

A drop too much? Anti-inflammatory prophylaxis in cataract surgery

On May 21, 2021, Jesper Højberg Erichsen defended his thesis titled "Optimizing Anti-inflammatory Prophylaxis in Cataract Surgery." The project was conducted at Rigshospitalet-Glostrup, Denmark. His supervisors were Associate Research Professor Line Kessel, MD, PhD, FEBO, and Associate Professor Lars Morten Holm, MD, PhD, FEBO.



Jesper Højberg Erichsen, PhD
Department of Ophthalmology,
Rigshospitalet-Glostrup, Denmark

Cataracts are the principal cause of moderate to severe visual impairment in people older than 70 years of age, and cataract surgery is the only curative treatment. To secure an excellent outcome after surgery, as expected by surgeons and patients, the postoperative inflammatory response must be controlled, and anti-inflammatory prophylaxis is usually administered parallel to surgery.

The main purpose of this thesis was to provide clinical evidence that can be used for optimizing prophylactic, anti-inflammatory treatment administered parallel to standard, uncomplicated cataract surgery. We conducted a large, randomized controlled trial in which we assessed five main questions: (1) Is a combination of steroid and non-steroidal anti-inflammatory drugs (NSAIDs) superior to NSAID monotherapy? (2) Is preoperative initiation of eye drop prophylaxis superior to

Illustration of interventional groups

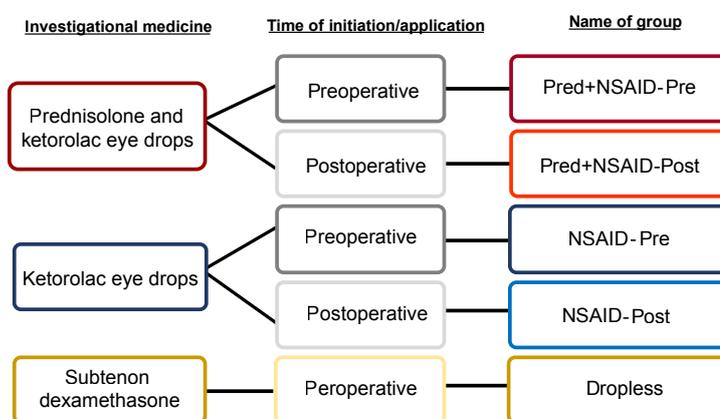
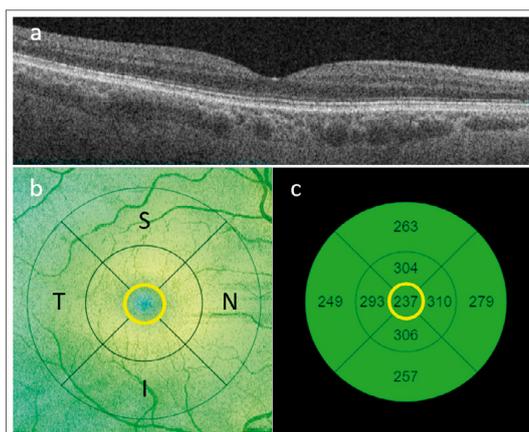


Figure 1. Illustration of the five intervention groups. Pred+NSAID-Pre = prednisolone and ketorolac eye drops 3 times/day from 3 days before surgery to 3 weeks post-op; Pred+NSAID-Post = prednisolone and ketorolac eye drops 3 times/day from the day of surgery to 3 weeks post-op; NSAID-Pre = ketorolac monotherapy 3 times/day from 3 days before surgery to 3 weeks post-op; NSAID-Post = ketorolac monotherapy 3 times/day from the day of surgery to 3 weeks post-op; Dropless = subtenon depot of 0.5 ml dexamethasone phosphate (4 mg/ml) administered at the conclusion of surgery.

Figure 2. Illustration of the primary endpoint: central macular thickness (CMT). Macular OCT scans show a cross-section of the macula (a), the ETDRS grid used for mapping macular thickness measures (b), and corresponding thickness measures in microns (c). The central 1.0 mm zone (yellow circle) defines the central macular thickness. Letters S, N, I and T define the orientation. S = superior; N = nasal; I = inferior; T = temporal; ETDRS = Early Treatment Diabetic Retinopathy Study.



initiation on the day of surgery? (3) Can dropless surgery replace eye drops? (4) What is the effect of early postoperative inflammation on macular thickening? (5) Is subjective visual outcome affected by choice of prophylactic regimen?

Key points:

- Combined steroid and NSAID eye drops were not superior to NSAID monotherapy.
- Preoperative initiation was not superior to initiating eye drops on the day of surgery.
- Increased early, postoperative inflammation was significantly associated with postoperative macular thickening, but other conditions, like vitreomacular traction, may also play a role.
- Subjective visual outcome was not affected by choice of prophylactic regimen.

Future studies:

- Other dropless approaches need to be compared to NSAID eye drops.
- Future studies should consider measuring accumulated inflammation.

Articles in the dissertation

1. Erichsen JH, et al. Effect of anti-inflammatory regimen on early postoperative inflammation after cataract surgery. *J Cataract Refract Surg.* 2021;47(3):323-330.
2. Erichsen JH, et al. Prednisolone and Ketorolac vs Ketorolac Monotherapy or Sub-Tenon Prophylaxis for Macular Thickening in Cataract Surgery: A Randomized Clinical Trial. *JAMA Ophthalmol.* Published online August 12, 2021.
3. Erichsen JH, et al. Effect of early postoperative inflammation on central macular thickening after cataract surgery.
4. Erichsen JH, et al. Influence of anti-inflammatory prophylactic regimen on subjective visual outcome after cataract surgery – A randomized controlled trial.