

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 found 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 transconjunctival 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 cornea, ocular motility, Hertel exophthalmometry, applanation tonometry, computed perimetry. The preoperative and postoperative position of the upper eyelid was measured in millimetres from the pupil to the upper

eyelid margin with the eye in primary gaze and with coronal plane of the patient's head perpendicular to the floor.

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

All patients were operated in endotracheal anaesthesia. After marking for symmetric upper eyelid crease incision, the subsequent dissection through orbicularis oculi 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 identified (Figure 1c). Anterior orbital fat was removed using blunt surgical dissection and unipolar electrocautery. Dissection extended deep into the orbit. Traction sutures 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 patients were admitted for 2 days of observation for postoperative 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 during slit lamp examination.

Results

We report our results after 5 operated orbits in 4 patients (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. After 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 postoperatively. 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.

TABLE 1
SYMPTOMS OF GRAVES' DISEASE AND EFFECT OF BLEPHAROTOMY COMBINED WITH ORBITAL FAT DECOMPRESSION

Eye	Gender	age	Eyelid		Exposure keratitis		Visual acuity		Intraocular pressure		Diplopia		Hertel exophthalmometry	
			Preop.	Postop.	Preop.	Postop.	Preop.	Postop.	Preop.	Postop.	Preop.	Postop.	Preop.	Postop.
1. Right	Male	46	7	3	no	no	1.0	1.0	16	14	no	no	22	19
2. Right	Female	78	8	4	mild	no	0.8	0.7	19	19	no	no	20	18
3. Left	Male	52	10	3	mild	no	1.0	1.0	15	18	no	no	25	22
4. Right	Female	44	8	3	mild	no	1.0	1.0	21	17	no	no	23	19
Left	Female	44	9	4	no	no	1.0	1.0	19	18	no	no	24	19

preop. – preoperative, postop. – postoperative

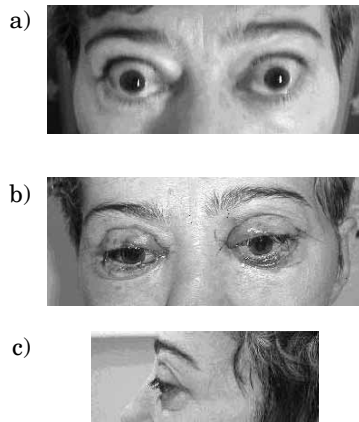


Fig. 4. patient No.4 – exophthalmos and eyelid retraction on both side and c) 5 days after operation on both eyes.

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 proptosis¹. 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 inert to conservative treatment. In such cases together with correction of eyelid amniotic membrane has to be applied².

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 longer lasting effect has only surgery. Henderson has 1965. modified the first surgical methods for the treatment of retracted eyelids in Graves' disease³. Olver revisited this method and find out under-correction and lateral temporal flare to be common⁴. Numerous modification of Handerson's technique have been described. Most of these technique use either

transconjunctival Müller muscle myotomy or excision or transcutaneous levator aponeurotomy or myotomy with or without Müller muscle myotomy or excision with additional modifications⁴⁻⁷. Postoperative clinical risk is low in comparison with the functional and cosmetic results of procedure but some complications have been reported like dry eye⁸. None of the reported surgical methods use a full-thickness technique presented by Koorneef in June 1999 at the University of Michigan including the skin and conjunctiva^{9,10}. The anterior blepharotomy permits better control of eyelid contour and height because the eyelid is not deformed by inversion or stretching during operation¹⁰.

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 Koorneef, that dissection through eyelid essential part of the surgery and that leaving conjunctiva unsutured doesn't lead to its shortening and recurrence of eyelid retraction¹⁰.

Graves' orbitopathy expands also soft tissue within the fixed bony orbital volume. Fat decompression reduces exophthalmos, eliminate orbital pain and reduce congestion^{11,12}. Nowadays some authors have shown that this technique can be successfully used for treating optic neuropathy as a result of Graves' orbitopathy¹³. 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 decompression¹⁴. Transpalpebral decompression as Olivari described is one of standard method to reduce exophthalmos at our department. Olivari reported about simultane-

ously performed fat decompression and levator aponeurosis and Müller muscle lengthened¹⁵. We have combined transpalpebral fat decompression with »open sky« blepharotomy and achieved good results even 6 months after operations were done. Visual acuity was stabile, 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.

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BLEFAROTOMIJA U PUNOJ DEBLJINI VJEĐE I TRANSPALPEBRALNA MASNOTKIVNA 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 oštrina, retrakcija gornje vjeđe i proptoza. Kod svih 5 operiranih orbita preoperativni simptomi su nestali; postignuti su dobri funkcionalni i kozmetički rezultati. Blefarotomija pune debljine vjeđe kombinirana s masnotkivnom dekompresijom orbite sigurna je i učinkovita operacija za bolesnike s retrakcijom gornje vjeđe i egzoftalmusom uslijed povećanja orbitalnog masnog tkiva.