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Original Article

Outcomes of Various Surgical Procedures on Acquired Lower Eyelid Epiblepharon in Thyroid Associated Ophthalmopathy

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Purpose: To report the outcomes of acquired lower eyelid epiblepharon after various surgeries in thyroid associated ophthalmopathy (TAO) patients.

Methods: A retrospective review of the medical records of 53 TAO patients with acquired lower eyelid epiblepharon between October 1999 and June 2011 was performed. Data were collected on demographics, type of lower eyelid epiblepharon, the detailed surgical history such as orbital decompression, retraction repair, or epiblepharon repair and surgical outcomes including follow-up period, recurrence of epiblepharon, and postoperative complications.

Results: Among the 53 TAO patients with acquired lower eyelid epiblepharon, 25 eyes of 17 patients underwent surgical management; 6 eyes of orbital decompression, 1 eye of orbital decompression followed by retraction repair, 2 eyes of orbital decompression followed by epiblepharon repair, 6 eyes of lower eyelid retraction repair, and 10 eyes of epiblepharon repair. Twenty two lower eyelid epiblepharons (88%) were resolved after final surgical treatment without complication during mean 16.2 months (SD, ±29.9 months) of follow up period; three of 6 epiblepharons that remained after orbital decompression underwent subsequent surgical management of retraction repair or epiblepharon repair, and epiblepharons were well-corrected. Mean amount of lower eyelid retraction was decreased from 1.68 mm (SD, ±1.17 mm) to 0.29 mm (SD, ±0.44 mm) after surgery, regardless of the type of surgery (n = 25, $p < 0.000$, Wilcoxon signed rank test).

Conclusions: Acquired lower eyelid epiblepharon of TAO should be managed sequentially according to the general serial order of surgical managements in TAO; orbital decompression, correction of lower eyelid retraction and epiblepharon repair. Acquired lower eyelid epiblepharon was well resolved after surgical management in consecutive order, especially after repair of the lower eyelid retraction with a graft, or lower eyelid epiblepharon repair. Decreased lower eyelid retraction with a resolution of epiblepharon after surgery implied that lower eyelid retraction was associated with lower eyelid epiblepharon.

Key Words: Acquired lower eyelid epiblepharon, Graves ophthalmopathy, Lower eyelid epiblepharon repair, Lower eyelid retraction

Epiblepharon is a disease condition which a fold of skin and underlying orbicularis muscle overrides the eyelid margin and pushes the eyelashes inward against the cornea [1]. Although epiblepharon has been known to be a congenital disease, it is recognized that it could also develop later in a life [2,3]. Recently, we reported acquired lower eyelid epiblepharon as one of the clinical features of thyroid associated ophthalmopathy (TAO); an acquired lower eyelid epiblepharon was found in 8.5% of Korean TAO patients. We suggested that acquired lower eyelid epiblepharon could develop through a different mechanism from congenital form, and lower eyelid retraction might play an important role in developing acquired lower eyelid

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epiblepharon in TAO patients [4].

The surgical management and outcome of congenital lower eyelid epiblepharon repair was well described [5,6]; however, reports about surgical management and outcome of acquired lower eyelid epiblepharon in TAO were very rare. Chang et al. [7] reported only 1 patient without follow-up. Our group previously reported the surgical results of four TAO patients with both lower eyelid retraction and epiblepharon [8]. These two reports said that acquired lower eyelid epiblepharon of TAO could be resolved secondarily after orbital decompression or retraction repair. Herein, we report the outcomes of epiblepharon after various surgeries in TAO patients having acquired lower eyelid epiblepharon.

Materials and Methods

We reviewed the medical records of TAO patients with acquired lower eyelid epiblepharon who visited ophthalmology clinic of Seoul National University Hospital and Seoul National University Bundang Hospital between October 1999 and June 2011. Data were collected on demographics, presence and extent of lower eyelid epiblepharon, exophthalmos, lower eyelid retraction, the detailed surgical history, and surgical outcomes including follow-up period, recurrence of epiblepharon, change of lower eyelid retraction, and post-operative complications. The type of lower eyelid epiblepharon is classified according to the extent of epiblepharon as medial, diffuse, and central type as was described in previous study [4]. Lower eyelid retraction was also measured by standard photograph using ImageJ program as previously described [4].

The principle of the surgical management for TAO with acquired epiblepharon was as follows: if patient had severe exophthalmos and acquired lower eyelid epiblepharon, orbital decompression was performed first. If patient had lower eyelid retraction and lower eyelid epiblepharon, and there was no need for orbital decompression, lower eyelid retraction repair with graft was performed. If patient had lower eyelid epiblepharon and mild lower eyelid retraction that does not require surgical management, lower eyelid epiblepharon repair was performed. Orbital wall decompression was either 2 wall decompression or 3 wall decompression, and lower eyelid retraction repair was performed with an ear cartilage graft as previously described [9]. The detailed surgical techniques to correct epiblepharon were same as described in our previous study [10]. Briefly, an elliptical excision of skin and orbicularis muscle after tarsal rotating suture of the upper edge of the incised skin was performed. The protocol for this study was approved by the institutional review board of Seoul National University Bundang Hospital. For the statistical analysis, SPSS ver. 18.0 (SPSS Inc., Chicago, IL, USA) was used. A p-value of less than 0.05 was considered to be statistically significant using Wilcoxon signed rank test.

Results

Fifty three TAO patients were diagnosed as an acquired lower eyelid epiblepharon, and 25 eyelids of 17 patients underwent surgical treatment; 7 eyelids of 4 patients from our previous report were also included [8]. Three patients were male and 14 patients were female with mean age of 38.3 years (SD, ±12.7 years). Among the 25 eyelids of acquired epiblepharon, 7 eyelids were medial type, 9 eyelids were diffuse type, and 9 eyelids were central type.

The 25 eyelids of acquired lower eyelid epiblepharon underwent surgical management as follows; 9 eyes of 7 patients underwent orbital decompression to correct compressive optic neuropathy or exophthalmos including 1 eye subsequently underwent lower eyelid retraction repair and 2 eyes of 2 patients subsequently underwent epiblepharon repair, 7 eyes of 5 patients with lower eyelid retraction underwent retraction repair, and 12 eyes of 8 patients underwent lower eyelid epiblepharon repair. Three epiblepharons of 3 patients out of 9 eyelids of 7 patients were resolved after orbital decompression and all 7 eyelids treated with retraction repair (Fig. 1) and 12 eyelids treated with epiblepharon repair (Fig. 2) were resolved after surgery. Among 6 eyelids that did not resolved after orbital decompression, 3 eyelids subsequently received surgical management of retraction repair in 1 eyelid (patient 9) and epiblepharon repair in 2 eyelids (patients 5 and 7), and all the epiblepharons were corrected well. Demographics and surgical outcomes were shown in Table 1.

Interestingly, mean amount of lower eyelid retraction was decreased from 1.68 mm (SD, ±1.17 mm) to 0.29 mm (SD, ±0.44 mm) after surgery, regardless of the type of surgery (n = 25, $p < 0.000$, Wilcoxon signed rank test). Changes of the amount of lower eyelid retraction according to the type of surgery were described in Table 2.

Discussion

In the present study, 22 out of 25 acquired lower eyelid epiblepharon that underwent surgical management such as orbital decompression, retraction repair, or epiblepharon repair were corrected after surgery regardless of the type of epiblepharon. Surgical management of TAO patients was generally performed in a serial order of orbital decompression, strabismus surgery, retraction repair, and eyelid surgery. As for an acquired lower eyelid epiblepharon in TAO patients, this principle should be also followed and epiblepharons were managed by orbital decompression first if there were accompanied exophthalmos or compressive optic neuropathy; it was reported that orbital decompression in TAO patients could also improve lower eyelid retraction and epiblepharon [8]. If epiblepharon does not

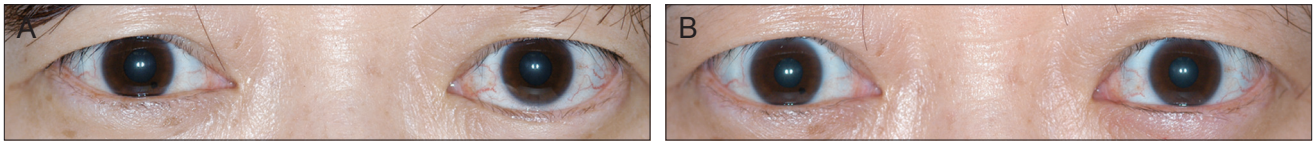

Fig. 1. Diffuse-type acquired lower eyelid epiblepharon in left lower eyelid before (A) and 2 months after (B) left lower eyelid retraction repair with autologous ear cartilage graft in thyroid associated ophthalmopathy patient 10. Epiblepharon was resolved after retraction repair surgery.

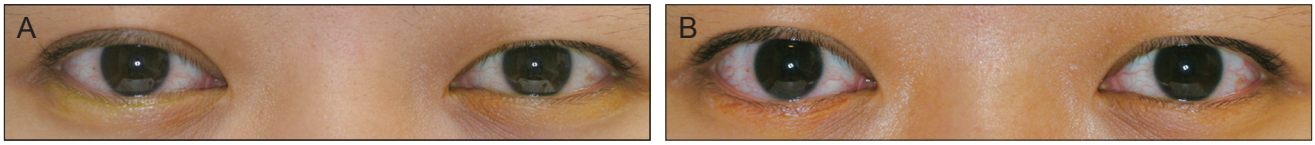

Fig. 2. Central-type acquired lower eyelid epiblepharon in right eye before (A) and 13 months after (B) epiblepharon repair surgery in thyroid associated ophthalmopathy patient 3. Epiblepharons were well-corrected after right lower eyelid epiblepharon repair surgery.

resolve after orbital decompression and lower eyelid retraction was accompanied, then, retraction repair should be performed. If acquired lower eyelid epiblepharon is not accompanied by retraction or patient does not want a surgery for retraction, epiblepharon repair surgery could be performed.

With respect to the orbital decompression surgery, only three of 9 acquired lower eyelid epiblepharons were resolved after orbital decompression surgery. Almousa and Sundar [11] reported a case of acquired lower eyelid epiblepharon treated with lateral orbital decompression. Resolution of epiblepharon after decompression surgery implies that exophthalmos itself could be a possible cause of acquired lower eyelid epiblepharon. Though orbital decompression surgery was not as effective as direct epiblepharon repair or lower eyelid retraction repair, and not intended for the correction of epiblepharon, it should be considered as a treatment option for the patients with both acquired lower eyelid epiblepharon and severe exophthalmos.

Interestingly, mean amount of lower eyelid retraction was decreased with a resolution of epiblepharon after surgery, regardless of the type of surgery. It implies that lower eyelid retraction could be associated with lower eyelid epiblepharon. In current study, seven eyelids of 5 patients with acquired lower eyelid epiblepharon and lower eyelid retraction underwent only lower eyelid retraction repair, and epiblepharons were also resolved after surgery. Chang et al. [7] reported that lower eyelid recession with posterior lamellae spacer graft was successful treatment of acquired lower eyelid epiblepharon in 5 eyelids of 3 patients who also had lower eyelid retraction. This close relationship between lower eyelid retraction and acquired lower eyelid epiblepharon was also suggested in our previous study [4]. Considering that mean amount of lower eyelid retraction was decreased after epiblepharon surgery, we suggested that acquired lower eyelid epiblepharon in TAO also affected lower eyelid retraction and vice versa. It also supports close relation between acquired lower eyelid epiblepharon and lower eyelid retraction in TAO.

All the 12 eyelids of acquired epiblepharon that underwent epiblepharon repair were completely corrected after the surgery and not recurred; surgical outcomes were good regardless of type of epiblepharon. The cilia-rotating tarsal fixation sutures were made along whole eyelid length from medial canthus to lateral canthus, not only to the focal extent of epiblepharon, thus making this procedure effective regardless of type or extent of epiblepharon. There are two widely used surgical techniques for congenital lower eyelid epiblepharon; cilia-rotating suture technique, and modified Hotz procedure. Surgical outcome of cilia-rotating suture is better than that of modified Hotz procedure [5,6]; about 92% of patients were well corrected with cilia-rotating suture technique, requiring only 1.3% of second operation [5]. However, with modified Hotz procedure, 83% of patients were corrected and 6.8% recurred [6]. We have performed surgery consistently with cilia-rotating suture technique for acquired epiblepharon patients in current study. Although the pathogenesis of epiblepharon was supposed to be different between congenital and acquired epiblepharon, lower eyelid epiblepharon repair with cilia-rotating suture technique was found to be also effective for correction of acquired lower eyelid epiblepharon as for congenital lower eyelid epiblepharon. This surgical procedure involves direct cilia rotating tarsal fixation suture, which could make cilia rotated to point outward, thus resulting in favorable outcome for both congenital and acquired epiblepharon regardless of etiologic background.

Considering that three of 6 acquired lower eyelid epiblepharons that remained after orbital decompression were corrected by consequent retraction repair or epiblepharon repair, we believed that the other three epiblepharons remained after orbital decompression could be possibly corrected if they were treated with retraction repair or epi-

Table 1. Demographics and treatment outcomes of acquired lower eyelid epiblepharon in thyroid associated ophthalmopathy patients

Patient	Age (yr)	Sex	R/L	Type of epiblepharon	Surgical procedure	Follow-up (mon)	Surgical outcome of epiblepharon	Lower eyelid retraction (mm)		Exophthalmos (mm)	
								Preoperative	Postoperative	Preoperative	Postoperative
1	32.4	F	R	Medial	Epiblepharon repair*	8.3	Resolved	1.9	1.2	16.5	17.5
			L	Medial	Epiblepharon repair	8.3	Resolved	1.6	0.9	16.5	17.5
2	40.8	F	R	Central	Epiblepharon repair	10.3	Resolved	2.2	0	22.5	NA
3	29.3	F	R	Central	Epiblepharon repair	12.5	Resolved	0	0	21.5	NA
4	40.3	F	R	Diffuse	Epiblepharon repair	26.7	Resolved	1.6	0.9	20.5	22.5
			L	Diffuse	Epiblepharon repair	26.7	Resolved	1.6	0.9	20.5	22.5
5§	43.7	M	R	Medial	Decompression† & epiblepharon repair	0.2	Resolved	0	0	14.0	NA
6	18.5	M	R	Medial	Epiblepharon repair	0.2	Resolved	0.4	0.9	23.0	NA
			L	Diffuse	Epiblepharon repair	0.2	Resolved	1.1	1.0	23.0	NA
7§	52.2	F	L	Central	Decompression & epiblepharon repair	125.2	Resolved	0	0	16.0	14.0
8	21.6	F	R	Central	Epiblepharon repair	0.6	Resolved	0	0	16.5	NA
			L	Central	Epiblepharon repair	0.6	Resolved	0	0	19.5	NA
9§	46.7	F	R	Medial	Decompression & retraction repair‡	9.1	Resolved	1.9	0	17.5	NA
10	51.4	F	L	Diffuse	Retraction repair	2.1	Resolved	3.2	0	18.5	18.5
11	46.5	F	R	Central	Retraction repair	1.8	Resolved	2.0	0	19.0	NA
			L	Central	Retraction repair	1.8	Resolved	2.5	0	19.0	NA
12	49.5	F	R	Diffuse	Retraction repair	9.1	Resolved	3.0	0	17.0	18.0
			L	Diffuse	Retraction repair	9.1	Resolved	3.0	0	17.0	18.0
13	40.3	F	L	Diffuse	Retraction repair	9.1	Resolved	1.1	0	21.0	NA
14	23.1	F	R	Medial	Decompression	8.3	Resolved	3.4	0	23.0	18
			L	Medial	Decompression	8.3	Remained	3.9	0.7	24.0	19.5
15	60.3	F	R	Central	Decompression	29.6	Resolved	1.0	0	18.5	NA
16	36.7	F	R	Central	Decompression	2.3	Remained	2.6	0.7	24	22
17	26.0	M	R	Diffuse	Decompression	5.6	Resolved	2.0	0	24.5	19.0
			L	Diffuse	Decompression	3.5	Remained	2.0	0	26.0	19.0

NA = not available.
*Epiblepharon repair by cilia rotating suture technique; †Orbital wall decompression surgery; ‡Retraction repair with autologous ear cartilage graft; §Preoperative findings were described from conditions before secondary surgical procedure.

Table 2. Changes in amount of lower eyelid retraction in eyes of thyroid associated ophthalmopathy with epiblepharon according to the type of surgery

Type of surgery	Lower eyelid retraction (mm)		*p*-value
	Preoperative	Postoperative	
Orbital decompression (n = 6)	2.48 ± 1.05	0.23 ± 0.35	0.031*
Retraction repair (n = 7)	2.39 ± 0.76	0.00 ± 0.00	0.016*
Epiblepharon repair (n = 12)	0.87 ± 0.88	0.48 ± 0.51	0.047*
Total (n = 25)	1.68 ± 1.17	0.29 ± 0.44	0.000*

Values are presented as mean ± SD.
*Wilcoxon signed rank test, $p < 0.05$.

blepharon repair.

In conclusion, acquired lower eyelid epiblepharon in TAO patient should be also treated following a serial order as recommended in general TAO patients. Orbital decompression could be considered as a treatment for acquired lower eyelid epiblepharon in patients who have both epiblepharon and severe exophthalmos. It seems that acquired lower eyelid epiblepharon could be well treated with either repair of the lower eyelid retraction if present, or direct repair of the epiblepharon. Decreased lower eyelid retrac-

tion with a resolution of epiblepharon after surgery implies that lower eyelid retraction was associated with lower eyelid epiblepharon. Large-scale study should be required to verify surgical outcomes of acquired lower eyelid epiblepharon in TAO.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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