

## Comparison of posterior lamellar resection versus lumpectomy for initial management of localized tarsal conjunctival sebaceous carcinoma in 54 cases

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**Purpose:** Comparison of outcomes of localized eyelid sebaceous carcinoma (American Joint Committee on Cancer (AJCC) 8<sup>th</sup> edition categories T1, T2, T3) following initial management with posterior lamellar resection (PLR) versus (vs) lumpectomy (nonposterior lamellar resection, non-PLR). **Methods:** This was a retrospective, comparative, interventional case series. Of 54 patients, 26 were managed by PLR and 28 by nonPLR. The main outcome measures were vision loss, orbital exenteration, lymph node metastasis, and remote metastasis were the main outcome measures. **Results:** A comparison of PLR vs nonPLR revealed no difference in mean age at presentation (70 vs 72 years), race (Caucasian 100% vs nonCaucasian 93%), gender (female 54% vs male 71%), entering mean visual acuity (20/30 vs 20/50), or corneal involvement (23% vs 11%). There was significant difference in clinical features with PLR demonstrating greater mean basal diameter (21 mm vs 12 mm,  $P = 0.004$ ), and positive margins were seen more frequently in PLR (69% vs 46%). There was significantly less number of surgical procedures in PLR to achieve complete tumor control (1.7 vs 2.5,  $P = 0.001$ ). Outcomes at mean 55 months follow-up revealed significantly better control with PLR (vs nonPLR) with fewer orbital exenterations (15% vs 43%,  $P = 0.038$ ), fewer lymph node, and systemic metastases (0% vs 39%,  $P < 0.001$ ). There was no significant difference in final mean visual acuity (20/60 vs 20/200). **Conclusion:** For eyelid sebaceous carcinoma, the initial management is critical to the patient's outcome. PLR demonstrates superior outcomes with regard to preservation of visual acuity and avoidance of exenterations, lymph node metastases, and systemic metastases compared to patients managed with other techniques.

**Key words:** Conjunctiva, eyelid, posterior lamellar resection, sebaceous carcinoma, sebaceous gland carcinoma

Sebaceous carcinoma of the eyelid is a particularly dangerous malignancy with relatively high risk for recurrence, metastasis, and orbital exenteration.<sup>[1-4]</sup> The difficulty in its management stems from the fairly transparent appearance, overlooked clinical features often mistaken for inflammation, and tendency for invasion. In one series of 60 patients, referral misdiagnosis was documented in 68% with mean delay in treatment of 23 months.<sup>[1]</sup> In another series of 25 patients, invasion into the surface epithelium (pagetoid spread) was found in 44%.<sup>[2]</sup> Pagetoid invasion of sebaceous carcinoma (vs no pagetoid invasion) is associated with greater risk for ocular irritation (45% vs 7%), larger tumor base (median 14 mm vs 8 mm), and ultimately greater need for orbital exenteration (36% vs 7%).<sup>[2]</sup> Sebaceous carcinoma can be difficult to track with horizontally invasive tumor within the eyelid tarsus, demonstrating skip areas, invading the overlying conjunctival epithelium (pagetoid invasion), and extending into the orbit and eventually the brain, lymph nodes, and remote sites.<sup>[5]</sup>

Similar to other malignancies, the initial management of sebaceous carcinoma can be critical to patient long-term outcomes.<sup>[5-7]</sup> For some, the initial management involves surgical resection of the tumor using a "lumpectomy" approach

with removal of mass plus a rim of tumor-free tissue versus our preferred approach of precisely and anatomically removing the entire posterior lamellar (posterior lamellar resection, PLR) of the eyelid including the mass and clinically-hidden sites ("skip" areas) without disruption of the tumor and with wide clean margins. Exenteration is reserved for those with multiple recurrences, extensive upper and lower eyelid disease, or orbital invasion.

Over the past 30 years, there has been a paradigm shift in the management of different cancers such as breast carcinoma from older days of radical mastectomy with chest wall deforming surgery to more recent anatomic focal resection of the involved tissue using breast conservation methods.<sup>[8-11]</sup> Sebaceous carcinoma is similar in that focal anatomic posterior lamellar dissection has evolved as a clean method for tumor removal in comparison to partial or complete full thickness eyelid removal or exenteration. Over the past 25 years, we have been employing a specific technique for complete excision

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of localized eyelid sebaceous carcinoma involving the tarsal plate (American Joint Committee on Cancer [AJCC] 8<sup>th</sup> edition categories T1, T2, and T3)<sup>[12]</sup> with total glandular removal of the entire posterior lamella of the eyelid to remove the main mass as well as unseen skip areas or subclinical invasion, particularly since this malignancy is difficult to visualize. This technique offers high rate of clean margins and we have coined this procedure as “posterior lamellar resection” (PLR). With this technique, reconstruction can occur immediately. Here, we compare our results following PLR versus nonPLR surgery as primary management for newly diagnosed eyelid sebaceous carcinoma.

## Methods

The medical records of 126 patients with newly established diagnosis of eyelid sebaceous carcinoma that were evaluated and surgically managed on an Ocular Oncology Service from July 1, 1980 to December 1, 2015 were retrospectively reviewed. Each case was analyzed according to the specific clinical and pathologic features. Data were collected by a retrospective review of medical records after Institutional Review Board approval. The study adhered to the tenets of the Declaration of Helsinki. Of the 126 patient charts analyzed, 54 patients demonstrated localized sebaceous carcinoma (T1, T2, T3) primarily involving the tarsal region, initially managed, and were included in this study.

Data was collected regarding demographics, tumor features, therapies, and outcomes. Demographic data included age at presentation, gender, and race. Data related to tumor features at initial presentation included visual acuity, tumor laterality (right, left), quadrant location of the mass (superotemporal, superonasal, inferotemporal, and inferonasal), anatomic conjunctival location of tumor (bulbar or tarsus) extent of tumor (clock hours involved, 1 to 12), largest basal diameter (millimeters), thickness (millimeters), involvement of eyelid margin (upper, lower, both upper and lower), caruncle involvement (present, absent), and corneal involvement (present, absent). All tumors were classified according to the AJCC 8<sup>th</sup> edition classification of sebaceous carcinoma.<sup>[12]</sup> Histopathologic data included microscopic features intraepithelial (pagetoid) only, invasive (deep to the epithelium) only, or both intraepithelial and invasive.

Treatment data included initial tumor treatment (PLR, nonPLR [lumpectomy]). The primary outcomes included final visual acuity, need for orbital exenteration, and local and systemic metastasis. The clinical and histopathologic parameters were analyzed as a comparative series between two groups, comparing those who underwent PLR versus (vs) nonPLR. The impact of the choice of surgery on outcomes was assessed including moderate visual acuity loss ( $\geq 3$  Snellen lines), eventual orbital exenteration, and local or systemic metastasis. The outcomes from each group were evaluated using the two-tailed Fisher exact test for categorical variables. For continuous variables, the student *t*-test was employed. *P* values of 0.05 or lower were considered statistically significant.

## Surgical Technique

### Posterior lamellar resection

The technique of PLR [Fig. 1a-d] for sebaceous carcinoma involves initial incision into the anterior lamella 2 mm outside

the eyelid margin so that the entire eyelid margin with sebaceous orifices and all sebaceous units within the tarsal plate are captured and removed in one specimen. The incision is created parallel to the eyelid margin, from canthus to canthus, and then dissected beneath the epithelium and orbicularis muscle to include the entire tarsal plate and conjunctiva in one specimen. The anterior skin-muscle flap is lifted off the posterior lamella, and relaxing incisions are performed in the posterior lamella at the medial and lateral canthus. The posterior lamella is then pulled to better expose it and the inferior incision is made outside the tarsal plate in the fornix. The tarsoconjunctival specimen is removed completely in total and submitted to pathology. Cryotherapy (double freeze-thaw) is applied to all margins. Reconstruction of the posterior lamella was performed with tarsoconjunctival flap or free graft from the buccal mucosa or opposite upper tarsoconjunctival region. The patients look excellent with good lid position [Fig. 1e-l]. Complications were seen such as dry eye with corneal decompensation [Fig. 1m-p].

### Nonposterior lamellar resection (lumpectomy)

The technique of non-PLR for sebaceous carcinoma involves incision 1–2 mm outside the clinically visible mass, typically from the conjunctival approach with the eyelid everted, completely encompassing the mass with or without sparing of the anterior lamella, similar to a wedge resection. Cryotherapy (double freeze-thaw) is applied and reconstruction is performed.

## Results

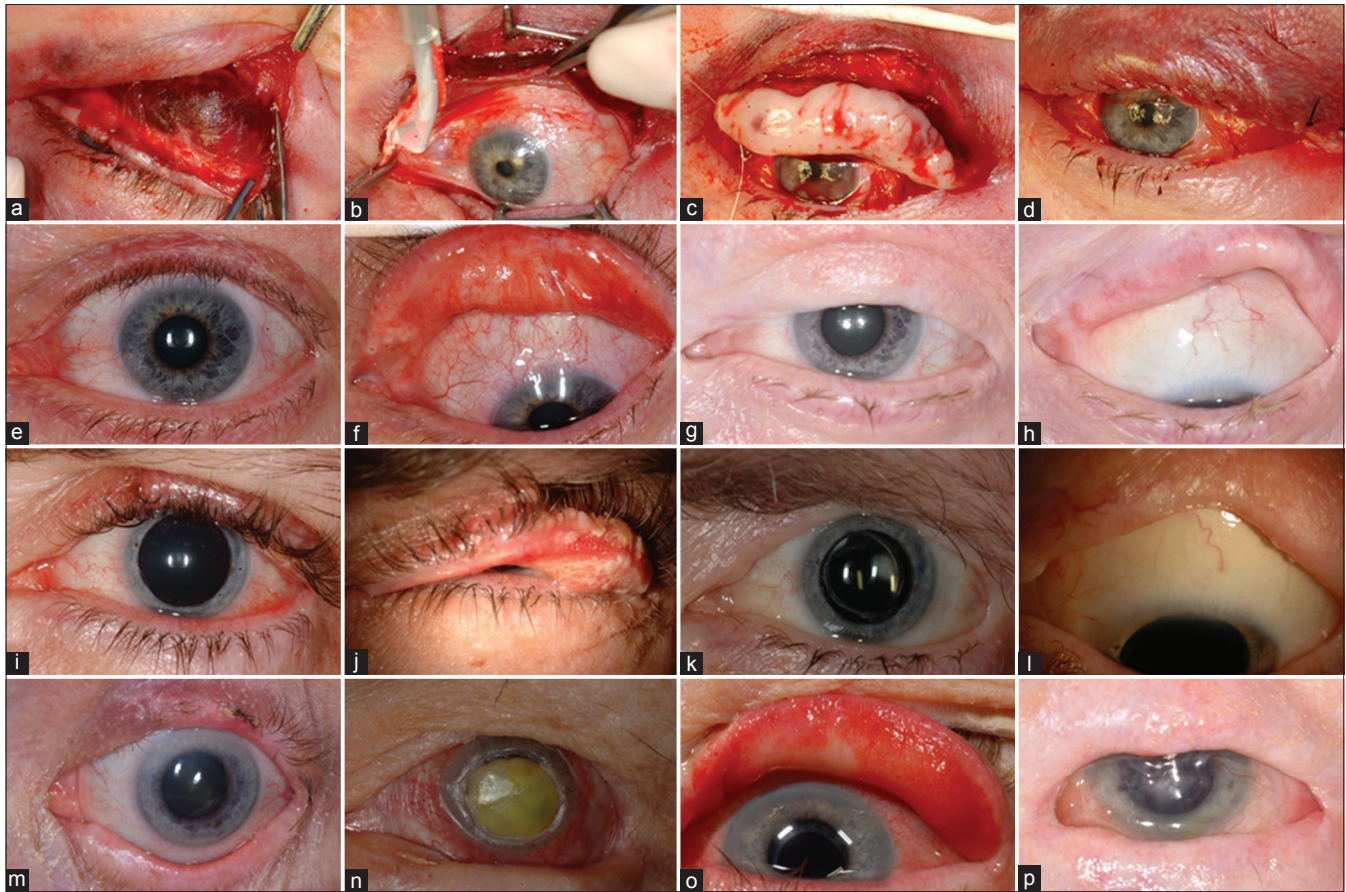
There were 54 eyes of 54 patients with localized eyelid sebaceous carcinoma involving the tarsoconjunctival region (AJCC category T1, T2, T3 [without orbital involvement]) included in this analysis and all were initially treated at WEH either by PLR (*n* = 26 eyes) or nonPLR (*n* = 28 eyes) techniques.

Patient demographics are listed in Table 1. There was no difference (PLR vs nonPLR) regarding mean age at presentation (70 vs 72 years), race (Caucasian 100% vs 93%), sex female (54% vs 71%), affected eye right (38% vs 39%), and mean visual acuity (20/30 vs 20/50).

The tumor features are listed in Table 2. All tumors fit AJCC classification of T1, T2, or T3. There was no case of orbital involvement. A comparison of tumor features (PLR vs nonPLR) demonstrated significant difference with greater tumor size in the PLR, measured as mean clock hours of involvement (4 vs 2 clock hours, *P* = 0.010) and mean largest diameter (21 mm vs 12 mm, *P* = 0.004). No other tumor features showed differences.

Treatment parameters are listed in Table 3. Regarding PLR, complete tumor control was achieved with mean of 1.7 surgical procedures due to positive margins or recurrence, and control was achieved following only 1 operation in 35% (*n* = 8). By comparison, nonPLR required mean 2.5 operations to achieve control (*P* = 0.001). The location of PLR was upper eyelid (*n* = 16, 62%), lower eyelid (*n* = 2, 8%), and both upper and lower eyelids (*n* = 8, 30%) performed simultaneously in 7 (26%) and sequentially in 1 (4%). Positive margins were seen in 69% of patients with PLR (*n* = 18) and 46% (*n* = 13) in those with lumpectomy. In both surgeries, positive margins were addressed by cryotherapy if pathology proved to be intraepithelial sebaceous carcinoma and further excision if invasive sebaceous carcinoma.





**Figure 1:** Posterior lamellar resection (PLR) procedure for eyelid sebaceous carcinoma. (a) After assessing the total tumor extent in the eyelid margin and the everted conjunctival surface, an incision is made 2 mm above the eyelash and the dissection carried out vertically and horizontally to reach beyond the tumor margins and the posterior lamella flap is excised. (b) Double freeze-thaw cryotherapy is applied to the resection margins. (c) Freshly harvested buccal mucosal graft is sutured to the posterior side of the anterior lamella to reconstruct the posterior lamella. (d) Final appearance at the end of the surgical procedure with a well-formed eyelid margin. (e) Eyelid and (f) conjunctival surfaces showing diffuse sebaceous carcinoma before therapy. Following PLR the (g) eyelid and (h) conjunctival surfaces are well healed. (i) Eyelid and (j) conjunctival surfaces showing diffuse sebaceous carcinoma before therapy. Following PLR the (k) eyelid and (l) conjunctival surfaces are intact, demonstrating the healed buccal graft. (m) Upper eyelid sebaceous carcinoma managed with PLR that developed (n) corneal melt with lens exposure at 13 months follow-up. (o) Upper eyelid sebaceous carcinoma that showed tumor control but developed (p) corneal decompensation at 5-year follow-up

Primary outcomes are listed in Table 4. There was no difference in the mean follow-up period of PLR vs nonPLR (52 vs 57 months) or final visual acuity (20/60 vs 20/200). However, PLR showed significantly fewer recurrences leading to orbital exenteration (15% vs 43%,  $P = 0.038$ ), fewer lymph node metastasis (0% vs 21%,  $P = 0.024$ ), and fewer systemic metastasis (0% vs 18%,  $P = 0.052$ ), and fewer lymph node or systemic metastasis (0% vs 39%,  $P < 0.001$ ).

## Discussion

In this study, we specifically focused on the management of sebaceous carcinoma classified as AJCC T1 ( $\leq 10$  mm), T2 ( $>10$ - $\leq 20$  mm), or T3 ( $>20$ - $\leq 30$  mm) using either complete PLR to remove all tumor plus hidden, subclinical sites within the tarsus, and conjunctiva versus nonPLR lumpectomy removing visible mass with attempt for clean margins. A decision for nonPLR lumpectomy versus PLR was based on the extent of the disease (less than half the lid versus greater than half the lid involvement) and surgeon preference over time. No anterior lamella was involved. We found that PLR was more successful

at tumor control with significantly reduced number of surgical procedures, reduced risk for orbital exenteration, and no case with metastasis to lymph node or remote site. Needless to say, we were surgically precise in this approach to remove the entire tarsal plate with adherent conjunctiva, and surrounding loose tissue, with preservation of the orbicularis muscle and skin. The salvaged anterior lamella was useful in reconstruction as a flap, and the posterior lamella was reconstructed with Hughes flap or free graft.

There are limitations to this study. The Ocular Oncology Service is a tertiary care center experienced in treating this rare disease. Therefore, the patient population referred may not be typical when compared to other centers. In addition, this study evaluates only localized tarsal disease and no anterior involvement. Therefore, it is for a certain subpopulation of all sebaceous carcinoma patients. Moreover, data was collected over a 35-year period. Surgeon preference over time may influence the outcomes.

As stated previously, sebaceous carcinoma is a relatively rare tumor, affecting the elderly population and with a fairly high

**Table 1: Posterior lamellar resection for localized tarsal conjunctival sebaceous carcinoma. Patient demographics**

	Posterior lamellar resection (% , 95% CI), n=26	Nonposterior lamellar resection (% , 95% CI), n=28	P	Total (%), n=54
Mean age (median, range), years	70 (75, 33-89)	72 (71, 46-92)	0.653	71 (72, 33-92)
Race				
Caucasian	26 (100, 85-100)	26 (93, 76-99)	0.491	52 (96, 87-99)
African-American	0 (0, 0-15)	1 (3.6, 0-19)	1.000	1 (2, 0-11)
Hispanic	0 (0, 0-15)	1 (3.6, 0-19)	1.000	1 (2, 0-11)
Asian	0 (0, 0-15)	0 (0, 0-14)	1.000	0 (0, 0-8)
Sex				
Male	12 (46, 29-65)	8 (29, 15-47)	0.260	20 (37, 25-50)
Female	14 (54, 35-71)	20 (71, 53-84)		34 (63, 50-75)
Affected eye				
Right eye	10 (38, 22-58)	11 (39, 24-58)	1.000	21 (39, 27-52)
Left eye	16 (62, 42-78)	17 (61, 42-76)		33 (61, 48-73)
Mean Snellen visual acuity (median, range)	20/30 (20/30, 20/20-LP)	20/50 (20/40, 20/20-CF)	0.174	20/40 (20/30, 20/20-LP)

CI by modified Wald method, P value for categorical variables using Fisher exact test, P value for continuous variables using student t-test

**Table 2: Posterior lamellar resection for localized tarsal conjunctival sebaceous carcinoma: Tumor features.**

	Posterior lamellar resection (% , 95% CI), n=26	Non-posterior lamellar resection (% , 95% CI), n=28	P	Total (%), n=54
Conjunctiva quadrant				
Superotemporal bulbar conjunctiva	0 (0, 0-15)	0 (0, 0-14)	1.000	0 (0, 0-8)
Superotemporal tarsal conjunctiva	14 (54, 35-71)	16 (57, 39-74)	1.000	30 (55, 42-68)
Superonasal bulbar conjunctiva	1 (4, 0-20)	0 (0, 0-14)	0.482	1 (2, 0-11)
Superonasal tarsal conjunctiva	4 (15, 6-34)	7 (25, 12-44)	0.505	11 (20, 12-33)
Inferotemporal bulbar conjunctiva	2 (8, 1-25)	1 (4, 0-19)	0.604	3 (6, 1-16)
Inferotemporal tarsal conjunctiva	0 (0, 0-15)	1 (4, 0-19)	1.000	1 (2, 0-11)
Inferonasal bulbar conjunctiva	3 (11, 3-30)	0 (0, 0-14)	0.105	3 (6, 1-16)
Inferonasal tarsal conjunctiva	2 (8, 1-25)	3 (10, 3-28)	1.000	5 (9, 4-20)
Mean clock hours involvement (median, range)	4 (4, 1-8)	2 (1, 1-8)	0.010	3 (2, 1-8)
Mean largest diameter (median, range), mm	21 (20, 5-60)	12 (10, 4-30)	0.004	16 (10, 4-60)
Mean thickness (median, range), mm	4 (4, 2-8)	3 (2, 2-10)	0.255	4 (3, 2-10)
Eyelid margin involvement				
Upper lid	16 (62, 42-78)	15 (54, 36-71)	0.593	31 (57, 44-70)
Lower lid	4 (15, 6-34)	5 (18, 7-36)	1.000	9 (17, 9-29)
Upper and lower lids	5 (19, 8-38)	5 (18, 7-36)	1.000	10 (19, 10-31)
None	1 (4, 0-20)	3 (10, 3-28)	0.612	4 (7, 2-18)
Additional features:				
Caruncular involvement	8 (31, 16-50)	5 (18, 7-36)	0.346	13 (24, 15-37)
Cornea involvement	6 (23, 11-42)	3 (11, 3-38)	0.286	9 (17, 9-29)

CI by modified Wald method. Categorical variables compared with Fisher exact test. Continuous variables compared with t-test

rate of recurrence and metastasis.<sup>[1-3,5,13]</sup> Sebaceous carcinoma is a difficult disease to manage due to the cryptic onset of the mass, common misdiagnosis, and often aggressive nature with frequent recurrences. The initial management of sebaceous carcinoma is important, similar to most human malignancies, as inaccurate tumor resection could potentially lead to numerous recurrences, seeding, and long-term risk for orbital exenteration and metastatic disease. Our approach to the management of

sebaceous carcinoma generally involves a two-step strategy, including map biopsy of the ocular surface to determine tumor site(s) and then subsequent definitive therapy based on the results of mapping. It is important to map all surfaces of the eye, including the bulbar, forniceal, and tarsal surfaces to understand the extent of malignant disease and know if the tumor is superficial (intraepithelial) or invasive (carcinoma) and if there is pagetoid spread. The second step of definitive

**Table 3: Posterior lamellar resection for localized tarsal conjunctival sebaceous carcinoma: Treatment and histopathology features**

	Posterior lamellar resection (% <i>, 95% CI</i> ), <i>n</i> =26	Non-posterior lamellar resection (% <i>, 95% CI</i> ), <i>n</i> =28	<i>P</i>	Total (% <i>, n</i> =54)
Initial treatment at WEH				
Posterior lamellar resection	26 (100)	0 (0)	--	26 (48)
Excision biopsy plus cryotherapy	0 (0)	14 (50)	--	12 (22)
Wedge resection plus cryotherapy	0 (0)	10 (36)	--	12 (22)
Cryotherapy only	0 (0)-	3 (11)	--	3 (6)
Plaque radiotherapy	0 (0)	1 (3)	--	1 (2)
Mitomycin C	0 (0)	0 (0)	--	0 (0)
Posterior lamellar resection features, <i>n</i> =26				
Upper lid only	16 (62)	0 (0)	--	16 (28)
Lower lid only	2 (8)	0 (0)	--	2 (4)
Upper and lower lid, sequential	1 (4)	0 (0)	--	1 (2)
Upper and lower lid, simultaneous	7 (26)	0 (0)	--	7 (18)
Mean number of surgeries (median, range)	1.7 (1,1-4)	2.5 (2,1-12)	0.001	2.4 (2, 1-12)
Histopathologic features				
Only invasive sebaceous carcinoma	17 (65, 46-81)	16 (57, 39-74)	0.586	33 (61, 48-73)
Only intraepithelial sebaceous carcinoma	2 (8, 1-25)	3 (11, 3-28)	1.000	5 (9, 4-20)
Both invasive and intraepithelial	7 (27, 13-46)	9 (32, 18-51)	0.770	16 (30, 19-43)

**Table 4: Posterior lamellar resection for localized tarsal conjunctival sebaceous carcinoma: Treatment outcomes**

	Posterior lamellar resection (% <i>, 95% CI</i> ), <i>n</i> =26	Non-posterior lamellar resection (% <i>, 95% CI</i> ), <i>n</i> =28	<i>P</i>	Total (% <i>, n</i> =54)
Mean follow-up (median, range), months	52 (44, range: 5-189)	57 (22, range: 1-316)	0.760	55 (33, range: 1-316)
Final mean visual acuity in Snellen equivalent (median, range)	20/60 (20/40, range: 20/20-HM)	20/200 (CF, range: 20/20-NLP)	0.488	20/80 (20/70, range: 20/20-NLP)
Final mean visual acuity in logMAR (median, range)	0.59 (0.24, 0-3)	0.80 (0.35, 0-3)	0.499	0.68 (0.3, 0-3)
Treatment outcomes:				
Moderate ( $\geq 3$ lines) vision loss	8 (31, 16-50)	14 (50, 33-67)	0.176	22 (41, 29-54)
Exenteration	4 (15, 6-34)	12 (43, 27-61)	0.038	16 (30, 19-43)
Indications for exenteration, <i>n</i> =17				
Tumor control	3 (12, 3-30)	11 (39, 24-58)	0.030	14 (26, 16-39)
Patient comfort	1 (4, 0-20)	1 (4, 0-19)	1.000	2 (4, 0-13)
Lymph node biopsy done				
Total lymph node biopsy	2 (8, 1-25)	6 (21, 10-40)	0.253	8 (15, 7-27)
Clinically palpable lymph nodes	0 (0, 0-15)	5 (18, 7-36)	0.052	5 (9, 4-20)
Positive lymph node metastasis	0 (0, 0-15)	6 (21, 10-40)	0.024	6 (11, 5-23)
Preauricular lymph node metastasis	0 (0, 0-15)	5 (18, 7-36)	0.052	5 (9, 4-20)
Anterior cervical lymph node metastasis	0 (0, 0-15)	1 (4, 0-19)	1.000	1 (2, 0-11)
Metastasis				
Regional lymph nodes plus systemic*	0 (0, 0-15)	11 (39, 24-58)	<0.001	11 (20, 12-33)
Systemic metastasis only*	0 (0, 0-15)	5 (18, 7-36)	0.052	5 (9, 4-20)

\*Sites of metastasis included: parotid gland (2), liver (2), and lung (1). Visual acuity *P* value excludes exenterated eyes



surgery is closely based on the results of mapping whereby all superficial disease is managed with cryotherapy, Mitomycin C, or resection, and the deep tumor is managed by resection plus adjuvant cryotherapy, followed by reconstruction.<sup>[14]</sup>

Previous studies on eyelid sebaceous carcinoma have revealed the rate of metastatic disease at 11–18% with greater surface area involvement increasing likelihood for systemic spread.<sup>[2,13,14]</sup> When comparing PLR vs nonPLR groups, patients who had PLR demonstrated significantly larger tumor burden (mean 21 mm base) compared to nonPLR (mean 12 mm base), despite greater tumor control with PLR. This highlights the fact that tumor size may not be as important for tumor control, but perhaps the more relevant feature is surgical approach with more complete removal of tarsoconjunctival plate and hidden subclinical tumor. Tumor invasiveness beyond the tarsal plate or, as we have documented in this report, the initial surgical technique could be a factor in ultimate outcome. We have documented in this analysis that those treated with PLR showed significantly fewer recurrences, fewer second operations, and fewer metastatic events. These findings should be considered when designing future modifications of the AJCC tumor classification scheme.

Orbital exenteration is occasionally required for patients with sebaceous carcinoma that demonstrate extensive pagetoid invasion and orbital mass. Chao *et al.* found 7%–36% of patients in their series of 25 cases underwent exenteration for these reasons.<sup>[2]</sup> Lisman *et al.* noted that exenteration was not always necessary for intraepithelial disease as there are no lymphatics within the conjunctival epithelium; hence, little risk for lymphogenous metastasis.<sup>[15]</sup> They indicated that large resection and repair using Cutler Beard flap could avoid exenteration but was associated with side effects of chronic dry eye, symblepharon, corneal erosion, and increased corneal vascularity.<sup>[15]</sup> Our study documented that exenteration can possibly be avoided if the first surgical approach to sebaceous carcinoma is with wide anatomic resection using PLR rather than nonPLR.

In most oncologic surgical subspecialties, there has been a gradual movement towards less radical and deforming surgery with anatomic dissection.<sup>[10,11]</sup> Our study has demonstrated that anatomic removal of the entire tarsoconjunctival plate including the eyelid margin (with cilia, sebaceous orifices, and all sebaceous glands in affected tarsal plate) using PLR for eyelid sebaceous carcinoma can be a successful approach. We found that re-constitution of the eyelid with the remaining anterior lamella and reconstruction of the posterior lamella using buccal graft or tarsoconjunctival flap provides patient comfort, satisfactory eyelid function, low risk for tumor recurrence, and low need for ultimate exenteration. By this analysis, this approach is more complete at tumor control, avoiding misleading subclinical “skip” areas and unforeseen ill-defined tumor margins within in the tarsal plate.

In summary, PLR demonstrates superior outcomes compared to focal eyelid lumpectomy (nonPLR) with regard to achieving local and systemic tumor control for localized tarsal conjunctival sebaceous carcinoma, classified as AJCC T1, T2, or T3. For those with more advanced T4 category with invasion into the orbit, globe, sinus, or brain, exenteration and/or chemotherapy/radiotherapy would likely be necessary. However, the majority of patients with sebaceous carcinoma present with T1, T2, or T3 categories and initial management

with PLR (including eyelid margin) rather than lumpectomy could be an important approach.

## Conclusion

In conclusion, PLR with removal of the entire tarsoconjunctival plate including the lid margin can be a successful approach in the treatment of sebaceous carcinoma.

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## Conflicts of interest

There are no conflicts of interest.

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