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Ophthalmic Technology Assessment

Intense Pulsed Light for Meibomian Gland Disease

A Report by the American Academy of Ophthalmology

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Purpose: To review the literature on the efficacy of intense pulsed light (IPL) on the eyelids in the management of meibomian gland disease (MGD) and meibomian gland–related ocular surface disease.

Methods: A literature search was last conducted on May 15, 2019, in the PubMed and Cochrane Library databases for English-language original research that assessed the effect of IPL on MGD in adult patients. Thirty-three articles were identified, and 12 studies were determined to be relevant to the criteria outlined for assessment. The panel methodologist (V.K.A.) assigned a level of evidence rating to each study; 4 studies were rated level II, and 8 studies were rated level III. Five studies had potential conflicts of interest and design limitations that affected interpretation of results.

Results: All studies documented improvement in clinically meaningful metrics, including tear breakup time (TBUT), corneal staining and eyelid margin measurements, meibum quality, meibomian gland expressability, ocular surface disease index (OSDI), and standard patient evaluation of eye dryness (SPEED) questionnaire scores. Side effects were relatively uncommon but included discomfort, cutaneous erythema, blistering, eyelash loss, and floaters; these were uniformly self-limited.

Conclusions: Although methodological limitations and potential conflicts of interest in some studies raised concern, the existing body of literature demonstrates improvements in the signs and symptoms of MGD after IPL therapy. *Ophthalmology 2020;127:1227-1233 © 2020 by the American Academy of Ophthalmology*

The American Academy of Ophthalmology prepares Ophthalmic Technology Assessments to evaluate new and existing procedures, drugs, and diagnostic and screening tests. The goal of an Ophthalmic Technology Assessment is to review systematically the available research for clinical efficacy, effectiveness, and safety. After review by members of the Ophthalmic Technology Assessment Committee, other Academy committees, relevant subspecialty societies, and legal counsel, assessments are submitted to the Academy's Board of Trustees for consideration as official Academy statements. The purpose of this assessment by the Ophthalmic Technology Assessment Committee Oculoplastics and Orbit Panel is to review the published literature on the efficacy and safety of intense pulsed light (IPL) therapy on the eyelids and ocular surface of patients who have meibomian gland disease (MGD) and MGD-related ocular surface disease.

Background

Meibomian gland disease is an extremely common condition, with a reported prevalence of up to 70% in certain geographic areas.[1] This disorder is the most common cause of evaporative dry eye and results in considerable keratopathy, pain, blurred vision, tearing, and photophobia. The ocular surface disease that results from dysfunction of the meibomian glands represents a significant impediment to normal activities of daily living for patients who have the disease and results in a considerable societal financial burden.[2] In light of the substantial consequences of this problem, multiple therapeutic interventions have been used to address it, including oral and topical antibiotics, corticosteroids, and anti-inflammatory agents; nutritional supplementation, lifestyle modification, laser-based and light-based modalities; and surgical treatments, even though MGD is often refractory to these therapies.[3]

Intense pulsed light therapy involves the application of a wide array of wavelengths of light directly to the skin. Typically, the handheld sources used in this technology emit light in wavelengths that range from 515 to 1200 nm, although a variety of filters may be used to select wavelengths for particular therapeutic goals.[4] Each session generally lasts for 3 to 5 minutes. Several treatments may be required to achieve a therapeutic goal, and even though

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practice patterns vary, these sessions are usually staggered by several weeks over the course of 2 to 4 months. Intense pulsed light is currently used to address multiple dermatologic maladies, including vascular and pigmented lesions, facial erythema, and hypertrichosis.[5,6]

Several properties of IPL suggest that this modality may be useful in addressing MGD. Specifically, hemoglobin absorbs the heat administered in IPL, thereby reducing telangiectatic blood vessels.[7] These vessels are a hallmark of MGD. Theoretically, restoration of a more normal structure of the skin may help to reduce the cutaneous inflammation that results in the characteristic ocular surface changes. Additionally, IPL may eradicate Demodex microbe infestation that is common in MGD through coagulation, and, as such, may provide therapeutic suppression of the disease.[8] Intense pulsed light treatment also upregulates anti-inflammatory cytokines, downregulates proinflammatory molecules, and suppresses matrix metalloproteinases, thereby inducing a more favorable cutaneous molecular milieu.[9-12]

In the studies included in this assessment, the light was focused on the skin surrounding the eyelids, but patients wore protection for the eyes. The light intensity was determined by assessing patient skin pigmentation and pain response during treatment. The literature reviewed by the panel on the use of IPL in this setting demonstrates that it may represent a promising intervention to address MGD.

Question for Assessment

The purpose of this assessment was to address the following question: Does IPL therapy improve ocular surface-specific symptoms or signs, or both, in patients with MGD?

Description of Evidence

A literature search was performed on November 15, 2018, and repeated on May 15, 2019, in the PubMed and Cochrane Library databases. The following search terms were used: *intense pulsed light, intense pulsed light therapy, meibomian gland disease, meibomian gland disorder, blepharitis, blepharoconjunctivitis, evaporative dry eye, evaporative dry eye disease, evaporative dry eye syndrome, dry eye, keratitis, evaporative dry eye syndromes, eyelid diseases, meibomian glands, meibomian gland dysfunction, meibomian gland expression,* and *rosacea associated meibomian gland disease*.

Articles were limited to original research for which an English language abstract was available and to those studies that included at least 15 patients with MGD who were at least 18 years of age, had undergone IPL, and were followed clinically for at least 3 months. This relatively small cohort of patients was chosen to ensure that an adequate number of studies were reviewed to facilitate meaningful conclusions. Acceptable outcome measures included changes in standardized assessments of the ocular surface and ocular surface-related symptoms.

Of the 33 articles identified, 20 were selected for full-text review and abstraction. Eight articles were eliminated because they did not include clinical metrics or an adequate number of patients. The remaining 12 articles were determined to be relevant for inclusion in this assessment. The panel methodologist (V.K.A.) assigned level of evidence ratings to the studies according to the American Academy of Ophthalmology's guidelines based on the rating scale developed by the British Centre for Evidence-Based Medicine.[13] A level I rating was assigned to well-designed and well-conducted randomized clinical trials, a level II rating was assigned to well-designed case-control and cohort studies and lower-quality randomized clinical trials, and a level III rating was assigned to case series and lower-quality case-control and cohort studies. Four studies were rated level II, and 8 studies were rated level III. All studies were abstracted by the panel members.

Published Results

A summary of the 12 studies included in this assessment, along with abstracted data, is provided in Table 1.

Level II Evidence

Arita et al[14] reported their experience with IPL in 90 eyes of 45 patients. Patients received either IPL (using an M22 device, Lumenis, Tokneam, Israel, 14-16 J/cm^2) and meibomian gland expression or expression alone. Eight treatment sessions were conducted, with 3 weeks between sessions. Patients were followed for 32 weeks after therapy was initiated. Lipid layer thickness was measured using a LipiView device (Tear Science, Morrisville, NC; currently produced by Johnson & Johnson Vision, Jacksonville, FL). Compared with the group that underwent only gland expression, the IPL group experienced improved lipid layer thickness (maximal mean increase at any follow-up interval, 21.3 nm), tear breakup time (TBUT) (maximal mean increase, 4.5 seconds), meibum grade (maximal mean decrease, 0.3), corneal staining score (maximal mean decrease, 1.0), and eyelid margin score (maximal mean decrease, 1.9 [on a scale of 0 to 6]) at 24 and 32 weeks, better standard patient evaluation of eye dryness (SPEED) score at 32 weeks (mean decrease, 9.2), and bilateral lipid layer grade from 6 weeks through 32 weeks (maximal mean decrease, 0.3). All of these differences were statistically significant. Nonetheless, 3 patients withdrew from the study because of the pain they experienced with IPL. Of note, the first author of the clinical study also serves as a consultant for the maker of the IPL device used in this study.

Zhang et al[15] compared patients who received 3 IPL treatments administered every 30 days with patients who received tea tree oil. Twenty patients were enrolled in each group and were followed for 90 days. The authors assessed meibum quality on a scale from 0 to 3 (i.e., from clear discharge to a toothpaste-like consistency) across 8 glands. This investigation did not identify any differences in Demodex counts, scoring of eyelid margin abnormalities or conjunctival congestion, corneal staining, Schirmer testing, or meibomian gland expressability. However, compared with patients who used tea tree oil, the group who received

Table 1. Summary of Included Studies

Author (Year)	Level of Evidence	No. of Patients	Average Age (Range, if Recorded)	Average No. of Sessions	Outcomes	Adverse Events	Conflicts of Interest
Arita et al[14] (2019)	II	42 (22 received IPL, 20 underwent meibomian gland expression)	61 yrs (23–81) for IPL patients, 61.9 yrs (39–78) for expression patients	8	TBUT, SPEED score, and TBUT improved at 24 and 32 wks	3 patients withdrew due to pain	1 author is consultant for manufacturer
Zhang et al[15] (2018)	II	40 (20 received IPL, 20 treated with tea tree oil)	38.3 for IPL, 39.2 for controls	3	At 90 days, OSDI, TBUT, and meibum quality improved	NR	None
Rong et al[16] (2018)[1]	II	44 (1 side received IPL, other side received sham)	46.3 yrs (23–86)	3	SPEED, TBUT, corneal staining, and MGYSS improved with IPL at 4 mos	5 patients experienced mild pain, 1 experienced eyelash loss	None listed, although 1 author disclosed a consulting role in another investigation
Rong et al[17] (2018)	II	28 (1 side received IPL, other side received sham)	42.2 yrs (range, 24–78)	3	TBUT and MGYSS improved at 1, 3, and 6 mos; MGYSS improved at 9 mos	NR	None
Dell et al[1] (2017)	III	40	57.5 yrs	4	TBUT, corneal staining, SPEED, and osmolarity improved through 15 wks	NR	Authors are consultants for manufacturer
Gupta et al[18] (2016)	III	100	63 yrs (range, 32–92)	3–6, mean of 4	Eyelid margin edema, telangiectasias, meibum viscosity, TBUT, and OSDI improved	None	None
Seo et al[19] (2018)	III	17	64 yrs (57–68)	4	88.2% of patients were satisfied, OSDI improved through 12 mos, TBUT improved through 12 wks	None	None
Arita et al[20] (2018)	III	31	47.6 yrs	4–8, average, 6	At 4 wks after final treatment, there were improvements in SPEED score, TBUT, meibum grade, eyelid margin abnormality score, and corneal staining	NR	Corresponding author is a consultant for manufacturer
Toyos et al[22] (2015)	III	78	54 yrs (21–84)	Average, 7	87% of patients experienced improvement in TBUT, 93% of patients were satisfied	14% of patients developed redness, edema, blistering, floaters, or hair loss	1 author is the inventor of the technology and a paid consultant; another is an employee of the manufacturer
Vegunta et al[21] (2016)	III	35	61 years (20–84)	Average, 4; range, 2–6	89% of patients had improved symptoms	NR	None
Yin et al[23] (2018)	III	18 received IPL, 17 received eyelid hygiene	41.6 for IPL patients, 40.8 for eyelid hygiene patients	3	At 3 mos, OSDI and TBUT improved in both groups; meibomian gland structures improved with IPL	NR	None
Albietz and Schmid[24] (2018)	III	26	54.7 yrs (21–82)	3	At week 8, TBUT, corneal staining, and MGYSS improved; at week 12, symptoms, TBUT, and staining improved	None	NR

IPL = intense pulsed light; MGYSS = meibomian gland yielding secretion score; NR = not recorded; OSDI = ocular surface disease index; SPEED = standard patient evaluation of eye dryness; TBUT = tear breakup time.

IPL enjoyed statistically significant improvements in ocular surface disease index (OSDI) scores (mean decrease, 25.6), TBUT (mean increase, 2.45 seconds), and meibum quality (mean decrease, 4.2). The authors did not comment on complications from either treatment. No potential conflicts of interest were disclosed.

Rong et al[16] performed 3 sessions of IPL at 4-week intervals (M22, Lumenis, Tokneam, Israel, 14-16 J/cm^2) to 1 side of the face of 44 patients and a sham treatment to the other side. Both sides underwent meibomian gland expression. The SPEED scores and corneal and conjunctival fluorescein staining improved on both sides, whereas TBUT and the meibomian gland yielding secretion score (MGYSS) showed greater improvement in the IPL-treated side that was statistically significant. Specifically, TBUT increased by 2.5 seconds on the IPL-treated side, whereas it increased by 0.4 seconds on the control side. The MGYSS was calculated using a standardized device, and the function of the gland was rated from 0 (no secretion) to 3 (clear liquid secretion). This score was assessed across 15 glands for a maximum possible score of 45. The MGYSS improved by 8.2 on the IPL-treated side compared with 0.9 on the control side. Five patients who received IPL experienced mild pain, and 1 patient experienced partial eyelash loss. No potential conflicts of interest were disclosed. However, of note, 1 of the investigators indicated having a position as a paid consultant to the manufacturer in another study.

Using similar methodology, Rong et al[17] studied 28 patients who underwent 3 sessions of IPL (M22, Lumenis, Tokneam, Israel, 14−16 J/cm^2) to 1 side of the face and sham treatment to the contralateral side. The sessions were conducted at intervals of 4 weeks, and both sides received meibomian gland expression. Tear breakup time and the MYGSS improved at 1-month, 3-month, and 6-month intervals in both groups, whereas the MGYSS improved in a statistically significant way on the IPL side at 9 months (mean improvement, 3.2). The study did not uncover any differences in SPEED scores or corneal staining between the 2 groups. Complications were not recorded, and no potential conflicts of interest were disclosed.

Level III Evidence

Dell et al[1] assessed the impact of 4 sessions of IPL (M22, Lumenis, Tokneam, Israel, 14−16 J/cm^2) on 80 eyes of 40 patients. The treatments were at 3-week intervals and were combined with meibomian gland expression. The authors evaluated the meibomian gland score by calculating a sum of 0 to 3 scores for eyelid thickness, vascularity, telangiectasias, clogged gland number, meibum quality, meibum expressablity, and gland dropout. Corneal staining scores were determined by grading 5 zones from 0 to 4. Over a 15-week follow-up interval, TBUT (maximal mean increase, 4.2 seconds), SPEED scores (maximal mean decrease, 7.1), meibomian gland scores (maximal mean decrease, 7.9), corneal staining (maximal mean decrease, 4.5), and tear film osmolarity (maximal mean decrease, 34.3 mOsm/L) all showed statistically significant improvement, although lipid layer thickness was unchanged. Complications were not specifically assessed in the study. Of note, the authors serve as consultants to the maker of the device.

Gupta et al[18] documented their experience with 100 patients who underwent a mean of 4 (range, 3−6) IPL treatments (Dermamed Quadra4, Lenni, PA). The average length of follow-up was not recorded in this study, although patients underwent a minimum of 3 treatments and the sessions were separated by at least 3 weeks, suggesting a minimum follow-up interval of 9 weeks. Using a unique scoring system that rated each metric from 0 to 4 (with 0 indicating a complete absence of disease and 4 representing the most severe disease), the authors noted decreased eyelid margin edema (mean decrease, 0.3), fewer facial telangiectasias (mean decrease, 0.7), enhanced TBUT (mean improvement, 3.4 seconds), and improved eyelid margin vascularity (mean decrease, 1.2), meibum viscosity (mean decrease, 1.1), and OSDI scores (mean decrease, 9.6). All of these differences were statistically significant. No complications were identified in this study, and no potential conflicts of interest were disclosed.

Seo et al[19] evaluated 17 patients who underwent 4 IPL treatments (M22, Lumenis, Tokneam, Israel, 11 J/cm^2) at 3-week intervals. These patients were followed for 1 year. Fifteen patients (88.2%) were satisfied with the treatment. Ocular surface disease index scores and meibum quality (assessed using a 0 to 3 scale) improved in a statistically significant way for the duration of the study, whereas TBUT and corneal staining scores improved for only the first 12 weeks. No adverse events were recorded, and no potential conflicts of interest were disclosed.

Arita et al[20] studied 62 eyes of 31 patients who underwent 4 to 8 IPL treatments (M22, Lumenis, Tokneam, Israel, 14−16 J/cm^2) at 3-week intervals, with a mean of 6 sessions. Meibum grade was measured on a scale of 0 to 3, corneal staining was assessed on a scale of 0 to 9, and eyelid margin abnormalities were graded on a scale of 0 to 3. Four weeks after the final treatment session, statistically significant improvements were detected in SPEED scores (mean decrease, 7.1), TBUT (mean increase, 4.5 seconds), meibum grade (mean decrease, 1.2), eyelid margin abnormality scores (mean decrease 1.3 for gland plugging and 1.1 for vascularity), and corneal staining (mean decrease, 0.5), although Schirmer testing and meibomian gland morphology remained unchanged. Complications were not evaluated in this study. Of note, the corresponding author serves as a consultant to the manufacturer.

Vegunta et al[21] followed 35 patients who underwent a mean of 4 sessions (range, 2−6 sessions) of IPL (Quadra Q4, Lenni, PA) that were conducted at 4- to 6-week intervals. The follow-up interval ranged from 6 to 20 months. After 1 treatment, 71% of patients had improved symptoms, and 83% experienced improvements after 3 sessions. Patients who received IPL demonstrated statistically significant improvements in SPEED2 results. The SPEED2 scores improved by 50% in 8 patients (23% of patients) and by 1% to 49% in 23 patients (66% of patients), although 1 patient worsened and 1 did not experience any change. Adverse events were not recorded. The authors stated they had no funding or conflicts of interest to disclose.

In a longer-term study, Toyos et al[22] documented the impact of a median of 7 sessions of IPL (DermaMed Diamond Series Q4, Lenni, PA, 8-20 J/cm^2) on 78 patients who were followed for 30 months. Sixty-eight patients (87%) experienced an improvement in TBUT, and 73 patients (93%) expressed satisfaction with their improvement in dry eye symptoms. Even though serious adverse events were not identified, 14% of patients developed cutaneous redness, edema, blistering, hair loss, and vitreous floaters. The authors noted that most of these issues self-resolved after 1 week. Significant financial conflicts of interest were disclosed. One author reported inventing IPL and received a consulting fee from the device manufacturer for this study. Another author reported being employed by the company.

Yin et al[23] compared 18 patients who received 3 monthly IPL treatments (M22, Lumenis, Tokneam, Israel, 16 or J/cm^2) and 17 patients who initiated eyelid hygiene. At a 3-month follow-up interval, OSDI scores, TBUT, and meibomian gland expressability dropout improved in both groups, and the study did not detect any differences in Schirmer testing or corneal staining. However, as measured by the longest acinar diameter and unit density, the structure of the meibomian glands improved in a statistically significant way in the IPL group compared with the cohort of patients who used eyelid hygiene. In the group who underwent IPL therapy, the longest acinar diameter decreased from a pretreatment mean of 102 µm to a post-treatment mean of 85 µm, and the acinar unit density improved from a mean of 92 to 113.1 units/mm^2. Complications were not assessed in this study, and no potential conflicts of interest were disclosed.

Albietz and Schmid[24] administered IPL (E>Eye, ESW Vision SAS, Houdan, France, 9.8-13 J/cm^2) at a baseline therapy session and repeated treatments 2 and 6 weeks later. After 8 weeks, improvement was reported in meibomian gland expressability (from a mean of 1.7 to a mean of 1.1 based on a scale of 0 to 3), meibum quality (from 18.5 to 14.7 on a scale of 0 [indicating clarity] to 24 [indicating a thick matter]), TBUT (from a mean of 1.2 seconds to a mean of 3.1 seconds), corneal staining (from a mean of 4 to a mean of 1.4 on the Efron scale), and eyelid erythema (from a mean of 1 to a mean of 0.6 on a scale that graded redness from 0 to 3). All improved in statistically significant ways, although OSDI scores, tear osmolarity, sensitivity, and lubricant use had not changed. At week 12, symptoms, TBUT, and corneal staining had all improved. No adverse outcomes were identified. The publication did not include a statement on conflicts of interest.

Discussion

Meibomian gland disease and its impact on the ocular surface represent a common ophthalmic condition that has significant effects on activities of daily living.[2,25] Multiple therapeutic strategies have been used to address this problem, even though our current therapeutic armamentarium is often ineffective, and the disease remains incurable.[3]

The studies assessed in this review used clinically meaningful metrics to determine the effect of IPL on MGD. Although level I evidence was not available to assess this effect, the investigations identified in this review suggest that this modality may provide benefit to address the eyelid and ocular surface changes that result from MGD in some patients. Specifically, the limited body of research documented measurable improvements in some aspect of ocular surface health, such as eyelid appearance, glandular health, meibum quality, meibum expressability, tear sustainability, and corneal staining. Patients' perceptions of the results of IPL therapy were reflected in SPEED and OSDI scores, which improved after treatment. Patient satisfaction rates varied from 88% to 92%. However, these favorable results should be interpreted cautiously because patients were unmasked, and the majority of treated groups did not have a comparative control group. Therefore, the potential for bias, placebo effect, and regression to the mean may explain these findings.

Other caveats should also be considered in the setting of IPL. First, although IPL was generally well tolerated and complications were usually mild and self-limited, 1 study detected a 14% rate of side effects. Three studies did not detect any post-treatment problems, and the authors of 6 studies did not comment on treatment-related side effects. Importantly, there are prior reports that document serious ophthalmic sequelae that resulted from IPL that was performed by nonophthalmologists, including uveitis, synechiae, photophobia, and pupillary abnormalities.[25,26] Limited power analyses, lack of standardized outcome metrics, and insufficient documentation of side effects or adverse outcomes also weaken the evidence base for IPL's efficacy and safety. Clinicians should use their judgment in discerning how each study applies to the patients with MGD they manage.

Additionally, IPL requires a significant commitment from patients. The costs associated with this therapy may be substantial, and IPL treatments are not currently covered by insurers. Furthermore, the benefits identified in this assessment required a minimum of 2 treatments, and studies herein used a mean of 4.3 treatments/patient at 3- to 4-week intervals. After each session, patients may develop cutaneous erythema, crusting, and bruising, but these complications are uncommon. Even among highly motivated patients with MGD, the discomfort associated with this therapy may infrequently be substantial enough to require discontinuation of the treatment.[14]

The benefits reported in these investigations must be juxtaposed against potential conflicts of interest. In 5 of the 12 studies (42%) identified in this assessment, the investigators declared a potential financial conflict, or they had such a conflict. In an additional study, no information was presented about conflicts of interest. Even though the presence of ties to relevant industry partners does not necessarily bias or invalidate the results of these studies, clinicians should be cognizant of potential conflicts of interest when considering these findings.

Overall, the existing body of literature demonstrates improvements in the signs and symptoms of MGD after IPL therapy, but these conclusions should be interpreted

cautiously because of the methodological limitations and conflicts of interest disclosed in some studies.

Future Research

Level I studies of IPL treatment should now be conducted to include standardized, validated, and longer-term outcomes. The investigations identified in this assessment raise important questions about the management of MGD and the role of IPL. The longest follow-up period in these studies was 12 months. Given that MGD is currently an incurable, long-term disease, future investigations should consider longer-term intervals of patient surveillance. Such an approach may enhance the ability of clinicians to counsel their patients before treatment and may define the durability of IPL treatments.

Furthermore, the number of sessions varied considerably between these studies, with a range of 2 to 8 interventions. Additional studies that are designed to identify the most beneficial number of treatments and the duration between IPL treatments would facilitate the development of optimal practice patterns.

Finally, several of these studies combined meibomian gland expression with IPL. In light of the treatment-refractory nature of MGD, testing the use of multiple modalities to achieve therapeutic efficacy would be beneficial. Further studies should focus on the optimal combination of treatments to remedy this disorder and on which patient factors indicate responsiveness to particular therapies.

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Data collection: Wladis, Aakalu, Foster, Freitag, Sobel, Tao, Yen

Analysis and interpretation: Wladis, Aakalu, Foster, Freitag, Sobel, Tao, Yen

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Abbreviations and Acronyms:
IPL = intense pulsed light; **MGD** = meibomian gland disease; **MGYSS** = meibomian gland yielding secretion score; **OSDI** = ocular surface disease index; **SPEED** = standard patient evaluation of eye dryness; **TBUT** = tear breakup time.

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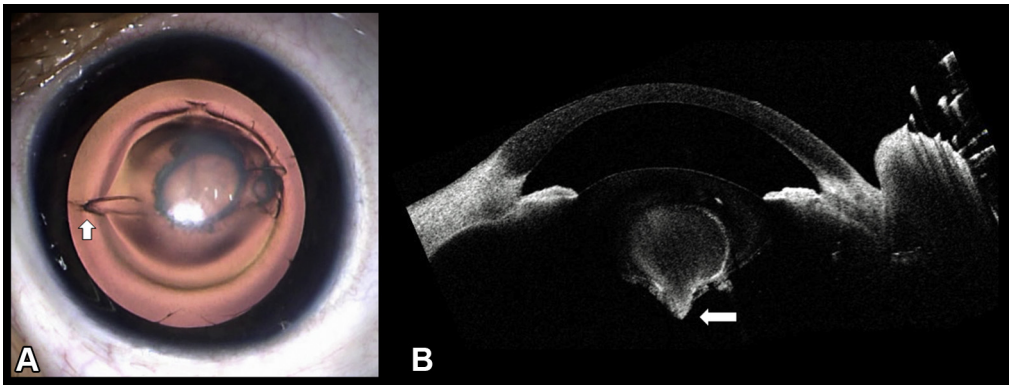
Pictures & Perspectives



Inadvertent Intra-Lenticular Injection of Anti-Vascular Endothelial Growth Factor

A 3-month-old boy presented with poor red reflex in his right eye (RE) following retinopathy of prematurity (ROP) treatment. Diagnosed with zone 1 ROP, he was treated with laser photocoagulation followed by intravitreal injection of bevacizumab in both eyes (OU). Lamellar cataract was observed in the right eye with a needle track going into the lens giving the appearance of a teardrop (Fig **A**). Anterior-segment OCT revealed dehiscence of posterior capsule (Fig **B**). Phaco-aspiration was performed on the right eye without intraocular lens implantation. With more ophthalmologists opting for intravitreal anti−vascular endothelial growth factor injections in ROP requiring treatment, secondary cataract is a growing subject of concern. Judicious use and appropriate technique of intravitreal injections in neonates is essential. (Magnified version of Fig **A**-**B** is available online at www.aaojournal.org).

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