

EYELID RECONSTRUCTION IN OPHTHALMIC SURGICAL PRACTICE

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ABSTRACT

INTRODUCTION: Eyelid reconstruction is not implemented very often in ophthalmic surgical practice. Numerous surgical procedures exist, and the surgeon's experience is one of the leading factors for the choice of a technique.

AIM: The aim of this article is to study the causes and frequency of eyelid surgeries at the Specialized Eye Hospital for a five-year period and to evaluate the chosen surgical approach in relation to patients' disease.

MATERIALS AND METHODS: A retrospective study was conducted on all patients who underwent eyelid surgery in the hospital for the study period (2011-2015). Detailed information was collected on demographic data, clinical details for the diagnosis, histological results, and type of surgery.

RESULTS: A total of 692 reconstructive eyelid surgeries were performed, which represents 5.63% of all surgeries in the hospital for the study period. The most common cause of planned eyelid surgery was tumor excision (50.8%) and the used reconstructive procedures were: direct closure in 78.3% of cases, skin flap transposition – 15.5%, Hughes procedure – 3.1%, full-thickness skin graft – 2.7%, and Cutler-Beard procedure – 0.4%. Entropion was diagnosed in 18.5%, ectropion – 13.0%, dermatochalasis – 9.1%, and ptosis – 8.5% of the planned surgeries. The most frequently used technique for entropion repair was the Quickert procedure – 44.7% and for ectropion repair this was the Bick procedure – 59.1%. Ptosis was acquired in 62.8% of cases, and the most frequently used technique was aponeurosis surgery – 57.2%.

CONCLUSION: Eyelid reconstruction is an important branch of oculoplastic surgery. We found that tumor excision was the most common reason for planned eyelid surgeries. In recent years, the number of blepharoplasties has increased markedly.

Keywords: *eyelid surgery, ectropion, entropion, ptosis, eyelid tumors, blepharoplasty*

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Received: September 19, 2020

Accepted: December 6, 2020

INTRODUCTION

Different causes throughout the person's life might lead to a change in the position and function of the eyelids, thus requiring surgical correction. The most common among them are age-related tissue changes, horizontal lid laxity, ligament dehiscence resulting in involutional entropion, ectropion, ptosis, and dermatochalasis formation. Jacobs LC et al. reported an overall prevalence of sagging

eyelids among individuals 45 years and older in the Netherlands to be 16.3%, more common among men (19.0%) than in women (14.4%) (1). They found many non-genetic risk factors for sagging eyelids, including age, high body mass index, lighter skin color, smoking, male gender, and heritability. Damasceno RW et al. evaluated 24 565 elderly people and found the prevalence of involutional entropion to be 2.1% and that of involutional ectropion - 2.9%, with involutional entropion being more prevalent in women and involutional ectropion more prevalent among men (2). The Blue Mountains Eye Study evaluated 3654 people aged between 49 and 97 years, and found that ectropion prevalence was 3.9%, higher in men (5.1%) than in women (3.0%) (3). The prevalence of involutional ectropion and entropion increases with the patient's age (2,3).

Different studies report different prevalence of congenital and acquired ptosis. Lee et al., in their hospital-based study in Korea, found congenital ptosis in 78% of cases (4). In contrast, in Chicago, Lim et al., also in a hospital-based study, reported that the most common type of ptosis was aponeurotic ptosis (5). Levator muscle starts thinning and loses muscle tone with age; disinsertion and dehiscence of the levator aponeurosis are also common in elderly people, and all these conditions result in involutional ptosis formation (6).

Trauma and post-traumatic cicatrices, neurological diseases, like pareses and paralyzes of n. facialis and n. oculomotorius, also lead to changes in the eyelid position. Eyelid tumors are more common

among people above 60 years of age and the most common neoplasms in ophthalmic practice treated with eyelid surgery.

In Bulgaria, where more than 21% of the population is above 65, and more than 24% of women are above 65 years of age, the need of reconstructive eyelid surgery is expected to increase in the next years (7).

In the framework of an increasing demand for plastic and aesthetic surgery, the number of descriptive epidemiological studies analyzing the main reconstructive eyelid surgeries in relation to the characteristics of the patients and their diseases is limited.

AIM

The aim of this study was to evaluate the causes and frequency of eyelid surgeries performed in the Specialized Eye Hospital - Varna for the five-year period and the chosen surgical approach in relation to patients' diseases.

MATERIALS AND METHODS

A retrospective study was conducted over a 5-year period (2011-2015) including all of the patients who underwent eyelid surgery (excluding chalazion excision) at the Specialized Eye Hospital - Varna, providing services not only to the population of Varna region, but to the whole region of Eastern Bulgaria. Detailed information was collected on demographic data, including age, sex, resident status and clinical details for the diagnosis, histological result and type of surgery. It was summarized with descrip-

Table 1. Diagnosis leading to eyelid surgeries for the five-year period

Type of diagnosis	2011	2012	2013	2014	2015	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Trauma	33 (25.8)	40 (35.7)	31 (21.4)	37 (24.8)	43 (27.2)	184 (26.6)
Benign tumors	26 (20.3)	21 (18.6)	38 (26.2)	50 (33.6)	35 (22.2)	170 (24.6)
Malignant tumors	23 (17.9)	12 (10.7)	17 (11.7)	20 (13.4)	16 (10.1)	88 (12.7)
Entropion	16 (12.5)	11 (9.8)	17 (11.7)	16 (10.7)	34 (21.5)	94 (13.6)
Ectropion	12 (9.4)	13 (11.6)	22 (15.2)	10 (6.7)	9 (5.7)	66 (9.5)
Ptosis	11 (8.6)	9 (8.03)	14 (9.7)	3 (2.0)	6 (3.8)	43 (6.2)
Dermatochalasis	7 (5.5)	6 (5.36)	6 (4.1)	13 (8.7)	14 (8.9)	46 (6.6)
Floppy eyelid	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.6)	1 (0.1)
Total eyelid surgeries	128 (100.0)	112 (100.0)	145 (100.0)	149 (100.0)	158 (100.0)	692 (100.0)

tive statistical methods – qualitative variables were presented as percentages and quantitative variables – with mean and SD.

Ethical approval for the study was obtained from the Ethics Committee of the Specialized Eye Hospital - Varna.

RESULTS

A total of 692 reconstructive eyelid surgeries were performed for the study period, including trauma, ectropion, entropion, ptosis, dermatochalasis, and tumors. These operations represented 5.63% of all surgeries of the eyeball and eye adnexa for the study period (mean 2456 operations per year). Diagnosis leading to eyelid surgeries for the study period are presented in Table 1.

Excluding trauma cases (184, or 26.58%, for the five-year period), which were treated as emergencies, the planned surgeries for eyelid malposition and tumor excision were 4.14% of all performed surgeries at the hospital for the studied 5-year period. The mean age of these patients (n=508) was 61.6 (SD 17.42) years, where male patients presented 43.3% of all cases. The most common reason for planned surgery was tumor excision (Fig. 1).

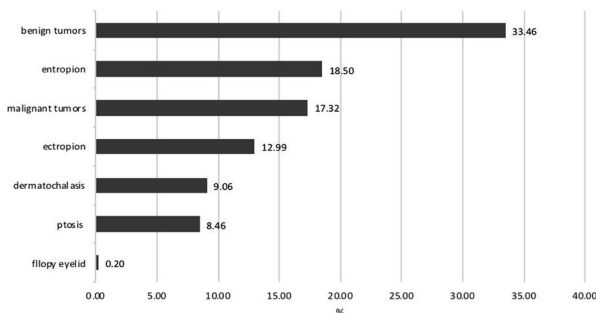


Fig. 1. Distribution of planned eyelid reconstructive surgeries by diagnosis (n=508)

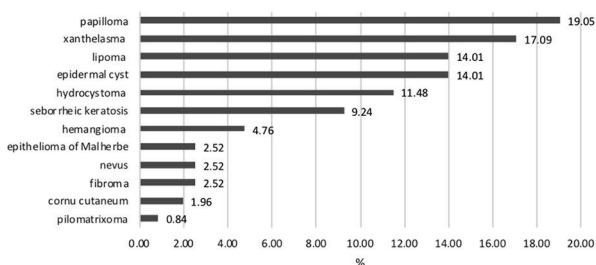


Fig. 2. Histological type of benign eyelid tumors

Table 2. Demographics of patients who underwent planned eyelid surgery by diagnosis

Type of Diagnosis	n	Mean Age (SD)	% Male
Benign tumors	170	55.0 (16.36)	38.8
Malignant tumors	88	67.5 (12.06)	39.8
Entropion	94	71.0 (11.67)	45.7
Ectropion	66	71.8 (11.40)	71.2
Ptosis	43	48.9 (28.52)	53.5
Dermatochalasis	46	53.3 (9.90)	10.9
Floppy eyelid	1	49	100
Total	508	61.7 (17.41)	43.3

Demographic data of patients who underwent planned eyelid surgery are presented in Table 2.

The total number of benign eyelid tumors was 170. The most common was papilloma - 19% of cases (Fig. 2). The surgical procedure used most often after a benign tumor excision was direct closure – in 90% of the cases, and in 10% skin flap transposition was needed.

The total number of malignant eyelid tumors was 88. The most common histological type was basal cell carcinoma (BCC) – 85.2% of the cases, squamous cell carcinoma (SCC) present in 9.1%, sebaceous carcinoma – 3.4%, Merckel cell carcinoma – 1.1%, and trichilemmal carcinoma – 1.1%. Lower lid tumor localization was found in 63.6% of the cases, upper lid – 18.2%, medial canthal area – 11.4%, and lateral canthal area – 2.3%. The most frequently used surgical technique for eyelid reconstruction after malignancy excisions was direct closure in 55.7% of the cases, followed by skin flap transposition – 26.1%, Hughes procedure – 9.1%, free full-thickness skin graft for reconstruction of anterior eyelid lamella – 8.0%, and Cutler-Beard procedure – 1.1%.

Entropion was cicatricial in 2 and involuntal in 92 cases. The most frequently used surgical procedure for ectropion repair was the Quickert technique – 44.7%, followed by horizontal lid shortening combined with everting sutures – 18.1%, lateral tarsal strip – 17%, Imre technique – 11.7%, free mucous graft – 2.1%, and everting sutures alone – 1.1% of cases.

Ectropion was cicatricial in 2 cases, paralytic in 6, and involuntal in 58 cases. The most frequent-

ly used surgical procedure was full-thickness pentagonal flap excision (Bick technique) in 59.1% of the cases, followed by lateral tarsal strip – 22.7%, Kuhnt-Szymanowski procedure – 10.6%, medial canthoplasty – 4.5%, and others.

Ptosis was congenital in 16 cases and acquired in 27 cases, 22 of which aponeurotic. The most frequently used surgical procedure was resection or plication of levator aponeurosis – 57.2%, followed by Fasanella-Servat – 33.3%, and frontalis suspension – 9.5%.

All blepharoplasty surgeries were performed on upper eyelid with a standard technique.

For the whole period only one surgery was performed in a case with floppy eyelid.

DISCUSSION

This study presented the epidemiologic characteristics of reconstructive eyelid surgeries in the Specialized Eye Hospital - Varna, providing information of prevalence of eyelid tumors, ectropion, entropion, ptosis, and dermatochalasis in ophthalmic surgical practice.

The most common cause of eyelid reconstruction that we found was tumor excision. It presented 50.8% of all cases of planned surgeries in this study, with prevalence of benign tumors (65.9%). Asproudis I et al., in a large study which covered a 30-year period in Ioannina, Greece, found 58.8% of benign tumors, of which seborrheic keratosis - 18%, nevus – 13%, and papilloma - 13% (8). Ho M et al. in Hong Kong reported 65.16% of benign tumors of which nevus – 31%, squamous cell papilloma - 22%, and seborrheic keratosis – 15% (9). Paul et al. reported 75.9% of benign tumors in their study in San Francisco, California, with seborrheic keratosis the most common benign neoplasm representing 19.7% of the cases (10). There is an agreement between our results and all cited publications on the prevalence of benign tumors and an average age of less than 60 years of individuals diagnosed with a benign lesion, but a difference is observed in histological type distribution.

Malignant tumors were diagnosed primarily in patients with an average age over 60 years (10,11), the mean age for patients with malignant lesions was 67.5 (± 1.6) years in Greece (8) and 67.5 (± 12.06) in the present study. In almost all studies, BCC is the most common malignant eyelid tumour. That histolog-

ical type comprises about 86% in Ioannina, Greece (8), 86% in Lausanne, Switzerland (11), 75% in Hong Kong (9), and 71.8% in San Francisco, California (10). In agreement with the above-mentioned data, BCC is the most prevalent histological type accounting for 85.2% of the eyelid malignancies in the present study. In contrast, Tan et al., in their study in a tertiary care hospital in Singapore, reported only one case of BCC of the eyelid, making its prevalence less than 0.01%. The low prevalence of BCC of the eyelid is likely due to the difference in skin phototypes between the Asian and Caucasian population (12). In some Asian populations, the proportions of BCC and sebaceous gland carcinoma (SGC) are almost equal, and in some studies, SGC is even the most common malignant eyelid tumor. An Indian study reports the proportion of SGC to be 32.6%, BCC - 29.8%, and SCC - 28.1% (13). In our study only three cases of SGC have been diagnosed. The second most common histological type of eyelid carcinoma was SCC. According to the epidemiological findings of our study, SCC affected 9.1% of the patients with eyelid cancer on average. Similar were the reports from Ioannina, Greece – 7%, Lausanne, Switzerland - 8.6%, and 9.7% in San Francisco, California (8,10,11).

Lee et al., in their study in South Korea, reported that the second most common eyelid surgery was lid mass excision - 19.1% and for eyelid reconstruction, the Tenzel semicircular rotational flap, Hughes and reverse Hughes procedures were performed. (14) The most common used technique for eyelid reconstruction after tumor excision is direct closure, in 60.9% of the cases in this study. There are opinions on the pros and cons of the Hughes procedure in the literature. Emesz M et al. reported good functional and cosmetic results in 76.4% of the cases after the Hughes procedure (15), Sommer and Wozniak (16) - in 97.8%, and Hishmi AM et al. (17) - in 87%. The Hughes procedure has become less popular in some studies because it is a 2-stage procedure and eyes are closed for 2 to 4 weeks, and contraction of the levator-Muller muscle complex after flap division in the classical Hughes procedure is a common reason for upper eyelid complications (18). In the present study, a modified Hughes procedure was used in 7.8% of the cases without complications. Also, in accordance with literature, we achieved very good results using

full-thickness skin graft for reconstruction of the anterior eyelid lamella (19).

The second and third most popular causes for eyelid surgery in that study were entropion and ectropion repair – 18.5% and 13.0% of all planned eyelid surgeries, respectively. In 98% of the cases there was involutional entropion and in 88% - involutional ectropion. Involutional entropion was more prevalent in females (54.3%) and involutional ectropion was markedly more prevalent among males (71.2%). These findings are supported by other studies (2,3,6) and may be explained by the differences of tarsal plate size and axial ocular globe projection between men and women (20,21). The main etiological factors for entropion and ectropion development are lateral and medial canthal tendon laxity, and disinsertion of the lower retractors, therefore surgical techniques with tightening of canthal tendons, horizontal lid shortening, and retractors reinsertion provide the best postoperative results (22,23,24). In the present study, the Quickert procedure was used in 44.7% of entropion cases, horizontal lid shortening combined with everting sutures – in 18.1%, and lateral tarsal strip – in 17%, with very good results. Dulz et al. compared the lateral tarsal strip with everting sutures and the Quickert procedure for involutional entropion and concluded that success rates at 14 months are similar in patients treated with either technique (25). Golan and Lelli found that the combination of the modified Bick quick strip procedure and Quickert sutures provides excellent results for the treatment of involutional entropion (26). The most frequently used surgical procedure for ectropion repair in our study was the Bick technique in 59.1% of the cases, followed by lateral tarsal strip – 22.7%. Vahdani et al. compared the functional and anatomical outcomes of lateral tarsal strip (557 cases) with Bick's procedure (87 cases) in the treatment of eyelid malposition and found that Bick's procedure achieved statistically significant better anatomical and functional outcomes compared to lateral tarsal strip although the samples were unequal (27).

Ptosis surgery was relatively rare in that study – 8.5% of all planned eyelid surgeries, with prevalence of acquired aponeurotic ptosis (51.2%) and an average age of patients – 48.9 years. In contrast, Tan et al. reported that ptosis was the most prevalent reason for eyelid surgery in their study – 19.5%, again with

marked prevalence of acquired ptosis and mean patient age of 45.3 years (12). Lim et al., in a retrospective study on 251 patients with ptosis, found that aponeurotic ptosis was the most common type of ptosis (60.2%), followed by traumatic (11.2%), congenital (10.4%), etc. (5). In contrast, a study of the epidemiology of ptosis at a teaching hospital in Nepal, where a total of 125 patients were evaluated, showed that congenital ptosis was the most common cause of ptosis in 62.4% with 37.6% of the cases being acquired of which only 10.7% were aponeurotic (28). In the more recent years of our study transcutaneous levator aponeurosis plication was the preferred surgical procedure for involutional ptosis correction. Our results with this technique were in accordance with the excellent results reported by McCulley in 77% of the cases (29).

Presently, the interest in aesthetic eyelid surgery has been growing. Upper eyelid blepharoplasty, the most common aesthetic surgery performed, may have medical indications, when the drooping skin limits the visual field, or serve a cosmetic purpose following the patient's desire to have a more youthful or aesthetic appearance (30). Blepharoplasty was the most common eyelid surgery reported by Lee et al., accounting for 24.2% of total eyelid surgeries in their study (14). The incidence of blepharoplasty in the present study was lower – 9.1%, with the mean age of the patients being 53.3 (SD 9.9) years and a significant prevalence of females – 89.1%. We have noted a marked growth of the number of blepharoplasties after 2013.

CONCLUSION

In conclusion, eyelid reconstruction is an important branch of oculoplastic surgery. We found that tumor excision was the most common reason for planned eyelid surgery and reconstruction. In recent years, the number of blepharoplasties has increased markedly. Numerous surgical procedures exist for eyelid reconstruction, and the surgeon's experience is leading in the choice of a technique.

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