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EVALUATION OF THE SURGICAL TREATMENT FOR CONGENITAL BLEPHAROPTOSIS USING MUSTARDE'S MODIFIED METHOD

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The aim of the study was evaluation of the results of surgical treatment of congenital blepharoptosis (CBP) using Mustarde's modified method.
Material and methods. Between 2005-2014 forty eight children with CBP underwent surgical correction of CBP by Mustarde's modified method. Basing on the results of ophthalmic and orthoptic examination, and standard measurements, we estimated postoperative difference in the position and symmetry of the upper eyelids, and postoperative complications in our patients.
Results. Very good results were obtained in all cases with mild, in 89.5% with moderate, and in 85.7% with severe unilateral CBP after correction by Mustarde's modified method. Lagophthalmos was seen in 6.25%, and undercorrection in 12.5% of cases.
Conclusions. 1. Mustarde's modified method allows for obtaining very good functional and aesthetic results in CBP patients. 2. Mustarde's modified method is a valuable supplemental surgical technique in CBP, and contributes to a low rate and small range of lagophthalmos.
Key words: congenital blepharoptosis, surgical treatment

Congenital blepharoptosis (CBP) is the most common developmental disorder of the palpebral apparatus. In more than half of the afflicted cases it is a consequence of a dystrophy or dysgenesis of the levator palpebrae superioris (LPS) (1, 2, 3). In the majority of patients CBP is an isolated anomaly, and rarely is a part of a congenital syndrome with myogenic or neurogenic origin (4, 5, 6). CBP often coexists with numerous visual system disorders, which can affect the course of surgical treatment (7, 8). The main aim of CBP correction is not only elevation of the dropping eyelid within appropriate range, but also symmetry of both upper eyelids position. Undoubtedly, a wide variety of surgical methods used in CBP treatment and over 100 different operating techniques show how difficult it is to obtain proper final results of CBP surgery. However, appropriate and permanent functional and aesthetic results can be achieved using of the methods with LPS shortening (9, 10).

Since Bartisch introduced methods facilitating elevation of the upper eyelid (in the first textbook of ophthalmology and ophthalmic surgery) in 1583, only Everbusch in 1883, and than Blascovics in 1909 described techniques related to LPS shortening, with different approaches (11, 12, 13). In 1975 Mustarde advocated two-level resection of the structures antagonistic to the levator complex – skin and orbicularis muscle at the upper level, and tarsal plate with conjunctiva at the lower level, together with LPS shortening (14).

We present our experience and results of CBP treatment using modified Mustarde's method, introduced by Professor A. Zieliński.

The aim of the study was to evaluate the results of surgical treatment of CBP using Mustarde's modified method.

MATERIAL AND METHODS

A group of 48 patients (29 males, 19 females) aged between 5 and 19 years with CBP underwent CBP correction by modified Mustarde's method. Postoperative follow-up examination was performed after one year (Plastic Surgery Outpatients Department).

Preoperative analysis was performed after ophthalmologic and orthoptic examination and included:

- LPS function (Beard's scale),
- degree of ptosis (regarded as mild if eyelid dropped 2 mm or less, moderate if it dropped more than 2 mm but less than 4 mm, or severe if it dropped 4 mm or more),
- height of palpebral fissures, and eyelid folds,
- Bell's phenomenon,
- lagophthalmos,
- compensatory head posture, or brows elevation.

Photographs of all patients were taken while looking: straight ahead, up, and down.

The degree of CBP, taking into consideration its uni- and bilaterality, determined individual choice of surgical method. All examined patients underwent modified Mustarde's method (fig. 1 A, B and 2 A, B). In four patients we decided on surgery at the age of 5 years because of the risk of stimulus deprivation amblyopia, confirmed by opthalmologist.

Mustarde's method (the split level lid resection) consists of the skin and orbicularis muscle resection at the upper level, and resection of 4-5 mm of tarsal plate with conjunctiva (subtotal resection) at the lower level. Mustarde advocated peripheral shortening (by means of a tuck or resection) of the levator complex according to the Rycroft's rule (4 mm of LPS for every mm of ptosis). To minimize the range of lagophthalmos after Mustarde's technique we modified this method and used a limited resection: 2-3 mm of the tarsus and 3 mm of LPS for every mm of ptosis. LPS resection, but not LPS tucking, was done in all cases.

The following measurements were reexamined and reassessed postoperatively, and compared with preoperative results:

- the position of the upper eyelid margin in relation to the cornea, with the pupil in primary position; in unilateral CBP difference in the height of the two palpebral fissures was considered to be the amount of ptosis; estimated both visually and from photographs,
- range of lagophthalmos.

Fig. 1A. 12 year old girl with mild unilateral congenital blepharoptosis

Fig. 1B. 1 year after correction by Mustarde's modified method

Fig. 2A. 5 year old boy with severe unilateral congenital blepharoptosis

Fig. 2B. 1 year after correction by Mustarde's modified method

RESULTS

In patients with unilateral CBP we assumed that a very good result is present when the postoperative difference in the position of the upper eyelids (normal and corrected) in primary gaze is 0-1 mm. Taking into consideration the pre- and postoperative palpebral positions in primary gaze, we obtained very good final results in all cases of unilaterall mild CBP, in 89.5% of moderate, and in 85.7% of severe CBP (tab. 1).

In patients with bilateral CBP the result is very good when the difference in the postoperative position of the upper eyelids is above the preoperative one (in primary position) by: 1-2 mm in mild ptosis, 2-3 mm in moderate, and 3-5 mm in severe ptosis. Taking into consideration these criteria very good results with symmetric eyelids positions were found after bilateral operation with LPS shortening in 75% patients after bilateral CBP correction.

One person with severe CBP underwent additional procedure – frontalis suspension in anotther institution because of undercorrection.

Another patient with severe, asymmetric CBP did not want to agree to additional operation.

There were no early postoperative complications (during the first week after operation). During the first year after CBP surgery lagophthalmos <1 mm was noted in 3 patients (6.25%): in one child with moderate CBP, and LPS function of 7 mm, and in two cases with severe CBP and LPS function of 5-6 mm.

In all cases the treatment included applications of bland ointments and artificial tears.

Undercorrection was observed in six children (12.5%); in 2 with unilateral and moderate CBP (1 mm), and in 2 with severe (1.5 mm). These patients were not reoperated because their parents did not agree. Moreover, in two cases with bilateral severe CBP undercorrection (1.5 mm) was confirmed.

DISCUSSION

The severity of CBP and LPS dysfunction, together with the presence of visual system abnormalities, as well as the age of patients, should influence the complex treatment based on clinical analysis, ophthalmologic and orthoptic examination, and standard measurements, which was confirmed by other authors (15).

Precise measurements can be usually performed in children between the age of 4 and 5 years. Similarly to other authors, we also recommend surgery of a ptotic eyelid not earlier than before school age to avoid consequences of too early correction. However in patients with a threatened pupil early operation should be considered to avoid stimulus deprivation amblyopia (7, 16, 17). For this reason four of the children underwent CBP surgery at the age of 5 years. Coincidence of visual system abnormalities in patients with CBP indicates the importance of performing early clinical analysis of CBP patients together with complete ophthalmic and orthoptic examination during early evaluation.

LPS shortening, when LPS function is greater than 3-5 mm, is the preferred method for CBP correction. The amount of LPS shortening depends on the degree of ptosis, and includes 8 mm in mild CBP and even over 20 mm in severe cases. Alternatively, patients can undergo frontal suspension when LPS function is less than 3 mm or is not detectable (6, 9, 18, 19).

Patients from this series with LPS function more than 5 mm underwent surgery with complex shortening by Mustarde's modified

Table 1. Results of CBP surgery in patients with unilateral CBP

Preoperative degree of ptosis	Number of patients	Difference in palpebral margins position of two upper eyelids (normal and corrected) in primary gaze, after CBP surgery (mm)		
		0-1	1≥2	2-4
Mustarde's modified method				
Mild	7	7 (100%)	-	-
Moderate	19	17 (89,5%)	2 (10,5%)	-
Severe	14	12 (85,7%)	2 (14,3%)	-
Total	40 (100%)	36 (90%)	4 (10%)	-

method. The analysis of our present results of CBP surgery in comparison with retrospective analysis of postoperative data related to Mustarde's technique proved comparable efficacy of both techniques as to appropriate position of the eyelids margins, taking into account their symmetry.

Lagophthalmos as the most common late complication (in patients with similar severity of CBP) did not exceed 1 mm after modified Mustarde's technique and was less than after Mustarde's surgery. However, it was up to 3 mm in patients corrected by methods with more extensive LPS and tarsal plate resection, as in Mustarde's method, or even 4 mm in Everbusch, or Blascovics techniques (20, 21). Similarly to other authors, we also confirm the association of lagophthalmos with the range of LPS resection or tucking and the amount of resected tarsal plate (6, 10, 19). This corresponds with a small number and a lower range of incomplete lid closure in children from our study who underwent operation using Mustarde's modified method. Some authors explain the presence of postoperative lagophthalmos by incomplete freeing of the septum orbitale, or sutures incorporating superior oblique muscle or the septum and LPS – tarsal sutures (22, 23, 24). The use of appropriate local treatment in prevention of corneal drying is better tolerated by children than by adults with incomplete lids closure, which is reflected in an improvement of corneal adaptation.

CONCLUSIONS

1. Mustarde's modified method allows for obtaining very good functional and aesthetic results in CBP patients.
2. Mustarde's modified method is a valuable supplemental surgical technique in CBP, and contributes to a low rate and small range of lagophthalmos.

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