

# MORPHOLOGICAL CHANGES IN THE MACULA IN CATARACT SURGERY

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Refractive Crystalline Lens surgery

Actual Requirements

EFFICACY

FUNCIONALITY



EMMETROPIA



ABSCENCE OF COMPLICATIONS

## Factors that contribute to obtaining satisfactory visual results

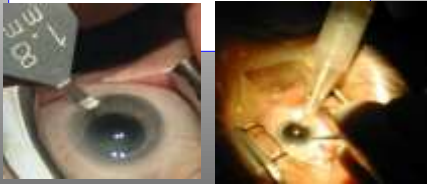
### INTRAOPERATIVE

Mínimally invasive surgery

Midriasis

Mínimal surgical trauma

Asepsis



### POSTOPERATIVE

#### Control of the inflamación

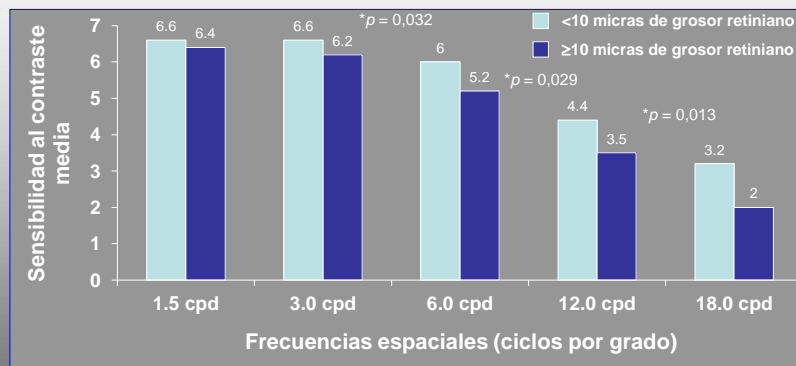
Pain  
Photofobia  
Corneal edema  
Loss of VA  
Tyndall  
HTO  
Syniquia  
Depósitos on IOL  
CME subclínical & clínical

*The control of the inflamación is essential to obtain satisfactory visual results*

<sup>1</sup>Cho H et al. Clin Ophthalmol 2009;3:199-210. <sup>2</sup>McGhee CN et al. Drug Saf 2002;25:33-55. <sup>3</sup>Kim SJ, et al. Surv Ophthalmol 2010;55:108-133. <sup>4</sup>Gaynes BI, Onyekwulije A. Clin Ophthalmol 2008; 2:355-368

## OCT post-operative

The increase of macular thickness after surgery is correlated with reduced Contrast sensitivity



- Patients with macular thickening **<10  $\mu\text{m}$** , measured by OCT, showed better contrast sensitivity than those who presented macular thickening  $\geq 10 \mu\text{m}^1$

\* Los valores p se refieren a la comparación de <10 micras con  $\geq 10$  micras

<sup>1</sup>Witpenn JR et al. Am J Ophthalmol 2008; 146: 554-560.

## Pstoperative CME



### Multifocal IOL

- **Incidence:**

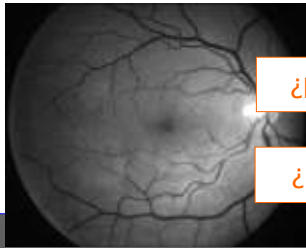
clínical CME: 3,70 %

243 IOLs: 9 CME (OCT)

- **Average Time of appearance:** 18,77 ± 13,02 days (*r 7-24 days*)

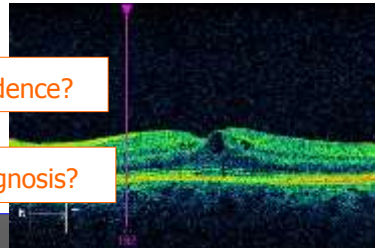
- **Average Time of resolution:** 24.11 ± 8.13 days (*r 14-38 days*)

- **Treatment:** topical NSAI , oral Edemox



¿higher incidence?

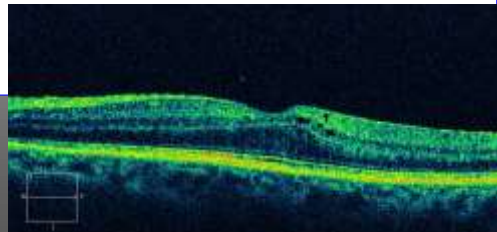
¿ better diagnosis?



## Pstoperative CME

### Multifocal IOL

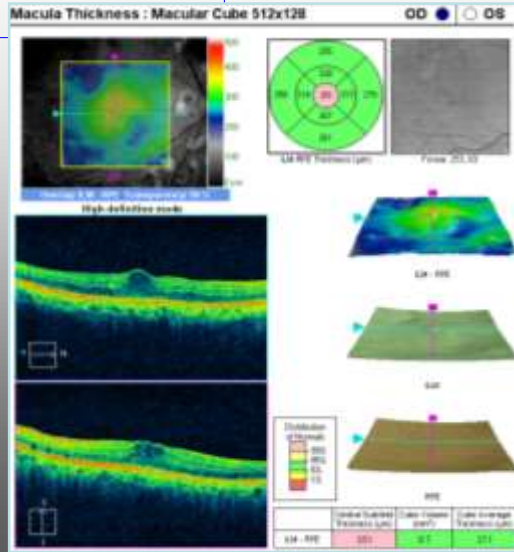
- Loss of VA: 0.25 – 0.8
- Inflammation: No Tyndall AC / No Tyndall vitreous
- Abscence of external inflammatory signs.
- Classical OCT Image
  - Mild Macular thickness (294 a 402μ)
  - Small sized macular cysts
- Treatment: good response
- Recurrence: NO



# Pstoperative CME

## Multifocal IOL

OCT 1 month

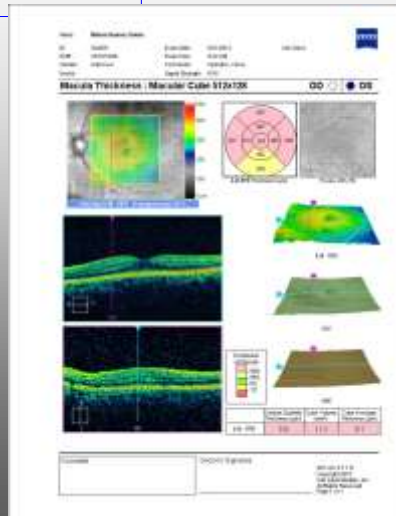
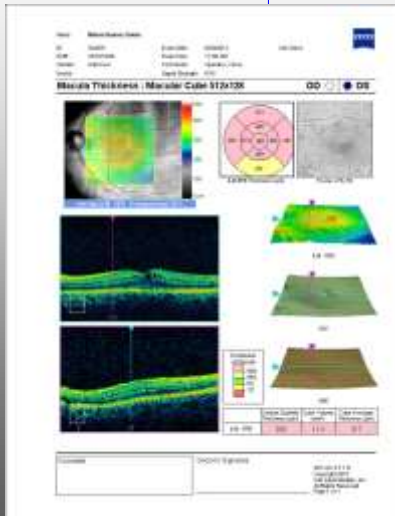


# Pstoperative CME

## Multifocal IOL

7 days

21 days post-treatment



### Multifocal IOL

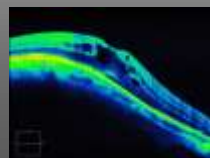
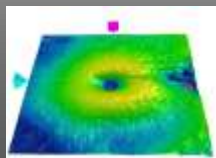
#### Favouring Factors

- Rapid Visual recovery
- Accomodative effort in immediate postop:  
*periodo de máxima inflamación → más inflamación*
- Short distance for near Focal distance (add +4D)  
*more convergence-accomodation effort*
- Insufficient efficacy of topical corticosteroids :
  - *Early Suspencion*
  - *Need to act on 2 levels of inhibition*

#### Morphological changes in the Macula in Uneventfull cataract surgery: macular thickness

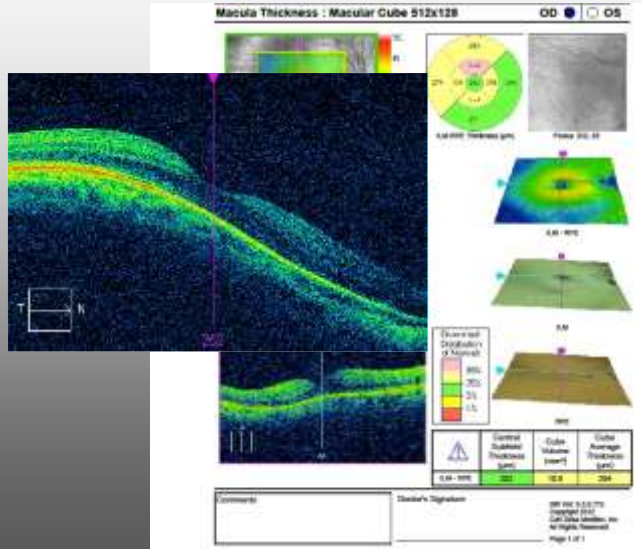
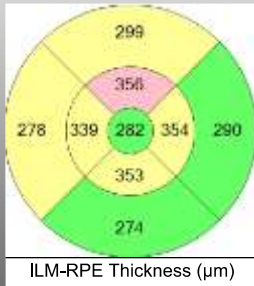
##### Materials & Methods

- Discriptive Observational prospective study
- **Inclusión criteria:** cataract surgery (Phacoemulsification) with implant of post chamber IOL
- **Exclusión criteria:** previous ocular pathology, complicated cataract surgery.
- **Macular OCT** preoperative, 24h, 7 days & 1 month postop.
- Preoperative & Postoperative Central Macular thicknesses are compared.
- The presence of macular thickness  $\geq 10$  micras is analyzed .
- The presence of macular cysts with or without loss of VA is analysed.



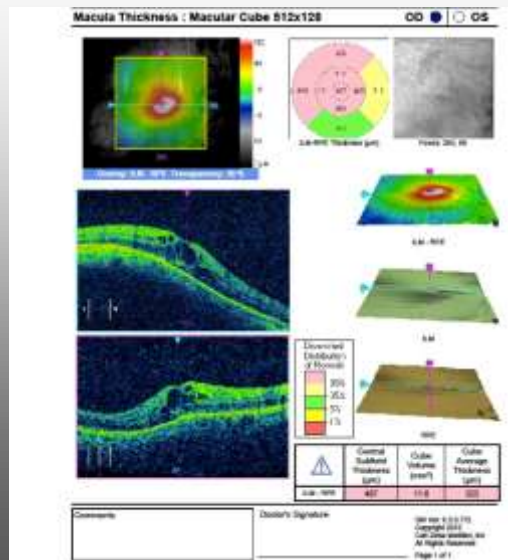
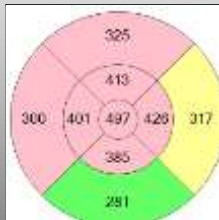
Morphological changes in the Macula in Uneventfull cataract surgery:  
macular thickness

Preoperative  
Macular OCT



Morphological changes in the Macula in Uneventfull cataract surgery:  
macular thickness

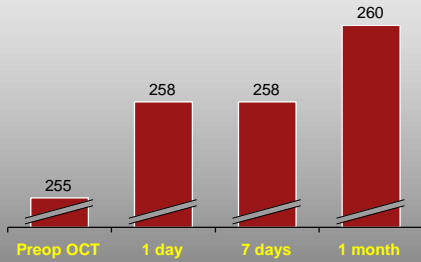
1 Month Postop  
Macular OCT



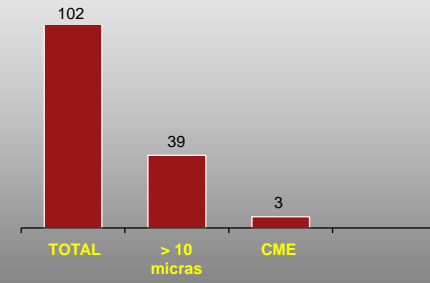
## Morphological changes in the Macula in Uneventfull cataract surgery: macular thickness

### Results

#### Evolution of average thickness Micras



#### Sample of the study & high risk patients # patients



The results demonstrate increase in macular thickness postop , >10 microns in 39 pts

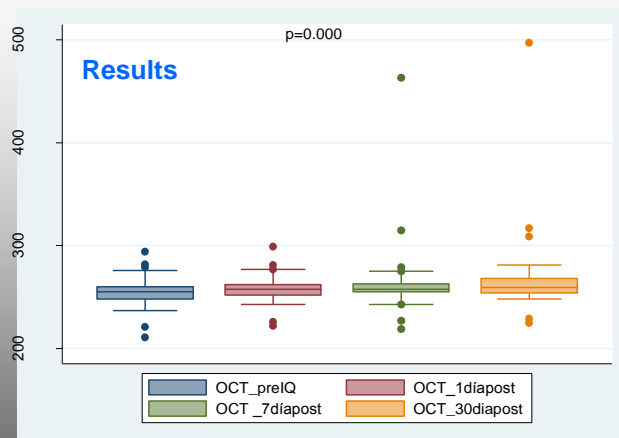
Note: confidence 95%

p-value

0,000

## Morphological changes in the Macula in Uneventfull cataract surgery: macular thickness

### Results



The results demonstrate a significant increase in macular thickness postoperatively

## Morphological changes in the Macula in Uneventfull cataract surgery: macular thickness

### Discussion

- Exists a significative number of eyes with macular engrossment >10 microns after uneventfull cataract surgery.
- **The actual Standard Treatment** cataract surgery **consists of topical antiobiotics & corticosteroid drops.**
- Topical corticosteroids are not so efficient as the Non-Steroidal Anti-inflammatory drops in preventing increase of macular thickness after cataract surgery.
- Postoperative treatment protocols combining Topical corticosteroids and Non-Steroidal Anti-inflammatory drops could possibly yield better results.

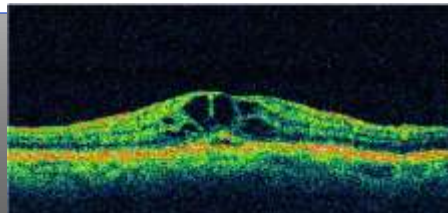
### Conclusion

- Exists a significative number of eyes with macular engrossment >10 microns after uneventfull cataract surgery.
- These results suggest that the efficacy of the topical corticosteroid treatment is limited.

## CONTROL OF THE INFLAMMATION

### Perioperative Non-Steroidal Anti-inflammatory drops

- Non-Steroidal Anti-inflamatoty drops **limit the postop inflammation mediated by PG:**
  - Limit the presence of cells& flare in theanterior chamber
  - Control IOP<sup>1</sup>
  - Help to control pain & phtophobia<sup>1</sup>
  - **Reduce incidence of postoperative retinal engrossment & clinical CME<sup>1,3</sup>**
  - Help to preserve contrast sensitivity

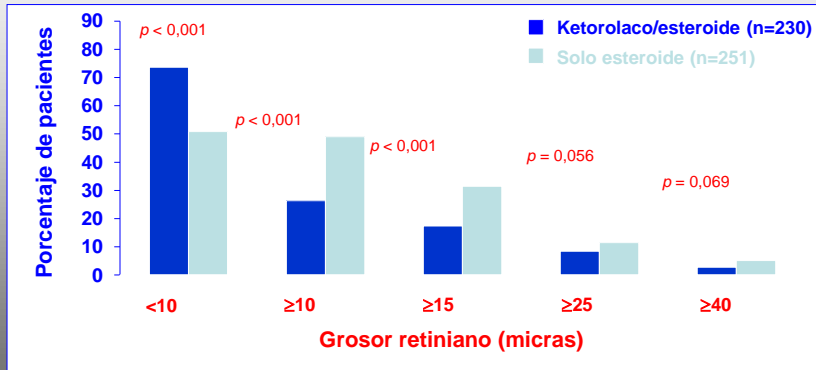


<sup>1</sup>Kim SJ et al. Surv Ophthalmol 2010; 55:108-133. <sup>2</sup>Cho H et al. Clin Ophthalmol 2009; 3:199-210. <sup>3</sup>Wittpenn JR et al. Am J Ophthalmol 2008; 146: 554-560. <sup>4</sup>Alan D. Clin Evid 2008; 8:708.



## CONTROL OF THE INFLAMMATION

**Combination** Non-Steroidal Anti-inflammatory drops + **corticosteroid drops** controls postoperative retinal engrossment significantly better than corticosteroid drops in monotherapy



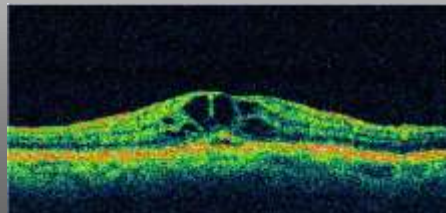
- The average retinal engrossment in combined therapy (3,9  $\mu\text{m}$ ) was significantly less than with corticosteroid drops monotherapy (9,6  $\mu\text{m}$ ;  $p = 0,003$ )<sup>1</sup>

<sup>1</sup>Wittpenn JR et al. Am J Ophthalmol 2008; 146: 554-560.

## CONTROL OF THE INFLAMMATION

### Perioperative Non-Steroidal Anti-inflammatory drops

| AINE        | CI 50 (mM) |
|-------------|------------|
| Diclofenaco | 0,0307     |
| Ketorolaco  | 0,0279     |
| Amfenaco    | 0,0204     |
| Bromfenaco  | 0,0075     |



## CONTROL OF THE INFLAMMATION

### Perioperative Non-Steroidal Anti-inflammatory drops

| AINE        | CI 50 (mM) | Potencia relativa |
|-------------|------------|-------------------|
| Diclofenaco | 0,0307     | 0,25              |
| Ketorolaco  | 0,0279     | 0,27              |
| Amfenaco    | 0,0204     | 0,37              |
| Bromfenaco  | 0,0075     | 1.0               |



## CONTROL OF THE INFLAMMATION

### Amfenaco

#### Incidence of significant CME



Wolf EJ, Braunstein A, Shih C, Braunstein RE. Incidence of visually significant pseudophakic macular edema after uneventful phacoemulsification in patients treated with nepafenac. *J Cataract Refract Surg.* 2007;33:1546-1549.

## CONTROL OF THE INFLAMMATION

### Amfenaco

### Posology

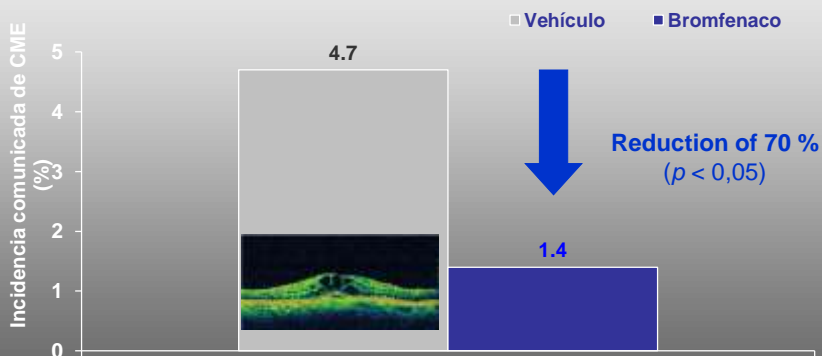


- **Pain / Inflammation post-cataract:**
  - 1 drop 3 times daily
  - **Pre-op:** 1 day previously+ 1 additional drop 30-120 min before surgery
  - **Post-op: for 21 days post-op**
- **Prevention of macular edema :**
  - 1 drop 3 times daily
  - **Pre-op:** 1 day previously+ 1 additional drop 30-120 min before surgery
  - **Post-op: for 60 days post-op**

## CONTROL OF THE INFLAMMATION

### Bromfenaco

### INCIDENCE OF CME



CME: edema macular cistoide.

Adaptado de Donnerfeld ED, Donnerfeld A. Int Ophthalmol Clin 2006; 46:21-40.

## PHARMACOLOGICAL PROTOCOLS

**Cataract Surgery**

CATARATA    TRAUMA QUIRURGICO    ENZIMA COX-2 EXPRESADA    INFLAMACIÓN DE LA CÁMARA ANTERIOR    RUPTURA DE LA BHA    INFLAMACIÓN EN HÚMOR ACUOSOVITREO    RUPTURA DE LA BHR Y LOS ESPACIOS QUISTICOS

**MIOSIS**    **PAIN & INFLAMMATION**    **Cystoid Macular Edema**

Preoperatorio    Perioperatorio    Posoperatorio 1-7 days    Prolonged 4-6 weeks

**CORTICOSTEROIDS + Non steroidal anti-inflammatory**

In clinical studies, the combined therapy offered:  
*Significant benefits over monotherapy<sup>1</sup>*  
*Less risk of postop CME than monotherapy<sup>3,4</sup>*

# Post-cataract Prevention of Inflammation and Macular Edema by Steroid and Nonsteroidal Anti-inflammatory Eye Drops

## A Systematic Review

Line Kessel, MD, PhD,<sup>1,2</sup> Brita Tendal, PhD,<sup>2</sup> Kirsten Juhl Jørgensen, MD, DMedSci,<sup>2,3</sup> Ditte Ersgaard, MD,<sup>4</sup> Per Flesner, MD, PhD,<sup>2</sup> Jens Lundgaard Andersen, MD, PhD,<sup>6</sup> Jesper Hjortdal, MD, DMedSci<sup>7</sup>

**Purpose:** Favorable outcome after cataract surgery depends on proper control of the inflammatory response induced by cataract surgery. Pseudophakic cystoid macular edema is an important cause of visual decline after uncomplicated cataract surgery.

**Design:** We compared the efficacy of topical steroids with topical nonsteroidal anti-inflammatory drugs (NSAIDs) in controlling inflammation and preventing pseudophakic cystoid macular edema (PCME) after uncomplicated cataract surgery.

**Participants:** Patients undergoing uncomplicated surgery for age-related cataract.

**Methods:** We performed a systematic literature search in Medline, CINAHL, Cochrane, and EMBASE databases to identify randomized trials published from 1996 onward comparing topical steroids with topical NSAIDs in controlling inflammation and preventing PCME in patients undergoing phacoemulsification with posterior chamber intraocular lens implantation for age-related cataract.

**Main Outcome Measures:** Postoperative inflammation and pseudophakic cystoid macular edema.

**Results:** Fifteen randomized trials were identified. Postoperative inflammation was less in patients randomized to NSAIDs. The prevalence of PCME was significantly higher in the steroid group than in the NSAID group: 3.8% versus 25.3% of patients, risk ratio 5.35 [95% confidence interval, 2.94–9.76]. There was no statistically significant difference in the number of adverse events in the 2 treatment groups.

**Conclusions:** We found low to moderate quality of evidence that topical NSAIDs are more effective in controlling postoperative inflammation after cataract surgery. We found high-quality evidence that topical NSAIDs are more effective than topical steroids in preventing PCME. The use of topical NSAIDs was not associated with an increased events. We recommend using topical NSAIDs to prevent inflammation and PCME after routine cataract surgery. *Ophthalmology* 2014;121:1915–1924 © 2014 by the American Academy of Ophthalmology.

Muchas Gracias

