ORIGINAL ARTICLE

Reconstructive Methods on Different Parts of the Periocular Region after Mohs Micrographic Surgery in a Combination of Dermatologist and Facial Plastic Surgeon Practice

Omeed Memar[1], Benjamin Caughlin[2,3,4]

[1]Department of Dermatology, Academic Dermatology and Skin Cancer Institute, Chicago, Illinois, [2]Department of Surgery, Division of Otolaryngology, John H. Stroger, Jr. Hospital of Cook County, Chicago, Illinois, Division of Facial Plastic and Reconstructive Surgery, Jesse Brown VAMC, Chicago, Illinois, [3]Division of Facial Plastic and Reconstructive Surgery, University of Illinois Health Hospital System, Chicago, IL, [4]Kovak Cosmetic Center, Oakbrook Terrace, Illinois

ABSTRACT

Objective: In the United States, the majority of post-Mohs closures around the eye are done by Mohs surgeons, who are mainly dermatologists. The objective of this study is to determine the options for closing post-Mohs defects on different parts of the periocular region that is performed by both a Mohs surgeon and facial plastic surgeon as a team. Non-melanoma skin cancer is common around the eyes and can lead to great morbidity. Mohs micrographic surgery is the treatment of choice for its resection. The resulting wound can be extensive, and the reconstruction can have great ramifications on both eyelid function, visual acuity, and esthetics. The majority of the reconstruction is handled by the Mohs surgeons. **Methods:** We presented 28 periocular Mohs closures that were done at a practice where a combined Mohs surgeon and facial plastic surgeon operated together in a team as opposed to individually. **Results:** We find that this combination provided more complex closures such as flaps and grafts, while previous publications had shown that Mohs surgeons more often close with a primary closure. Different regions of the periocular region were examined for treatment methods. The medial canthus was most often affected, and advancement flaps were most commonly used followed by full-thickness skin grafts. We did not have any cases on the upper eyelid, highlighting the sun protected characteristic of the anatomy. **Conclusion:** This is the first publication presenting a large number of post-Mohs closures that were reconstructed by a combined Mohs surgeon and facial plastic surgeon. The significance is that the combined skills of a Mohs surgeon and facial plastic surgeon offer a wider range of closure techniques, to the benefit of the patient.

Key words: Combined closure, facial plastic surgeon, flap closure, full-thickness skin graft, Mohs micrographic surgery, non-melanoma skin cancer, periocular

INTRODUCTION

Mohs micrographic surgery was invented by Frederick Mohs and has proven to be a very accurate method of resecting contiguous tumors like non-melanoma skin cancers (NMSCs).[1] Recent imaging techniques have attempted to reproduce the accuracy of NMSC detection *in vivo*, but the technology is not a standard of care.[2] The periocular region is a common location, Mohs surgery is performed.[3] Post-Mohs defects are most commonly closed by Mohs surgeons, who are mainly dermatologists, and their closure of choice is linear.[4] The role of the plastic surgeon in skin cancer management is changing and mainly involves being a referred the post-Mohs defect for closure.[5]

Address for correspondence:
Omeed Memar, Academic Dermatology and Skin Cancer Institute, 130 N. Garland Ct, Chicago, IL 60602.
Tel: 312 230 0180. E-mail: omeedmemar@gmail.com

The problem there is the inconvenience to the patient in seeing another physician, possibly at another location. We presented a large number of post-Mohs closures done by a combined surgical team consisting of a Mohs surgeon and a facial plastic surgeon, showing that a combined team offers a wider option for post-Mohs reconstruction.[6]

Here, we present patients from a practice where both a Mohs surgeon and a plastic surgeon operated together on post-Mohs defects around the eye. We present the age and sex of the patients in relation to the different periocular regions involved. Furthermore, the methods of reconstruction selected by a Mohs and facial plastic surgeon duel practice in association between the number of stages, tumor type, and anatomic location.

METHODS

Patient selection

Skin cancer patients treated at Academic Dermatology and Skin Cancer Institute were selected. At this clinic, the patients were treated by both the Mohs surgeon and plastic surgeon. 358 consecutive patients were selected, and of the 358, 28 had periocular cancers and subsequent post-Mohs defects. The patients were treated for basal cell carcinoma (BCC) and squamous cell carcinoma (SCC).

For each Mohs case, data on the age of the patient, tumor type, location of tumor, tumor diameter size, the number of Mohs stages needed to clear the margins, and the final defect diameter size were recorded. The different areas of the periocular skin were identified in relation to closure techniques, age, sex, and number of stages. Furthermore, the methods employed in the reconstruction of the remaining defect were recorded. These methods included primary closure (including complex layered closure), advancement flap, rotation flap, transposition flap, island pedicled flap, forehead flap, skin graft, use of cartilage graft, myocutaneous flap, staged melolabial flap, secondary intention, or outside referral to other plastic surgeons.

Data analysis

The statistical data were completed as previously described.[6]

RESULTS

Our analysis showed that the number of Mohs stages associated with different periocular areas was statistically significantly different (ANOVA, $P < 0.001$). The descriptive numbers [Table 1] show that the average number of Mohs stages done on the periocular area is 2.7. The lower eyelid had an average 3.1 stages, while the lateral canthus had the lease at 2 stages.

The average age of patients with periocular post-Mohs defects was 64.9 years [Table 2]. For defects on the lower eyelid, the average age was 61.9 years, and those on the lateral canthus were 73 years of age. The average diameter of tumors resected in the periocular area was 1.15 cm, and the resultant tumor-free defect diameter created was 2.92 cm.

More detailed analysis of the population showed differences in sex versus location of defects. [Table 3] shows that most closures in our combined practice were done on men. While 2/3 of defects in the medial canthus were in men, 80% of defects of the lateral canthus were in men.

BCC was the predominant tumor of the medial and lateral canthus, while one patient had squamous cell carcinoma SCC on the lower eyelid. Still, 89% of tumors resected from the lower eyelid were BCCs [Table 4].

Table 1: Average stage of Mohs at different areas around the eye

Mohs stage	Total	50th percentile of total	Medical canthus (15)	Lateral canthus (4)	Upper eyelid (0)	Lower eyelid (9)
Average stage	2.9	3	3	2		3.1

Table 2: Average age of patient at different areas around the eyes

Age	Total (28)	50th percentile of total	Medial canthus (15)	Lateral canthus (4)	Upper eyelid (0)	Lower eyelid (9)
Average age	64.9	66.5	65.1	73		61.6

Table 3: Sex associated with different areas around the eyes

Sex	Medial canthus (15)	Lateral canthus (4)	Upper eyelid (0)	Lower eyelid (9)
Male	10	4		7
Female	5	1		2

Table 4: Tumor types at different areas around the eyes

Diagnosis	Medial canthus (15)	Lateral canthus (4)	Upper eyelid (0)	Lower eyelid (9)
BCC	15	4		8
SCC				1

Table 5: Number of repairs associated with each closure type at different areas around the eyes

Closure type	Medial canthus (15)	Lateral canthus (4)	Upper eyelid (0)	Lower eyelid (8)
Linear	0	2		0
Advancement	9	1		1
Rotation	2	1		4
Transposition	1	0		0
Island pedicle (V to Y)	1	0		0
Forehead flap	0	0	0	0
Skin graft	6	1	0	3
Cartilage graft		0	0	0
Myocutaneous flap	1	0	0	0
Referred out	0	0	0	1

A difference in the closure techniques on different periocular regions. In the medial canthus, advancement flap followed by full-thickness skin graft (FTSG) was the most commonly used closure techniques. In the lateral canthus, linear closure was most commonly employed. The lower eyelid is a difficult location, due to the risk of ectropion. The most common closure technique used was a rotation flap, followed by FTSG. The number of closures exceeds that of defects, indicating the use of more than one closure technique per some defects. None of the patients in this group experienced major complications [Table 5].

DISCUSSION

Our study is the first of its kind that shows the value of Mohs closures done by both a Mohs surgeon and facial plastic surgeon in the periocular region. We have showcased a practice where the Mohs surgeon and facial plastic surgeon do the closures together. The benefit of a team closure includes a wider range of closure techniques and the fact that two set of surgeon's hands are better than one. We referred one patient, which amounted to 3% of periocular defects, while dermatologists referred out 23.5% of the periocular defects and 10% of their overall defects.[4] Eyelid reconstruction is founded on the principle that the end result is a properly functioning and appearing eyelid. Wound of the lower or upper eyelid can be closed primarily in cases were up to 30% of the lower lid is removed.[7] Medial canthus is important in considering the draining system of the eye. Mohs surgery is effective in meticulously following a tumor and not needlessly damaging the draining system of the eye. In closure techniques, flap tethering to periosteum is used to avoid tension on the lid margin.[8]

We chose an algorithmic approach to periocular post-Mohs defect closures. For the lower eyelid, if the anterior lamella was only involved, defects smaller than 0.6 cm were allowed to close secondarily, but if the defect was >0.6 cm, the defect was either closed primarily, a FTSG, a pedicled flap (usually rotation), or a laterally based transposition from the upper eyelid. If the Mohs defect created full-thickness defects, if the size of the defect was <25% of the lid, the defect was closed primarily. If the defect was 25–70% of the margin and the lateral canthus was intact, a rotation flap was used; otherwise, a staged tarsal flap was employed.

Defects of the medial canthus that were small were allowed to heal secondarily, and larger ones were closed by rotation flaps, with or without FTSG. In very large defects, paramedian forehead flaps were used. Defects of the lateral canthus that were small were allowed to heal secondarily, and the larger ones were closed by rotation flaps or primary closure placed into the crows feet.

CONCLUSION

This is the first publication presenting a large number of periocular post-Mohs closures that were reconstructed by a combined Mohs surgeon and facial plastic surgeon. The significance of a practice of a Mohs surgeon and facial plastic surgeon is a wider range of closure techniques for peri-ocular post-Mohs defects. We show that different locations around the globe require different closure techniques. The most challenging area for closure is the lower eyelid, due to the risk of dry eye and ectropion.[9]

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