Duration of Effect of Triamcinolone Intravitreal Injection in Previously Vitrectomized Eyes

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Triamcinolone

- Triamcinolone acetonide is a corticosteroid used in the treatment of macular edema of different etiologies.
- Blood retinal barrier action → vascular permeability.
- Secondary Effects: ocular hypertension/glaucma; cataract.

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<th>Half-life Time:</th>
<th>Vitreous Detection:</th>
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<tbody>
<tr>
<td>Non-Vitrectomized Eyes</td>
<td>18,6 days</td>
<td>11 weeks</td>
</tr>
<tr>
<td>Vitrectomized Eyes</td>
<td>3,2 days</td>
<td>Duration of action?</td>
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Duration of action?
Material and Methods

- Retrospective study from July 2013 until March 2014.

- Biomicroscopy
- BCVA before and after IVTA
- IOP
- OCT-SD (Cirrus TM® HD-OCT Zeiss Meditec)
Vitrectomized Eyes

Macular Edema: CMT Measure

4 mg / 0.1mL IVTA

CMT Measurement at 3 weeks

Monthly CMT Measurement until recurrence of edema
### Demographic Results

<table>
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<th>Sample</th>
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| • 20 patients  
  14 Female (70%)  
  6 Male (30%)  
• 23 Eyes  
  14 Right Eye (60.9%)  
  9 Left Eye (39.1%)  |

| Age | 59.05 ± 8.63 years |
| Causes |  |
| • DME 82.6% (19 eyes)  
• RD 8.7% (2)  
• Trauma 4.3% (1)  
• Lamellar Hole and Macular Schisis 4.3% (1)  |

| Pseudophakic | 23 Eyes |
| PPV-IVTA time | 13.3 ± 8.28 months |
Visual Acuity and IOP Results

Previous Visual Acuity: 0.41
Post Visual Acuity: 0.55

Previous IOP: 16.9 ± 2.0 mmHg
Post IOP: 20.2 ± 4.44 mmHg

$p=0.019$ (t-paired test)
CMT variation

393 ± 116 μm

304 ± 82 μm

p = 0.012
Triamcinolone effect duration

11 weeks in non-vitrectomized eyes

TA effect time: 0-17 months
Average: 3,61 ± 3,34 months
Macular edema is an important cause of visual loss.

Triamcinolone is a therapeutic option acting by decreasing vascular permeability and anti-inflammatory action.

Vitrectomized Eyes should have a shorter duration of effect than non-vitrectomized eyes.

Macular edema is highly responsive to triamcinolone.

IOP increase is an important side-effect.

Average TA effect is $3.61 \pm 3.34$ months $\rightarrow$ similar results than in non-vitrectomized eyes.
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Why do you think you can get such a long duration of effect in these patients?

- **Vitreous** as a pathway of drug delivery and clearance in eye.

- There are few studies comparing TA concentration in vitrectomized and nonvitrectomized eyes.

- **No studies** in human eyes.

- Logarithmical plotting shows that triamcinolone (0.3 mg) was eliminated 1.84 times quickly in vitrectomized + lensectomy rabbit eyes (China and Kim et al. Investigative Ophthalmology & Visual Science 2004. ARVO).
Why do you think you can get such a long duration of effect in these patients?

- **Anti-VEGF**
  - **No significant** differences between pharmacokinetics properties of **ranibizumab** in vitrectomized and nonvitrectomized rabbit eyes. (Ahn S., Ahn J. et al. in IOVS 2014 Jan)
  - **No BVCZ significant difference** between pharmacokinetics properties in vitrectomized and nonvitrectomized eyes. (Ahn J. Kim H. et al. un Journal of Ocular Pharmacology and Therapeuthtics, 2013 Jan)
  - **No lensectomy** was performed which is more similar than regular PPV procedure.
  - **Centrifuge** Concentrated Triamcinolone in nonvitrectomized eyes: 8.3 ± 4.0 months (Ober et al. in Retina, 2013)
  - **Phase 1 DRAW study**: compares **aflibercept** in wet-AMD vitrectomized and non-vitrectomized eyes.

- **What about the RPE function?**
Do you feel there is a difference in the incidence of side-effects such as intraocular pressure?

- **Steroid-induced glaucoma** is a well-known side-effect of steroid administration.

- **Vitrectomy surgery itself** has been related with open-angle glaucoma, particularly in nonphakic eyes.

- Vitrectomized eyes: dispersion of triamcinolone crystals into the **anterior chamber** (pseudohypopion) blocking trabecular spaces.

- Ocular hypertension after TA with vitrectomy and phacoemulsification is reported in Parke and Sisk et al. in Clinical Ophthalmology 2012.
Do you feel there is a difference in the incidence of side-effects such as intraocular pressure?

• Management:
  ✓ Drug discontinuation
  ✓ Topical IOP-lowering agents
  ✓ Oral carbonic-anhydrase inhibitor
  ✓ Filtering surgery

- Reported rates of IOP elevation: 20-80%.

- We had to stop our treatment in 4/23 eyes (17,4%) and 5/23 (21,7%) eyes were controlled with one eye drop.
- IOP elevation in 39,1% of our cases.