Deep levator palpebrae superioris detachment during aponeurosis surgery via transcutaneous approach in ptosis correction

Décollement profond du releveur de la paupière supérieure lors de la chirurgie de l’aponévrose via l’approche transcutanée dans la correction du ptosis

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Summary
Purpose. — To evaluate the efficacy of deep levator palpebrae superioris — Müller’s muscle complex detachment from conjunctiva and other connective tissues in order to improve post operative lid opening and levator function for ptosis surgery via the transcutaneous approach.
Methods. — In this retrospective study, 23 patients (29 eyelids) were surgically treated for ptosis repair between 2003 and 2008. All surgery was performed by the same surgeon. Patients were divided into 2 groups. The first group (12 patients) consisted of patients who underwent deep levator dissection during surgery; the second group (11 patients), used as control group, consisted of patients treated without deep levator dissection. Postoperative lid opening was compared in the two groups using the Mann-Whitney non-parametric test.
Results. — The comparison between change in lid opening changes between the two groups was statistically significant (P < 0.01).
Conclusions. — Deep levator detachment can be included among standard surgical steps during ptosis surgery via transcutaneous approach in order to improve postoperative lid opening and levator function.
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Introduction

Blepharoptosis is an abnormal margin position of the upper eyelid in primary eye position. It may be congenital or acquired. When congenital, it is present at birth and usually tends to be stable and non-progressive. In most cases it is due to poor “levator palpebrae superioris” muscle development or its fibrosis [1–3]. It can be found as an isolated abnormality or as part of a systemic syndrome [2,4–11]. Acquired ptosis can be aponeurotic, (involuntary or post surgery) usually the most common in clinical practice [1,3,7], neurogenic (third nerve palsy; Horner’s syndrome; Marcus Gunn’s syndrome) [5,6,8]), mechanical (tumors, dermatochalasis, orbital fat bulging, scarring) [1,3,4], myogenic (mitochondrial pathologies; myasthenia gravis; myotonic dystrophy) [1,8–13]. Blepharoptosis is both a functional disease, because it can influence the visual system development if present at birth and cause visual field limitations in adults [1–3,7,14–16], and an aesthetic disease that influences face mimic expressions and can have serious psychological implications.

Objectives and methods

In this retrospective study, authors evaluated efficacy of deep levator palpebrae superioris – Müller’s muscle complex detachment from conjunctiva and other connective tissues in order to improve post operative palpebral aperture and levator motility for ptosis surgery via transcutaneous approach. Twenty-three patients, 11 males, 12 females, all Caucasians, (29 eyelids) were surgically treated for ptosis correction between 2003 and 2008. The average age of the patients was of 43.52 ± 22.1, ranging from 15 to 80.

Eleven cases were acquired ptosis of which seven had both eyes involved, 10 were congenital ptosis, one patient suffered from blepharofimosis and one from ptosis due to post surgical scarring from aesthetic blepharooplasty.

All patients were admitted to the university hospital. A complete medical history was obtained. All patients underwent testing for best-corrected visual acuity. Detailed ocular examination was carried out including palpebral aperture, marginal reflex distance, upper lid crease position, levator function, brow action in upgaze, extracocular movements, bell’s phenomenon and synkinesis i.e. the presence of Marcus Gunn jaw winking. All the patients also underwent a complete systemic evaluation to rule out secondary cause of ptosis. Thirteen patients out of 23 (56.52%) had a history of other medical conditions. The most common being hypertension (seven patients), hypercholesterolemia (six patients), diabetes mellitus (seven patients), thyroid disease (one patient). One patient suffered from myasthenia gravis and two patients from a mitochondrial myopathy. Most of the patients had not undergone previous ocular surgery except two of them who had blepharoplasty and one cataract surgery.

Patients were divided into two groups. The first group (12 patients) included patients who had deep levator dissection during surgery; second group (11 patients), used as control group, included patients treated without deep levator dissection. Patients in the first group (12 patients, seven males, five females) had levator resection in seven cases and aponeurosis plication surgery in four cases. Patients in the control group (11 patients, six males, five females) had levator resection in eight cases and aponeurosis pllication in four cases. Surgery was performed by the same surgeon.

Statistical methods

The ”Mann Whitney” non-parametric test, for independent samples was used for continuous variables. A non-parametric test was chosen for data numerosity and non Gaussian distribution. Post operative palpebral aperture and levator shortening was compared in the two groups using SPSS software for macintosh ver.18.0.
Surgical technique

Deep "levator palpebrae superioris" detachment consists in a further step performed during aponeurosis surgery via transcutaneous approach (either levator resection or anterior aponeurosis plication): once the tarsal plate and levator aponeurosis has been reached, the orbital septum is cut and pre-aponeurotic fat tissue retracted in order to expose a deep portion of the levator muscle and the Whitnall’s ligament. Then, via blunt dissection with dissection scissors, muscullevator complex from conjunctiva and surrounding connective tissues is freed, going deep till orbital bone margin (Fig. 1).

Results

Patients had a mean levator function of 6.64 mm in group 1 (mean 6.64; Ds 1.11) and 8.82 in group 2 (mean 8.82; Ds 0.76) while mean preoperative palpebral aperture was 5.54 mm (mean 5.54; Ds 0.71) in the first group, and 4.81 mm (mean 4.81; Ds 0.51) in group 2. No significant difference was found between groups using non-parametric "Mann-Whitney" test ($P > 0.5$).

After surgery with deep levator detachment, the patients belonging to the first group reported a mean value for "palpebral aperture" of 14.16 mm, while, the second group reported a mean value of 12.45 mm. Non-parametric "Mann-Whitney" test was used to compare postoperative results between the two groups (Group 1 vs. Group 2). High statistical significance was found: ($P < 0.01$). Values before and post surgery are summarized in Fig. 2 for group 1 and in Fig. 3 for control group.

During surgery, Levator shortening in group 1 ranged from 4 mm to 20 mm (mean 10.45; Ds 1.98) while in group 2 ranged from 0 mm to 25 mm (mean 11.81; Ds 2.88), but this did not seem to influence the final result, statistical analysis showed no statistical difference for levator surgical shortening in the two groups ($P: 0.571$). As pointed out before, retrospective data analysis, showed a difference between levator function in group 1 and group 2 (group 1: 6.64 mm; group 2: 8.82 mm), anyway, the non parametric test did not show significant differences between groups ($P > 0.2$), furthermore worsened levator function was found in the test group, not in the control group, and this could strengthen the hypothesis that "deep levator" detachment is useful to improve surgical outcome. It would have been useful to analyze levator motility after surgery, but some postoperative data were missing, so a complete statistical analysis couldn’t be performed.

Discussion

Ptosis is a challenging disease for surgeons. Usually final symmetry and aesthetic results can be seen after a few months; over the years many different surgical approaches have been proposed. It’s possible to divide surgical options into two groups: anterior approach from skin and posterior approach from conjunctiva [17–22]. The correct choice between the different surgical techniques depends essentially on the amount of levator function [11,12,16–22] and the degree of ptosis [1,3,19–25]. Our results demonstrated that adding deep Müller – levator complex detachment among standardized surgical steps during aponeurosis surgery via
transcutaneous approach in ptosis correction, improved surgical outcome either for palpebral aperture, with a mean gain of 1.71 mm compared to other group, and in overall levator function. This is probably due to the fact that releasing the levator muscle from binding with other eyelid structures improves both palpebral aperture and muscle functionality. Further studies could be useful in order to investigate ‘‘deep Levator’’ detachment among different degrees of ptosis and with regards to levator motility.

Conclusion
Deep levator detachment can be included among standard surgical steps during ptosis surgery via transcutaneous approach in order to improve postoperative palpebral aperture and overall levator motility.

Disclosure of interest
The authors declare that they have no conflicts of interest concerning this article.

References