La décompression orbitaire dans la maladie de Basedow

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Background

• **Graves’ disease**
  - autoimmune disorder associated with goitre & hyperthyroidism
  - with clinically evident orbitopathy 30%
  - with severe orbitopathy 5%

• **Graves’ ophthalmopathy**
  - A Non infiltrative functional abnormalities produced by active thyrotoxicosis
  - ➔ Sympathetic stimuli on Müller's muscle
  - ➔ Spasm and retraction of the upper lid
Background

- **Graves’ ophtalmopathy**
  - Infiltrative lesions involving the contents of the orbit
    - Edema of the orbital contents
    - Protrusion of the globe
    - Infiltration of the extraocular muscles
      - Paresis of the extraocular muscles
      - Upward gaze is affected first and most seriously
      - Loss of convergence is common
    - Damage to the optic nerve and the retina
    - Increased intraocular pressure
      - Upon up gaze an increase in intraocular pressure correlated with severity of infiltrative disease

Olivari N. et al.
Background

- Grading activity and severity in Graves’ ophtalmopathy

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**Box 5 Activity and severity assessments in GO**

EUGOGO recommends the following assessments for patients with GO in specialist centers (IV, C), as reported previously by Wiersinga et al. (1):

(a) Activity measures based on the classical features of inflammation: clinical activity score (CAS) is the sum of all items present (43, 44)

- Spontaneous retrobulbar pain
- Pain on attempted up or down gaze
- Redness of the eyelids
- Redness of the conjunctiva
- Swelling of the eyelids
- Inflammation of the caruncle and/or plica
- Conjunctival edema

A CAS ≥3/7 indicates active GO
Background

- Grading activity and severity in Graves’ ophtalmopathy

(b) Severity measures

Lid aperture (distance between the lid margins in mm with the patient looking in the primary position, sitting relaxed, and with distant fixation)

Swelling of the eyelids (absent/equivocal, moderate, severe; www.eugogo.org)

Redness of the eyelids (absent/present; www.eugogo.org)

Redness of the conjunctivae (absent/present; www.eugogo.org)

Conjunctival edema (absent, present; www.eugogo.org)

Inflammation of the caruncle or plica (absent, present; www.eugogo.org)

Exophthalmos (measured in millimeter using the same Hertel exophthalmometer and same intercanthal distance for an individual patient)

Subjective diplopia score (0 = no diplopia; 1 = intermittent, i.e. diplopia in primary position of gaze, when tired or when first awakening; 2 = inconstant, i.e. diplopia at extremes of gaze; 3 = constant, i.e. continuous diplopia in primary or reading position)

Eye muscle involvement (ductions in degrees; www.eugogo.org)

Corneal involvement (absent/punctate keratopathy/ulcer)

Optic nerve involvement (best-corrected visual acuity, color vision, optic disk, relative afferent pupillary defect (absent/present), plus visual fields if optic nerve compression is suspected)
Background

- Classification of patients with Graves’ ophtalmopathy

Sight-threatening GO:  
- dysthyroid optic neuropathy
- corneal breakdown

Moderate to severe GO:  impact on daily life  
- lid retraction > 2mm
- moderate or severe soft tissue involvement
- exophtalmos > 3mm
- inconstant or constant diplopia

Mild GO:  impact on daily life  
- lid retraction < 2mm
- mild soft tissue involvement
- exophtalmos < 3mm
- transient or no diplopia
- corneal exposure responsive to lubricants
Background

• Classification of patients with Graves’ ophtalmopathy
Background

- UCL St-Luc treatments are based on:


Summary of consensus

  a All patients with GO should
     a be referred to specialist centers;
     b be encouraged to quit smoking;
     c receive prompt treatment in order to restore and maintain euthyroidism.
  
  b Patients with sight-threatening GO should be treated with i.v. GCs as the first-line treatment; if the response is poor after 1–2 weeks, they should be submitted to urgent surgical decompression.
  
  c The treatment of choice for moderate-to-severe GO is i.v. GCs (with or without OR) if the orbitopathy is active; surgery (orbital decompression, squint surgery, and/or eyelid surgery in this order) should be considered if the orbitopathy is inactive.
  
  d In patients with mild GO, local measures and an expectant strategy are sufficient in most cases, but treatment may be justified if QoL is affected significantly.
Background

All patients with GO

- Restore euthyroidism
- Urge smoking withdrawal
- Refer to specialist centers, except for the mildest cases
- Local measures

Mild

Local measures wait and see

Progression

Stable and inactive

Rehabilitative surgery (if needed)

Moderate to severe

Active

i.v. GCS (± OR)

Stable and inactive

Rehabilitative surgery

Inactive

Rehabilitative surgery

Sight-threatening (DON)

i.v. GCs

Poor response (2 weeks)

Prompt decompression

Still active

i.v. GCs (± OR)

Stable and inactive

Rehabilitative surgery
Background

- Rehabilitative surgery
  - Orbital decompression
  - Squint surgery
  - Eyelid surgery
Background

• Orbital decompression: indications
  – Optic neuropathy
  – Severe proptosis with
    • keratopathy
    • eyeball subluxation
    • persistent retrobulbar pain
    • disfiguring proptosis (cosmesis)

• Surgical techniques
  – Bone removal (1 -> 4 walls)
  – Fat removal
  – Balanced decompression
  – Orbital augmentation


• **Surgical approaches**

1. *Coronal approach*
2. *Translidded approach*
3. *Transconjunctival (lower eyelid) approach*
4. *Swinging eyelid approach*
5. *Extended upper lid crease incision*
6. *Caruncular approach*
7. *Lynch incision*
8. *Transantral approach*
9. *Endonasal (with or without the use of an endoscope) approach*
10. *Craniotomy approach*
Background


• Surgical approaches
  1. Coronal approach
  2. Translid (lower eyelid) approach
  3. Transconjunctival approach
  4. Swinging eyelid approach
  5. Extended upper lid approach
  6. Caruncular approach
  7. Lynch incision
  8. Transantral approach
  9. Endonasal (with or without the use of an endoscope) approach
  10. Craniotomy approach
Aim

To examine the outcomes of surgical orbital decompression for Graves' orbitopathy within the multidisciplinary center of the University Hospital St-Luc, Brussels, Belgium
Background

- Between September 1994 and May 1998
  - 16 patients (27 orbits) with Graves' ophtalmopathy resistant to the medical treatment
  - Endonasal orbital decompression (medial wall)

- Conclusions
  - The average reduction of proptosis of 3.17 mm (2-8) not high enough to propose this approach alone for the treatment of disfiguring proptosis
  - In such cases, a 2 or 3 wall orbital decompression should be performed to get marked cosmetic and functional improvement
  - Risk of postoperative diplopia

Methods

Retrospective file analysis of the
2 or 3 walls orbital decompressions procedures performed during a 7-years period (2001-2007)
in the UCL St-Luc OMFS Department

Most cases performed
with coronal approach
using a lateral wall osteotomy and osteosynthesis
in conjunction with medial and inferior wall orbital decompression
modified from Wulc AE et al. Ophthalmology 1990; 97 :1358-69
Patients

From 30/08/2001 to 31/12/2007

24 patients

- 14 F. 10 M.
- 50 ± 11 y. old
- range 26 - 71 y. old

- Mean follow-up : 33 months

- Mean delay from surgery to date : 47 months
Results (24 patients)

- **Indication**
  - Corneal exposure (3) and proptosis (12) 15
  - Optic neuropathy 9

- **Preoperative treatment**
  - GC (methylprednisolone 1gr/d 3d) 9
  - Radiation therapy (20 Gy) 3
Results

From 30/08/2001 to 31/12/2007

24 patients / 44 orbits

• 20 bilateral orb. decompression
  – 18 coronal access
  – 2 palpebral and/or conjunctival access

• 4 unilateral orb. decompression
  – 3 coronal access
  – 1 palpebral and/or conjunctival access

3 senior surgeons (12, 2 & 10 cases)
Results

• Mean operative duration
  – 250 ± 69 min
  – range 120 - 390 min

• Mean hosp. duration starting from surgery
  – 3.4 ± 1.1 d.
  – range 2 - 6 d.
## Results (44 orbits)

<table>
<thead>
<tr>
<th></th>
<th>preop.</th>
<th>CTR 1 (26 ± 40 d)</th>
<th>CTR 2 (11±11 months)</th>
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<tbody>
<tr>
<td>Hertel exopht. (mm)</td>
<td>26.4 ± 4.4</td>
<td>21.1 ± 3.8 ( p&lt;0.0001 )</td>
<td>20.8 ± 4.1 ( p&lt;0.0001 )</td>
</tr>
<tr>
<td>Visual acuity ( /10)</td>
<td>7.7 ± 2.4</td>
<td>8.4 ± 2.1 ( \text{NS} )</td>
<td>8.7 ± 2.3 ( \text{NS} )</td>
</tr>
<tr>
<td>Intraocular pressure (mm Hg)</td>
<td>22.1 ± 9</td>
<td>18.8 ± 2.8 ( p=0.08 )</td>
<td>16.5 ± 2.7 ( p&lt;0.01 )</td>
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All eye measurements were performed by the same ophtalmologist.
### Results (44 orbits)

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<td>Hertel exopht. (mm) all cases</td>
<td>26.4 ± 4.4</td>
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<td>20.8 ± 4.1 p&lt;0.0001</td>
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<tr>
<td>Hertel exopht. proptosis (n=19)</td>
<td>26.1 ± 5.1</td>
<td>22 ± 3.9</td>
<td>21.5 ± 3.9</td>
</tr>
<tr>
<td>Hertel exopht. other (n=24)</td>
<td>26.6 ± 3.7</td>
<td>20.5 ± 3.7</td>
<td>20 ± 4.2</td>
</tr>
</tbody>
</table>

Hertel normal values: white women 15mm, max 20
white men 16mm, max 21
Results (44 orbits)

Average retrodisplacement:
- 5.5 mm (range: -1 - 9.5) at first ctr
- 6.3 mm (range: -1 - 12.5) at late ctr

Average retrodisplacement: 3 walls n = 34
- 6.0 mm (range: -1 - 9.5) at first ctr
- 6.8 mm (range: -1 - 12.5) at late ctr  p<0.01

Average retrodisplacement: 2 walls n=10
- 3.0 mm (range: 0 - 4) at first ctr

Average retrodisplacement: 3 wall coronal access n = 31
- 6.2 mm (range: -1 - 9.5) at first ctr  p=0.08

Average retrodisplacement: 3 wall eyelid access n = 3
- 3.5 mm (range: 3 - 4) at first ctr
Results (44 orbits)

Average retrodisplacement:

- 3 walls, n = 34
  - 6.0 mm (range: -1 - 9.5) at first ctr
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- 3 wall coronal access, n = 31
  - 6.2 mm (range: -1 - 9.5) at first ctr

- 3 wall eyelid access, n = 3
  - 3.5 mm (range: 3 - 4) at first ctr

\( p < 0.01 \)

\( p = 0.08 \)

2 parois, voie bicoronale
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- 3.5 mm (range: 3 - 4) at first ctr

p<0.01

p=0.08
Results (44 orbits)

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- 3.0 mm (range: 0 - 4) at first ctr

Average retrodisplacement: 3 wall **coronal access** n = 31
- 6.2 mm (range: -1 - 9.5) at first ctr
  - p=0.08

Average retrodisplacement: 3 wall **eyelid access** n = 3
- 3.5 mm (range: 3 - 4) at first ctr
  - p<0.01
Results (44 orbits)

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- 5.5 mm (range: -1 - 9.5) at first ctr
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Average retrodisplacement: 2 walls n = 10
- 3.0 mm (range: 0 - 4) at first ctr

Average retrodisplacement: 3 wall coronal access n = 31
- 6.2 mm (range: -1 - 9.5) at first ctr

Average retrodisplacement: 3 wall eyelid access n = 3 (bald or elderly patients)
- 3.5 mm (range: 3 - 4) at first ctr

p<0.01
p=0.08
<table>
<thead>
<tr>
<th>Surg. techn.</th>
<th>↓ in propt.</th>
<th>n (orbits)</th>
</tr>
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<tbody>
<tr>
<td>Balanced, 2 walls (ML)</td>
<td>4.5 ± 2.3 mm</td>
<td>10</td>
</tr>
<tr>
<td>Balanced, 3 walls</td>
<td>6.8 ± 3 mm</td>
<td>34</td>
</tr>
<tr>
<td>endoscopic 1 wall (M)</td>
<td>3.2 mm</td>
<td>27</td>
</tr>
<tr>
<td>endoscopic</td>
<td>3.7 ± 2.2 mm</td>
<td>20</td>
</tr>
<tr>
<td>endoscopic 2 walls</td>
<td>4.4 mm, 4.6 mm</td>
<td>32, 15</td>
</tr>
<tr>
<td>endo., transantr. 2 walls (M,I) + cutan. 3 walls</td>
<td>4.4 mm, 7.7 mm</td>
<td>18, 8</td>
</tr>
<tr>
<td>transantral or endonasal</td>
<td>4.5 ± 2.9 mm</td>
<td>158</td>
</tr>
<tr>
<td>3 walls coronal</td>
<td>4.8 mm, 5.6 mm</td>
<td>46, 28</td>
</tr>
<tr>
<td>3 walls swinging eyelid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 walls (ML)</td>
<td>5.3 mm</td>
<td>276</td>
</tr>
<tr>
<td>Fat removal (6.3 ml) range 2 - 12 ml</td>
<td>5.9 mm</td>
<td>2697</td>
</tr>
<tr>
<td>Fat removal (3.6 ± 1 ml) range 1.2 - 6.5 ml</td>
<td>3.6 ± 1 mm</td>
<td>222</td>
</tr>
</tbody>
</table>

Malik et al. J Laryngol Otol. 2007
Sasim et al. Ophthalmology. 2005
Richter et Olivari PRS 2007
Results (44 orbits)

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<td>( /10) all cases</td>
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</tr>
<tr>
<td>neuropathy (n=18)</td>
<td>6.8 ± 2.6</td>
<td>7.6 ± 2.4 NS</td>
<td>8.3 ± 2.8 NS</td>
</tr>
<tr>
<td>Visual acuity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other (n=26)</td>
<td>8.5 ± 1.9</td>
<td>9.3 ± 1.2 NS</td>
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# Results (44 orbits)

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</table>
| (mm Hg)                     | 22.1 ± 9 | 18.8 ± 2.8  
  p=0.08               | 16.5 ± 2.7  
  p<0.01               |
| **Intraocular pressure**    |        |                   |                      |
| neuropathy (n=18)           | 23.9 ± 12.1 | 19.2 ± 2.4  
  NS                      | 16.1 ± 2.7  
  p<0.05               |
| **Intraocular pressure**    |        |                   |                      |
| other (n=26)                | 20.3 ± 3.5 | 18.4 ± 2.8  
  NS                      | 17.1 ± 2.6  
  p<0.05               |

IOP normal values: 16 mm Hg, range 10-21 ± 3.5 mm Hg during a 24-hour cycle
## Discussion

<table>
<thead>
<tr>
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<td>This study</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39 patients (fat removal)</td>
</tr>
<tr>
<td>Intraocular pressure (mm Hg)</td>
<td>19.3 ± 4</td>
<td>17± 2.9 (p&lt;0.001)</td>
<td>15.9± 3.7 (p&lt;0.001)</td>
<td>Robert et al. Ophthal Plast Reconstr Surg. 2006</td>
</tr>
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</table>

IOP normal values: 16 mm Hg, range 10-21 ± 3.5 mm Hg during a 24-hour cycle
Results

• Secondary surgeries
  – 7 cases of strabism surg. 29%
    • after 12 ± 6 months
    • 2 patients with two strabism surg.
  – 6 cases of eyelid surg. 25%
    • after 14 ± 7 months
    • 1 patients with two eyelid surg.
    • 2 patients with miniplate removal during eyelid surg.
  – 2 patients with both strabism and eyelid surg. 8%
Results

• Complications

- 2 patients with late $V_1$ and/or $V_2$ pain 8%

- 1 patient with acute meningeal syndrome 4%

Retrospective analysis!
Conclusions

Orbital decompression is scheduled to be followed by staged squint and thereafter eyelid surgery.

In our hands, orbital decompression was a safe procedure (No vision loss) effective in improving vision (↑VAcuity, NS; ↓IOPressure, p<0.01) effective in reducing proptosis (Δ 6.3 mm, p<0.0001)

Complications involve oculumotor function & trigeminal nerve
Conclusions

Patients with GO, except for the mildest cases, should either be managed by a physician with particular expertise in managing GO or better be referred to a combined thyroid eye clinics for further assessment and management.

www.eugogo.org