Full-Thickness Anterior Blepharotomy and Transpalpebral Fat Decompression in Graves’ Orbitopathy

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Abstract

A chief morbidity of Graves eye disease is eyelid retraction and exophthalmus. Transpalpebral orbital fat removal accomplished with full thickness anterior blepharotomy was performed in 4 patients (5 orbits). Preoperative and postoperative ocular exposure symptoms, visual acuity, upper eyelid retraction and proptosis were evaluated. In all 5 operated orbits preoperative symptoms resolved; good results were achieved from the functional and cosmetic point of view. Full-thickness anterior blepharotomy combined with fat decompression is a safe and effective surgery for patients with upper eyelid retraction and exophthalmus due to enlarged orbital fat compartment.

Key words: Graves’ orbitopathy, blepharotomy, fat decompression

Introduction

Graves’ ophthalmopathy appears to be an organic specific autoimmune disorder. A still unidentified pathogenic process induces swelling, lymphocytic infiltration and later fibrosis and contractures that restrict the normal function of extraocular muscles. Graves’ ophthalmopathy also expands soft tissue within the bony orbital volume. Typically orbital signs and symptoms like proptosis, chemosis, congestion of blood vessels, limitation of extraocular muscles motility as well as pain can be present. Treatment of Graves’ ophthalmopathy can be either non-surgical or surgical. Upper eye-lid retraction is a common symptom. The Mueller muscle is involved in the inflammation and on the histopathologic inspection, fibrosis, fatty infiltration and increased mast cells presence can be find in it. The surgery is required but there is no agreement about the best operative technique to correct retraction of upper eyelids. In our patients also proptosis due to expansion of orbital fat was present. Therefore we have combined two techniques: full-thickness anterior blepharotomy and orbital fat decompression.

Subjects and Methods

Between January 2003 and January 2004 orbital fat decompression combined with full-thickness anterior blepharotomy was performed in 5 orbits of 4 patients with Graves’ ophthalmopathy at the University Department of Ophthalmology «Sestre milosrdnice». The surgical treatment was recommended because of proptosis’ increasing, upper eye lid retraction and presence of exposure keratitis. The patients have shown no response on previous conservative treatment with corticosteroids orally or in mega-dosis infusions. One patient had previously experience with transconjuctival application of botulinum toxin injection in July 2003. All patients were clinically and biochemically euthyroid and all signs and symptoms of Graves’ disease have been stable for at least 6 months.

Preoperative and postoperative examinations included Snellen visual acuity, examination of the eyelids and corneas, ocular motility, Hertel exophthalmometry, applanation tonometry, computed perimeter. The preoperative and postoperative position of the upper eyelid was measured in millimetres from the pupil to the upper

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eyelid margin with the eye in primary gaze and with cor- 
noral plane of the patient’s head perpendicular to the 
floor.

Eyelid retraction was measured in millimetres in the 
primary position without accommodation. The eye-
lid retraction was considered when «scleral show» was 
present. Compressive optic neuropathy was not present 
in our patients.

All patients were operated in endotracheal anaes-
thesia. After marking for symmetric upper eyelid crease 
incision, the subsequent dissection through orbicularis 
ocularis muscle was made and levator aponeurosis exposed 
(Figure 1a). The levator aponeurosis, Müller muscle and 
conjunctiva were incised at the superior border of the 
tarsal plate. The dissection was extended from central 
third of eyelid medially and laterally along the superior 
tarsal border (Figure 1b). Limited bipolar cautery was 
used for hemostasis. After opening the orbital septum 
with Westcott scissors, prolapsing orbital fat was identi-
fied (Figure 1c). Anterior orbital fat was removed using 
blunt surgical dissection and unipolar electrocautery. 
Dissection extended deep into the orbit. Traction su-
tures on the rectus muscles aided in the identification of 
the muscles during deep dissection. Attention was paid 
to avoid damage on the globe, nerves, muscles and 
trochlea in superonasal dissection. Inferior orbital fat 
dissection was made through inferotemporal approach 
of the inferior eyelids. Slight pressure on the globe 
helped fat move into surgical field. Dissection in the 
superonasal space required greater attention and he-
mostasis because of numerous dilated veins and the 
confluence of muscles and nerves. The surgical fields 
were inspected for bleeding and irrigated with saline. 
The skin incision was closed with 6-0 nylon suture 
which was removed on fifth postoperative day. The pa-
tients were admitted for 2 days of observation for postope-
ратive hemorrhage and ice packs were applied for 24 
hours.

The outcome of surgery was evaluated 14 days, 1 
month and 3 months after the operation by measuring 
the eyelid aperture and the lid-limbus distance in the 
primary position. Corneal staining was performed dur-
ing slit lamp examination.

Results

We report our results after 5 operated orbits in 4 pa-
tients (two female and two man) (Figures 2 and 3) In one 
patient both orbits were operated (Figure 4). All operated 
patients suffered from proptosis and eyelid retraction 
due to Graves’ orbitopathy. Preoperative superficial 
mild punctate keratitis was present in all patients. Af-

er operation there was no signs for keratitis. The upper 
eyelid height was improved by surgery in all operated 
eyelids immediately after operation as well as after 3 
months. Proptosis reduction was achieved postope-
ratively. In all patient more than 6 cm³ of fat was removed 
from operated orbits – only in one case 5 cm³ of fat was 
removed (case No2., Table 1)

Fig. 1. a) Upper eyelid crease incision and dissection through orbicularis oculi muscle, b) The dissection extend from central third of 
upper eyelid medially and laterally, c) Prolapsing orbital fat.

Fig. 2. a) patient No.1 before operation – rightsided exophthalmos and upper eyelid retracted, b) five days after operation, c) 3 
months after operation.

Fig. 3. a) patient No. 2 before operation – rightsided exophthalmos and upper eyelid retraction, b) 3 days after operation, c) 1 month 
after operation.
No complications occurred during operations. No patient developed wound infection or complained of postoperative ocular surface irritation.

Discussion

A chief morbidity of Graves' eye disease is upper eyelid retraction that results in exposure keratopathy and cosmetic deformity and proptosis. The aim of correction is disappearance of keratopathy, complete relief of ocular discomfort and complete restoration of pre-illness appearance. In some cases exposure keratopathy can lead to corneal ulcer and to conservative treatment. In such cases together with correction of eyelid amniotic membrane has to be applied.

Eyelid retraction can not be treated successfully by medications. Transitory effects can be achieved by application of botulinum toxin subconjunctival in the eyelid, but permanent or lasting effect has only surgery. Henderson has modified the first surgical methods for the treatment of retracted eyelids in Graves’ disease. Olver revisited this method and found lateral temporal flare to be common. Numerous modification of Henderson’s technique have been described. Most of these technique use either transconjunctival Müller muscle myotomy or excision or transcutaneous levator aponeurosis or myotomy with or without Müller muscle myotomy or excision with additional modifications. Postoperative clinical risk is low in comparison with the functional and cosmetic results of procedure but some complications have been reported like dry eye. None of the reported surgical methods use a full-thickness technique presented by Koornneef in June 1999 at the University of Michigan including the skin and conjunctiva. The anterior blepharotomy permits better control of eyelid contour and height because the eyelid is not deformed by inversion or stretching during operation.

Our results in 5 operated eyelids support this thesis. In all patients we have achieved good results in functional and cosmetic point of view in all operated eyes. Scleral show was no more present immediately after operation as well as after 6 months. Our results confirm thesis from Elner et al. which explained Koornneef, that dissection through eyelid essential part of the surgery and that leaving conjunctiva unsutured doesn’t lead to its shortening and recurrence of eyelid retraction.

Graves’ orbitopathy expands also soft tissue within the fixed bony orbital volume. Fat decompression reduces exophthalmos, eliminate orbital pain and reduce congestion. Nowadays some authors have shown that this technique can be successfully used for treating optic neuropathy as a result of Graves’ orbitopathy. They report that removal of 4–6 ml of anterior and mid-orbital fat was sufficient to relieve optic neuropathy even in the cases in which orbital muscles were enlarged.

All patients involved in this study have suffered from exophthalmos and retraction of upper eyelid. Therefore we decided to combine two techniques mentioned above. Full thickness blepharotomy was performed in last few years in our department for reduction of scleral show in patients with Graves’ disease. Orbital decompression is known to reduce exophthalmos: bony or transpalpebral fat decompression. Endonasal endoscopic orbital decompression is nowadays standard bony decompression. Transpalpebral decompression as Olivari described is one of standard method to reduce exophthalmos at our department. Olivari reported about simultaneous...

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### TABLE 1

<table>
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<tr>
<th>Eye</th>
<th>Gender</th>
<th>Age</th>
<th>Lid Height</th>
<th>Exposure Keratitis</th>
<th>Visual Acuity</th>
<th>Intraocular Pressure</th>
<th>Diplopia</th>
<th>Hertel Exophthalmometry</th>
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<td>14</td>
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<td>15</td>
</tr>
<tr>
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<tr>
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<td>1.0</td>
<td>1.0</td>
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</tr>
</tbody>
</table>

Preop. – preoperative, postop. – postoperative

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Fig. 4. Patient No. 4 – exophthalmos and eyelid retraction on both sides and c) 5 days after operation on both eyes.

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52. svibanj 2005 14:47:14
Plate: 3 of 4
ously performed fat decompression and levator aponeurosis and Müller muscle lengthened\textsuperscript{15}. We have combined transpalpebral fat decompression with "open sky" blepharotomy and achieved good results even 6 months after operations were done. Visual acuity was stable, intraocular pressure after operation was lower and there was no new-onset diplopia. The advantage of this procedure are avoiding bone removal, one anaesthesia, less stress for patient and better cosmetic and functional results than in cases where either decompression or blepharotomy was done.

**Conclusion**

In conclusion, we believe that two described techniques can bring benefits to patients. Benefits included not only reductions of proptosis but also improved eyelid position at the same time. The cases are presented to illustrate an alternative successful surgical treatment in selected cases of Graves' orbitopathy. Limitations of this study are small number of cases and the nonmasked measurements.

**REFERENCES**


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**BLEFAROTOMIJA U PUNOJ DEBLJINI VJEDE I TRANSPALPEBRALNA MASNOTKVINA DEKOMPRESIJA KOD GRAVESOVE BOLESTI**

**SAŽETAK**

Glavni znakovi Gravesove bolesti na očima su retrakcija vjeđa i egzoftalmus. Kod 4 bolesnika (5 orbita) odstranjeno je masno tkivo kroz vjeđu i blefarotomija u punoj debljini vjeđe. Prije i nakon operacije praćeni su znakovi izloženosti očne jabučice, vidna očetina, retrakcija gornje vjeđe i proptoza. Kod svih 5 operiranih orbita preoperativni simptomi su nestali; postignuti su dobri funkcionalni i kozmetski rezultati. Blefarotomija pune debljine vjeđe kombinirana s masnotkvinnom dekompresijom orbite sigurna je i učinkovita operacija za bolesnike s retrakcijom gornje vjeđe i egzoftalmusom uslijed povećanja orbitalnog masnog tkiva.