

Deciding on drops: evidence-based postoperative cataract surgery prescribing

Laura Donaldson, PGY-4

Currently, there is widespread variability in the postoperative medications routinely prescribed by cataract surgeons. Regimens usually consist of both a topical steroid and an NSAID often accompanied by an antibiotic. However, high quality evidence guiding the choice of postoperative medications is lacking. In this issue, Al-Awadi et al. investigate two different dosing schedules of loteprednol etabonate (LE) gel and bromfenac eyedrops in a randomized control trial.

Patients undergoing routine cataract surgery were randomly assigned to receive LE either four times daily (control group with on-label dosing) or twice daily (study group) with both groups receiving bromfenac once daily. Drops were started two days prior to surgery and were continued for four weeks postoperatively. The study found no difference in the primary outcome of ocular inflammation, measured using a standardized scale consisting of a rating from zero to four each for anterior chamber cells and flare. There was also no difference in mean best-corrected visual acuity, intraocular pressure or central retinal thickness on OCT.

Notably, the authors used a questionnaire to determine self-reported adherence to their medication doses and how tolerable patients found them. In both groups, patients reported near complete adherence to their assigned regimens. There was no significant difference in doses missed or reported difficulty remembering, but trends towards more difficulty remembering doses as well as more doses taken than prescribed for bromfenac were seen in the control group. Literature from both the glaucoma and cataract surgery fields highlights the problem of medication adherence and supports the use of simple dosing protocols.^{1,2} In the study group, a total of only three drops per day was required, whereas many surgeons use NSAIDs and steroids each dosed at four times per day. Medication costs can also be an important factor limiting compliance. While patients in the study had medications provided to them free of charge, coverage in different regions varies. For example, bromfenac is not covered in Ontario for low-income individuals and seniors while other NSAID formulations are available under these plans.

It is important to recognize that the results of this study may not apply to all patients undergoing cataract surgery, including those with intraoperative complications or ocular comorbidities such as glaucoma. Although not enrolled in this study, glaucoma patients in particular may benefit from less frequent steroid dosing minimizing steroid-induced intraocular pressure spikes. The study did include 33 diabetic patients, composing 35% of enrolled subjects. Only three patients (3.2%) had either diabetic macular edema or non-proliferative diabetic retinopathy and more severe diabetic eye disease may require alternate approaches.

Further high-quality studies are needed to continue to build a strong evidence base for postoperative prescribing. A randomized control design and the use of standardized rating scales, as employed in the work by Al-Awadi et al., are essential for outcomes.

Summary 1: [https://www.canadianjournalofophthalmology.ca/article/S0008-4182\(18\)30046-2/fulltext](https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30046-2/fulltext)

REFERENCES

- Kim CY, Park KH, Ahn J, Ahn MD, Cha SC, Kim HS, Kim JM, Kim MJ, Kim TW, Kim YY, Lee JW, Park SW, Sohn YH, Sung KR, Yoo C, Cha J, Kim YJ. Treatment patterns and medication adherence of patients with glaucoma in South Korea. *Br J Ophthalmol*. 2017 Jun;101(6):801–7.
- Hermann MM1, Ustündag C, Diestelhorst M. Electronic compliance monitoring of topical treatment after ophthalmic surgery. *Int Ophthalmol*. 2010 Aug;30(4):385–90. <https://doi.org/10.1007/s10792-010-9362-3>. Epub 2010 Apr 7.



Intimate partner violence and traumatic ocular injury in women

Gareth Mercer, PGY-2

Intimate Partner Violence (IPV), defined as physical, emotional or sexual abuse by a current or former romantic/sexual partner, is a global public health and social justice problem. IPV is ubiquitous, affecting people of all genders, ethnicities, and socioeconomic positions. The risk is higher for women (lifetime risk, Canada, 6-20%¹⁻³) and for gay, bisexual, and transgender people⁴ than for heterosexual men (lifetime risk, Canada, 6%³).

Physicians in all disciplines may encounter people who have experienced IPV. Unlike child abuse, there is no legal obligation for physicians to report IPV in Canada. However, patients who disclose IPV to a health care provider have been found to be more likely to accept intervention services and to exit from the abusive relationship.⁵ Given the natural history of IPV is characterized by recurrent and escalating acts of violence,⁶ a physician's ability to identify and offer timely support to abused individuals may avert significant morbidity and mortality.

Although studies on screening for IPV in health care settings have shown mixed results,^{7,8} the US Preventative Services Task Force recommends screening for women of childbearing age.⁹ Evidence on appropriate screening methods and referral services for other population groups is lacking.

In their study in this issue, Cohen et al. take the novel—and overdue—step of examining IPV as a cause of traumatic ocular injury among women. The incidence of IPV-related ocular trauma in their population was relatively low, accounting for 2.6% of the total. However, because the study lacked a consistent, validated methodology for ascertaining IPV it may have underestimated the true incidence. What was quite stark about the findings is that IPV-associated ocular injuries were invariably severe, with 80% resulting in enucleation.

Notwithstanding remaining questions as to the most appropriate methods and true magnitude of benefit from screening, the serious nature of the injuries warrants thoughtful consideration be given to screening for IPV among

patients with ocular trauma. In addition, ophthalmologists and trainees ought to be aware of the support services available at their institutions.

For those planning to integrate screening into their clinical practice, Cohen and colleagues draw attention to a continuing medical education course hosted on the American Academy of Ophthalmology website and a published “Pocket Guide” for ophthalmologists. Specifically relevant to the Canadian context, brief IPV screening tools that have been validated for emergency department and primary care settings include:

- The Partner Violence Screen (PVS), a 3-item tool assessing physical abuse and feelings of safety,¹⁰ and
- The Woman Abuse Screening Tool (WAST), an 8-item tool covering physical, sexual, and emotional abuse.¹¹

There is also evidence from a randomized controlled trial to guide deciding between face-to-face and written methods of screening.¹²

In cases where IPV is identified, physicians should assess patients' home-going safety and arrange referral to appropriate support services, including social work, law enforcement, emergency housing, counseling, psychology, and psychiatry.

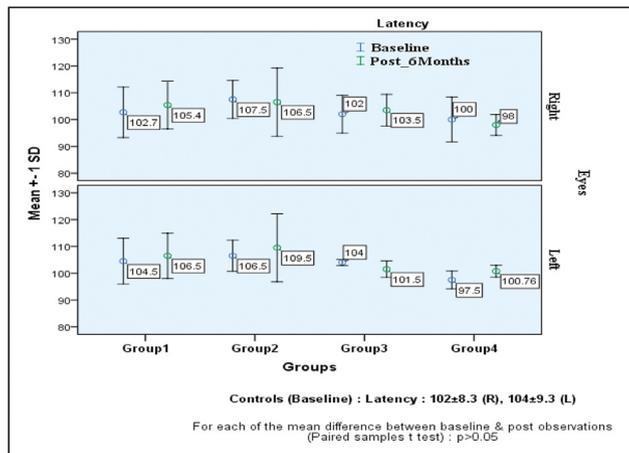
Summary 2: [https://www.canadianjournalofophthalmology.ca/article/S0008-4182\(18\)30430-7/fulltext](https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30430-7/fulltext)

REFERENCES

1. Sprague S, Bhandari M, Della Rocca GJ, Goslings JC, Poolman RW, Madden K, Simunovic N, Dosanjh S, Schemitsch EH. Prevalence of abuse and intimate partner violence surgical evaluation (PRAISE) in orthopaedic fracture clinics: a multinational prevalence study. *Lancet*. 2013;382(9895):866–76. [https://doi.org/10.1016/S0140-6736\(13\)61205-2](https://doi.org/10.1016/S0140-6736(13)61205-2).
2. Kirst M, Lazgare LP, Zhang YJ, O'Campo P. The effects of social capital and neighborhood characteristics on intimate partner violence: a consideration of social resources and risks. *Am J Community Psychol*. 2015;55(3-4):314–25. <https://doi.org/10.1007/s10464-015-9716-0>.
3. Ansara DL, Hindin MJ. Exploring gender differences in the patterns of intimate partner violence in Canada: a latent class approach. *J Epidemiol Community Health*. 2010;64(10):849–54. <https://doi.org/10.1136/jech.2009.095208>.
4. Barrett BJ, St. Pierre M. Intimate Partner Violence Reported by Lesbian-, Gay-, and Bisexual-Identified Individuals Living in Canada: An Exploration of Within-Group Variations. *Journal of Gay & Lesbian Social Services*. 2013;25(1):1–23. <https://doi.org/10.1080/10538720.2013.751887>.
5. McCloskey LA, Lichter E, Williams C, Gerber M, Wittenberg E, Ganz M. Assessing intimate partner violence in health care settings leads to women's receipt of interventions and improved health. *Public Health Rep*. 2006;121(4):435–44. <https://doi.org/10.1177/003335490612100412>.
6. Black MC, Basile KC, Breiding MJ, Smith SG, Walters ML, Merrick MT, Chen J, Stevens MR. The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 Summary Report. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention; 2011.
7. MacMillan HL, Wathen CN, Jamieson E, Boyle MH, Shannon HS, Ford-Gilboe M, Worster A, Lent B, Cohen JH, Campbell JC, McNutt LA. McMaster Violence Against Women Research Group. Screening for intimate partner violence in health care settings: a randomized trial. *JAMA*. 2009;302(5):493–501. <https://doi.org/10.1001/jama.2009.1089>.
8. Hegarty K, O'Doherty L, Taft A, Chondros P, Brown S, Valpied J, Astbury J, Taket A, Gold L, Feder G, Gunn J. Screening and counselling in the primary care setting for women who have experienced intimate partner violence (WEAVE): a cluster randomised controlled trial. *Lancet*.

2013;382(9888):249–58. [https://doi.org/10.1016/S0140-6736\(13\)60052-5](https://doi.org/10.1016/S0140-6736(13)60052-5).

9. Curry SJ, Krist AH, Owens DK, Barry MJ, Caughey AB, Davidson KW, Doubeni CA, Epling JW, Grossman DC, Kemper AR, Kubik M, Kurth A, Landefeld CS, Mangione CM, Silverstein M, Simon MA, Tseng CW, Wong JB. Screening for Intimate Partner Violence, Elder Abuse, and Abuse of Vulnerable Adults: US Preventive Services Task Force Final Recommendation Statement. *JAMA*. 2018;320(16):1678–87. <https://doi.org/10.1001/jama.2018.14741>.
10. Feldhaus KM, Koziol-McLain J, Amsbury HL, Norton IM, Lowenstein SR, Abbott JT. Accuracy of 3 brief screening questions for detecting partner violence in the emergency department. *JAMA*. 1997;277(17):1357–61.
11. Brown JB, Lent B, Schmidt G, Sas G. Application of the Woman Abuse Screening Tool (WAST) and WAST-short in the family practice setting. *J Fam Pract*. 2000;49(10):896–903.
12. MacMillan HL, Wathen CN, Jamieson E, Boyle M, McNutt LA, Worcester A, Lent B, Webb M. McMaster Violence Against Women Research Group. Approaches to screening for intimate partner violence in health care settings: a randomized trial. *JAMA*. 2006;296(5):530–6. <https://doi.org/10.1001/jama.296.5.530>.



Ethambutol-related toxic optic neuropathy: a commentary

Matthew D. Benson, PGY-4

Toxic optic neuropathy represents a form of optic nerve dysfunction related to exposure to an offending medication or environmental agent. Patients develop subacute, painless, bilateral loss of vision that is progressive and accompanied by visual field changes and dyschromatopsia.¹ Although the precise mechanism of toxicity is unknown in most cases, there are several agents with well-known associations with optic neuropathy.¹

In this issue, Kanaujia et al. present a concise prospective survey of the effects of ethambutol in patients with renal disease.² Ethambutol is a renally-excreted anti-microbial agent that is used first-line in the treatment of tuberculosis. In addition, ethambutol causes toxic optic neuropathy in 1-5% of all patients on this therapy.¹ In their study, Kanaujia et al. examined 23 patients with renal disease and tuberculosis who were receiving ethambutol and reported optic neuropathy in over 25% of cases. Toxicity was associated with end-stage renal disease and concomitant hepatic disease. Although visual deficits were reversible in two-thirds of cases, severe vision loss persisted in the remainder. These findings are consistent with an 8-year study in a Taiwanese population that confirmed an association between reduced renal function and ethambutol-related optic neuropathy.³ Based on this evidence, Kanaujia et al. recommend avoiding ethambutol in the setting of severe renal disease, if possible, as toxicity can occur even with reduced doses.

Given the potential for irreversible vision loss, identifying toxicity before it causes visual changes is crucial. Just as spectral domain optical coherence tomography (OCT) and automated visual fields are used to detect hydroxychloroquine toxicity before symptomatic vision changes develop, visual evoked responses (VER) show promise for detecting early ethambutol toxicity. Kanaujia et al. identified prolonged latencies in half of affected patients, suggesting that VER may be an early indicator of toxicity. This is supported by findings from other studies;^{4,5} however, a recent review cautions that further validation and reproducibility is needed before VER is routinely used.⁶ In addition, a reduced retinal nerve fiber layer (RNFL) thickness on OCT may be another early sign of ethambutol-related toxicity.⁶ This finding, however, seems to be less sensitive than VER in predicting optic neuropathy. As a result, a need for further validation of the utility of OCT in this setting has been emphasized.⁶ Despite the lack of a clear role for VER and OCT in detecting pre-clinical disease currently, the need for early and regular ophthalmic follow-up for patients on ethambutol is apparent.

Finally, while ethambutol is evidently the main culprit in instances of toxic optic neuropathy in the study by Kanaujia et al., it is important to mention that all 23 patients with renal disease and tuberculosis were also receiving isoniazid. Although typically associated with toxicity at higher doses than what was administered in this study,⁷ optic neuropathy has been reported with the use of isoniazid, especially if combined with ethambutol.⁸ There are instances when both agents may need to be reduced or discontinued in the setting of a visual disturbance.⁸

Kanaujia et al. draw attention to ethambutol-related optic neuropathy, especially in the setting of advanced renal disease. In the future, tests such as the VER may provide a means of detecting disease at a preclinical stage, allowing for earlier intervention to reduce the burden of vision loss in these patients.

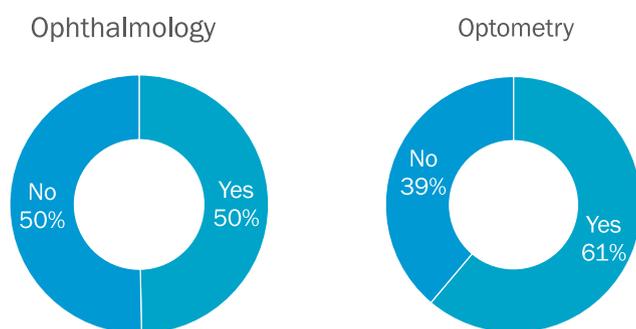
Summary 3: [https://www.canadianjournalofophthalmology.ca/article/S0008-4182\(18\)30327-2/fulltext](https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30327-2/fulltext)

REFERENCES

1. Sharma P, Sharma R. Toxic optic neuropathy. *Indian J Ophthalmol*. 2011;59:137–41.
2. Kanaujia V., Jain V.K., Sharma K., Agarwal R., Mishra P., Sharma K. Ethambutol-induced optic neuropathy in renal disorder: a clinico-electrophysiological study. *Can J Ophthalmol*(in press).

- Chen HY, Lai SW, Muo CH, Chen PC, Wang JJ. Ethambutol-induced optic neuropathy: a nationwide population-based study from Taiwan. *Br J Ophthalmol*. 2012;96:1368–71.
- Lee EJ, Kim SJ, Choung HK, et al. Incidence and clinical features of ethambutol-induced optic neuropathy in Korea. *J Neuroophthalmol*. 2008;28:269–77.
- Chen SC, Lin MC, Sheu SJ. Incidence and prognostic factor of ethambutol related optic neuropathy: 10-year experience in southern Taiwan. *Kaohsiung J Med Sci*. 2015;31:358–62.
- Chamberlain PD, Sadaka A, Berry S, Lee AG. Ethambutol optic neuropathy. *Curr Opin Ophthalmol*. 2017;28:545–51.
- Rana P, Roy V, Ahmad J. Drug-induced optic neuropathy in a case of extensively drug-resistant pulmonary tuberculosis. *J Basic Clin Physiol Pharmacol*. 2018;30:139–40.
- Karmon G, Savir H, Zevin D, Levi J. Bilateral optic neuropathy due to combined ethambutol and isoniazid treatment. *Ann Ophthalmol*. 1979;11:1013–7.

In the last 12 months, have you experienced musculoskeletal pain that you attributed to your WORK IN THE CLINIC?



Occupational musculoskeletal pain and injury in Canadian ophthalmologists

Jessica Ruzicki, PGY-4

In my experience, residents’ minds are rarely focused on the proper ergonomic position for an examination or procedure. However, for the longevity of our careers and our own personal well-being, this issue should attract far more attention. In their article in this issue, *Survey of occupational musculoskeletal pain and injury in Canadian ophthalmology*, Diaconita et al. quantify—for the first time—occupational musculoskeletal (MSK) pain and injury in Canadian ophthalmologists.¹ The authors conducted a nationwide survey, receiving responses from 169 ophthalmologists and 121 optometrists. The alarming results demonstrated that 50% of ophthalmology respondents and 61% of optometry respondents described having clinic-associated MSK pain in the previous 12 months. Similarly, 48% of respondents with a surgical practice reported MSK pain in the operating room in the previous 12 months.

Among ophthalmologists, the most common areas of self-reported MSK pain were the neck, followed by lower back, shoulder, upper back, and finally the hands and wrists. The most common responses for the cause of the reported pain

were related to “performing the same task over and over,” “working in cramped or awkward positions,” “working long erratic hours,” or “bending or twisting [the] neck.” The tasks identified as causing the MSK pain were slit lamp examinations, surgeries with a microscope, slit lamp lasers, indirect fundus examinations, and long surgical cases.

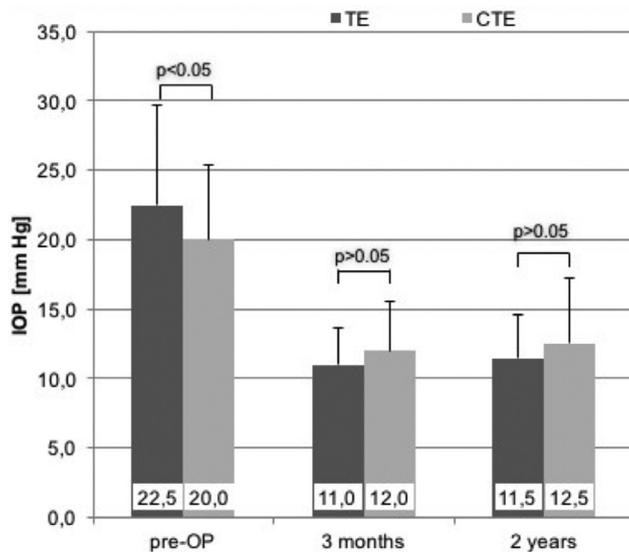
How do ophthalmologists typically manage the pain? Ophthalmologists reported using primarily NSAIDs, followed by rest, massage, and Tylenol. The authors point to identifying the tasks that are most related to the development of MSK pain and designing tools and equipment to better address those tasks, decreasing the risk to ophthalmologists.

MSK pain in the ophthalmologist community is pertinent to young ophthalmologists. It is easy to get lost in our day-to-day focus of attaining and perfecting the numerous technical skills required by our profession. However, the time is now to root out our bad habits. In a recent interventional pilot study, Ratzlaff et al. demonstrated that after completion of an online educational ergonomics module, improvement in body positioning among ophthalmology residents within the context of a slit lamp examination was achievable.² Taking an extra moment to ensure we are in proper position prior to commencing our examinations or procedures can go a long way. If aches or pain are currently present, seek appropriate help before it is too late. After committing extensive time to our educations, investing time to preserve our health and prolong our professional careers should be a priority for all of us.

Summary 4: [https://www.canadianjournalofophthalmology.ca/article/S0008-4182\(18\)30213-8/fulltext](https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30213-8/fulltext)

REFERENCES

- Diaconita V, Uhlman K, Mao A, Mather R. Survey of occupational musculoskeletal pain and injury in Canadian ophthalmology. *Can J Ophthalmol*. 2019;54:314–22.
- Ratzlaff TD, Diesbourg TL, McAllister MJ, von Hacht M, Brissette AR, Bona MD. Evaluating the efficacy of an educational ergonomics module for improving slit lamp positioning in ophthalmology residents. *Can J Ophthalmol*. 2018;0(0). <https://doi.org/10.1016/j.jcjo.2018.05.016>.



Two-year results of mitomycin C-augmented phacotrabeculectomy and trabeculectomy

Aishwarya Sundaram, PGY-3

As Graf et al. (2018) noted, glaucoma and cataracts often coexist in elderly patients, which has led to an increase in the popularity of combined phacotrabeculectomy.¹ However, the authors also noted a paucity in the number of studies with more than 1 year of follow-up data on these patients. To address this, they conducted a prospective study on 246 eyes of patients undergoing either mitomycin C-augmented limbus-based trabeculectomy (TE), phacotrabeculectomy (CTE), or phaco-repeat trabeculectomy (CRTE) more than 1 year after previous TE. TE was performed on 85 patients with insufficient intraocular pressure (IOP) control, glaucomatous deterioration of the visual field (VF), or increased optic disc damage despite maximal antiglaucoma medications. If patients had cataracts, then CTE was performed (n = 161). CRTE was performed on 10 patients. Best corrected visual acuity (BCVA), intraocular pressure (IOP), number of antiglaucoma medications, and complications were recorded at baseline, 3 months, and 2 years postoperatively.

The key results from this study were:

- **IOP reduction:** There was a statistically significant reduction in IOP post-TE and post-CTE at 3 months and 2 years. When considering the higher baseline IOP in the TE group, after 2 years, TE patients had statistically significant better IOP reduction compared with CTE patients (TE: 50.2% vs. CTE: 38.5%; Fisher's exact test: $p < 0.001$).

- **Intraoperative/immediate postoperative complications:** There were significantly more intraoperative complications in the TE group (7.1% vs. 4.9%; $p < 0.05$), mostly due to scleral flap issues. No significant differences were noted in the immediate postoperative period but there was more conjunctival scarring with repeat CTE.
- **Antiglaucoma medications:** The mean count in the TE group was reduced from 1.8 antiglaucomatous medications to 0.4, and from 1.4 to 0.3 in CTE patients at 2 years ($p < 0.001$).
- **Long-term complications:** Although statistically insignificant ($p > 0.05$), there was a higher percentage of patients with postoperative complications in the CTE group (9.9%) compared with the TE group (4.7%). The most common complication in both groups was hypotony. CTE patients also had bleb leakages, bleb subluxations, and vitreous hemorrhage.
- **BCVA:** With the removal of the cataract in the CTE group, there was an improvement in BCVA from 0.45 mean logMAR to 0.21 mean logMAR at 3 months. There was no change in BCVA in the TE group.

Overall, the authors' findings are in keeping with similar research that indicates TE is comparable with CTE,² and they suggest the use of CTE for patients with cataracts and uncontrolled IOP. However, there were significant differences between the 2 groups. Baseline characteristics showed significantly younger patients and significantly worse visual fields in the TE group compared with the CTE group. The overall reductions in IOP and complication rates were lower in the TE group, suggesting a possible role for the conservative use of combined phacotrabeculectomy compared to trabeculectomy alone.

Key practice point: For patients with uncontrolled IOP and visually significant cataracts, combined phacotrabeculectomy has good results compared with trabeculectomy alone. However, for patients who do not need cataract surgery within 6 months post-trabeculectomy, trabeculectomy alone appears to yield better IOP reduction and fewer complications.

Summary 5: [https://www.canadianjournalofophthalmology.ca/article/S0008-4182\(18\)30058-9/fulltext](https://www.canadianjournalofophthalmology.ca/article/S0008-4182(18)30058-9/fulltext)

REFERENCES

1. Friedman DS, Jampel HD, Lubomski LH, et al. Surgical strategies for coexisting glaucoma and cataract: an evidence-based update. *Ophthalmology*. 2002;109:1902–13.
2. Murthy SK, Damji KF, Pan Y, Hodge WG. Trabeculectomy and phacotrabeculectomy, with mitomycin-C, show similar two-year target IOP outcomes. *Canadian J Ophthalmol*. 2006;41:51–9.