD (tiamazole) effectively oppose the metabolic effects of hyperthyroidism.
- Non selective beta-blockers (propranolol) reduce metabolic rate (50%)
- Selective beta 1-blockers only provide symptomatic relief (heart rate)
- Iodine (Lugols solution)
Surgical techniques

• Bilateral lobe resection leaving 4-8 g
• Bilateral subtotal thyroidectomy (remnant size 2-4g).
• Dunhill procedure: Hemithyroidectomy and contralateral lobe resection (remnant 1-3 g).
• Total thyroidectomy (no remnant ?)
Which surgical strategy for Graves’ disease?

- Total thyroidectomy seems to be a surgically safe procedure in complicated Graves' disease and to provide normalization of therapy-resistant thyrotrophin receptor antibody antibody titers. Winsa 1994

- Total thyroidectomy can be performed as safely as STT and should be recommended as the procedure of choice for patients requiring surgical treatment for Graves' disease. CY Lo 2005

- We believe that Graves' disease should join the increasing list of thyroid conditions for which total thyroidectomy is the preferred option. Delbridge 2002
Which surgical strategy for Graves’ disease?

- In respect to possible postoperative hypoparathyroidism and a lack of difference in postoperative GO changes, we do not advocate total thyroidectomy for patients with Graves' disease and Graves' orbitopathy but prefer radical subtotal thyroid resection with a remnant of less than 4 ml. Goretzki 2000

- Subtotal thyroidectomy is associated with a high rate of hypothyroidism and large remnants have potential for recurrence. Total or near-total thyroidectomy obviates these disadvantages and can be performed without increased complication rates, thus appearing to be the preferred extent of thyroidectomy for Graves' disease Clark 2005
Postoperative results on Graves

- Graves´disease n=322, subtotal/total 89/11%
- Haemorrhage requiring reoperation 1.6%
- Recurrent laryngeal nerve palsy
  - Transient 2.5%
  - Permanent 0.3%
- Hypocalcemia
  - Temporary-prolonged 3.7%
  - Permanent 0.6%
- Scar – patient unsatisfied 3.4
- Recurrence of hyperthyroidism 2.2%

Werga-Kjellman P Thyroid 2001;11:187-92
Efficacy of thyroidectomy for Graves’: Meta-analysis

- 35 published studies comprising 7241 patients:
- 92% success
- Persistent/recurrent 7.2%
- Nerve injury 0.9%; hypopara 1%

Parathyroid transplantation

Should parathyroid transplantation be performed?

- Autotransplantation of at least one parathyroid gland during thyroidectomy in benign thyroid disease minimizes the risk of permanent hypoparathyroidism. Truptka 2002

- A "ready selective" approach to parathyroid autotransplantation is an effective strategy for minimizing the rate of permanent hypoparathyroidism. Delbridge 2005
Graves’ disease

- Total or near total thyroidectomy provides excellent results in Graves disease in the hands of an experienced endocrine surgeon.
- This procedure eliminates the risk for recurrence of hyperthyroidism and provides a quick way for women with Graves who plan for pregnancy.
- Complication rates for permanent recurrent nerve damage and hypoparathyroidism must be low, at least under 1%.
Ophtalmopathy in Graves disease

- Large epidemiological differences, etiology? Antibodies targeting TSH-r in orbital fat cells and connective tissue? T-lymphocytes targeting a cell membrane antigen on eye muscles?

- Important to obtain and maintain euthyroidism

- Multidisciplinary handling, endocrinology, oncology, ophtamology, ENT

- Total or near total thyroidectomy is the treatment of choice in patients with significant ophtalmopathy
TT 83
a prospective randomized trial in Graves’ disease

- Symptoms and signs of hyperthyroidism
- No previous thyroid surgery
- Increased levels of T3 and T4
- Not pregnant
- Diffuse goiter
No of patients

131-I 35-55-
Surg 35-55-
Thyrst 35-55-
Surg 20-34-
Thyrst 20-34-

No of patients

TT 83
Figure 2. Probability of the Development or Worsening of Ophthalmopathy in Patients with Hyperthyroidism Caused by Graves' Disease.

The curves were constructed from the regression coefficients in the logistic-regression analysis, with serum $T_3$ concentrations before treatment and the type of therapy as explanatory variables.
Conclusions after 24 months

- I-131-treatment increased the risk for endocrine ophtalmopathy
- Increased risk when T3 levels were high
- Increased risk when few lymphocytes in the tissue
- T4 treatment should start immediately after I-131
Conclusions after 24 months

- 50% recurrence after thyrostatic drugs
- Prospective randomized study with all three modalities possible to perform
- Surgery an excellent option for treatment of hyperthyroidism
- No permanent hypoparathyroidism or recurrent nerve injury in this series
Graves´disease 1983-1990 (TT83)  
Background

- 179 patients randomized to treatment with antithyroid drugs, radioiodine or surgery
- Medical records, clinical and laboratory status 14-21 years after randomization
SF36 and QoL2004 questionnaires

Methods 2

- The 36-items were classified into 8 health status subscales (0-100)
- Physical Component Summary (PMS)
- Mental Component Summary (MCS)
- Swedish reference population (n=8004)
- QoL2004
SF 36 Physical Health
20 – 34 years

- Young adult surgery (20-34 years old)
- Young adult medical (20-34 years old)

Norms for general Swedish population n=8004
Statistical analysis was done by Kruskal-Wallis ANOVA by ranks
SF 36 Mental Health
20 – 34 years

- Young adult surgery (20-34 years old)
- Young adult medical (20-34 years old)
**SF 36 Physical Health**

35 – 55 years

- Old adult surgery (35-55 years old)
- Old adult medical (35-55 years old)
- Old adult Radioiodine (35-55 years old)
SF 36 Mental Health
35 – 55 years

- Old adult surgery (35-55 years old)
- Old adult medical (35-55 years old)
- Old adult Radioiodine (35-55 years old)
Conclusions

Graves’ patients have diminished Quality of Life even many years after treatment which do not seem to be related to the choice of treatment of the hyperthyroidism, surgical, medical or radioiodine.