# COMPARISON OF INTRAOPERATIVE INTRAVITREAL DEXAMETHASONE IMPLANT (OZURDEX®) VERSUS PERIOPERATIVE INTRAVITREAL ANTI VASCULAR ENDOTHELIAL GROWTH FACTOR (VEGF) IN PATIENTS WITH DIABETIC MACULAR OEDEMA (DMO) UNDERGOING CATARACT SURGERY


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## Introduction

Cataract surgery in patients with diabetes is associated with progression of DMO in nearly 23% to 57% of cases due to the release of inflammatory mediators such as prostaglandins and VEGF.[1,2] There is no standard treatment approach for improving outcomes of cataract extraction in diabetic patients with DMO. In 2015, intravitreal dexamethasone 0.7mg (Ozurdex®) is recommended by National Institute for Health and Care Excellence (NICE) for treatment of DMO in pseudophakic eyes which do not respond to non-corticosteroid treatment, or if such treatment is unsuitable. Intraoperative injection of Ozurdex® in patients with diabetes undergoing phacoemulsification has been previously reported to minimise the risk of worsening postoperative DMO.[3,4] We perfomed a real word study to compare the efficacy and safety of intraoperative Ozurdex® and perioperative anti-VEGF for treatment of postoperative macular oedema in patients with DMO undergoing uncomplicated cataract surgery.

## Method

**Design:** Retrospective study involving real-world data using Medisoft Ophthalmology (Medisoft, Leeds, UK)

**Inclusion criteria**: patients with DMO who received intraoperative Ozurdex® and patients who received anti-VEGF within 2 weeks prior or after uncomplicated cataract surgery from 2016-2019 at Royal Hallamshire Hospital.

**Primary outcome:** change in central subfield foveal thickness (CSFT) in first 3 months post operation.

**Secondary outcomes**: average gain in best recorded visual acuity (BRVA) in first 3 months post operation, complications and additional treatment with laser, intravitreal steroid or anti-VEGF within 6 months post operation.

Last Observation Carried Forward (LOCF) imputation method was used for missing data. T-tests were performed with statistical significance accepted at p<0.05.

## Results

We identified 28 patient who received intraoperative Ozurdex® and 11 patients who received perioperative anti-VEGF as per inclusion criteria. Table 1 highlights baseline characteristics of both groups.

The differences in average reduction of CSFT from baseline between Ozurdex®and anti-VEGF were 32µm, 73µm and 31µm at month 1, month 2 and month 3 respectively. None of these results were statistically significant. In Ozurdex® group, average reduction from baseline CSFT were 23µm (p=NS), 76µm (P<0.05) and 68µm (P<0.05) at month 1, month 2 and month 3 respectively. In anti-VEGF group, average reduction from baseline CSFT were -9µm (p=NS), 3µm (P=NS) and 37µm (P=NS) at month 1, month 2 and month 3 respectively (Figure 1).

## Results (cont.)

| Baseline Characteristics | Ozurdex (n=28) | Anti-VEGF (n=11) |
|---|---|---|
| Sex | | |
| Male | 15 | 5 |
| Female | 13 | 6 |
| Age | 64 (43-80) | 70 (63-82) |
| Duration of diabetes | 23 (4-52) | 10 (11-24) |
| HBA1C | 64 (40-99) | 54 (33-87) |
| Best recorded visual acuity (BRVA) | 54 (0-76) letters | 42 (0-76) letters |
| Central Subfield Foveal Thickness (CSFT) | 376 (203-774) µm | 361 (257-474) µm |
| Co-morbidities | | |
| Glaucoma | 1 (4%) | 1 (9%) |
| Ocular hypertension | 3 (11%) | 0 (0%) |
| Retinal vascular occlusion | 1 (4%) | 0 (0%) |
| Epiretinal membrane | 3 (11%) | 1 (9%) |
| Dry AMD | 0 (0%) | 2 (18%) |
| Previous Treatment | | |
| Macular laser | 0 (0-2) | 0 (0-3) |
| Intravitreal anti-VEGF | 1 (0-4) | 2 (0-4) |
| Intravitreal steroid | 0 (0-1) | 0 |

Table 1. Baseline characteristics of patients who received intraoperative Ozurdex® and perioperative anti-VEGF.

The differences in average gain of BRVA from baseline between Ozurdex® and anti-VEGF were 2 letters, -1 letter and -4 letters at month 1, month 2 and month 3 respectively. None of these results were statistically significant. In Ozurdex® group, average gain from baseline BRVA were 13 letters (p<0.05), 14 letters (P<0.05) and 13 letters (P<0.05) at month 1, month 2 and month 3 respectively. In anti-VEGF group, average gain from baseline BRVA were 11 letters (p=NS), 15 letters (P<0.05) and 17 letters (P<0.05) at month 1, month 2 and month 3 respectively (Figure 2).

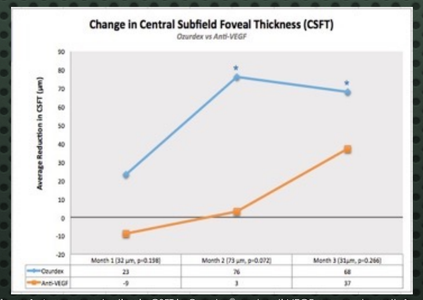



Figure 1. Average reduction in CSFT in Ozurdex® and anti-VEGF groups at month 1, 2 and 3 compared to baseline. * denotes statistical significance at p<0.05.

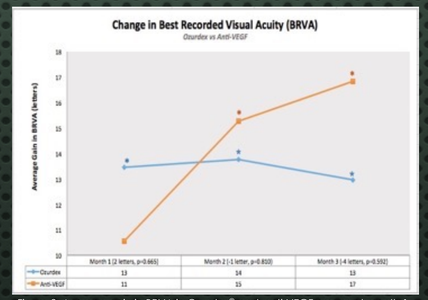



Figure 2. Average gain in BRVA in Ozurdex® and anti-VEGF groups at month 1, 2 and 3 compared to baseline. * denotes statistical significance at p<0.05.

Table 2 shows IOP measurements in both Ozurdex® and anti-VEGF group. The highest recorded IOP of 29mmHg was observed from a patient with ocular hypertension who received intraoperative Ozurdex®. No secondary glaucoma or endophthalmitis were recorded in either groups during follow up period. No patients required an additional or a change in IOP-lowering medications.

| IOP Profile | Ozurdex (n=28) | Anti-VEGF (n=11) |
|---|---|---|
| Baseline (mmHg) | 16 (10-25) | 15 (8-21) |
| Month 1 (mmHg) | 17 (9-29) | 14 (8-19) |
| Month 2 (mmHg) | 16 (9-24) | 14 (9-19) |
| Month 3 (mmHg) | 16 (9-24) | 13 (6-19) |

Table 2. Average IOP measurements in Ozurdex® and anti-VEGF at baseline, month 1, 2 and 3. Bracketed values are range of IOP measurements.

## Results (cont.)

An average of additional 0 (rounded from 0.45) intravitreal Ozurdex® top-up was required within 6 months of cataract surgery in Ozurdex® group. In this group, 12 patients (43%) required additional intravitreal Ozurdex® and 3 patients (11%) received additional intravitreal anti-VEGF within 6 months post cataract surgery. In anti-VEGF group, an average of additional 2 anti-VEGF injections within 6 months was required. 10 patients (91%) received post-operative additional anti-VEGF in this group.

## Discussion

There was no statistically significant difference in reduction of CSFT or gain in BRVA between intraoperative Ozurdex® and perioperative anti-VEGF groups. This is likely due to the small sample size. Reduction in CSFT with intraoperative Ozurdex® is highly variable among similar studies with average reduction between 50µm-193µm at month 1 and between 13µm-124µm at month 3.[3,4,5] Our results are comparable to these studies. The peak CSFT reduction was achieved at month 2 and maintained at month 3 in line with the known pharmacodynamics of the Ozurdex®. We performed Ozurdex® implantation at the end of surgery to ensure any potential complications were managed appropriately and to allow better visualisation of the implant. Other limitations of this study including its retrospective design, heterogeneity of baseline characteristics and short follow up period.

## Conclusion

Both intraoperative Ozurdex® and perioperative anti-VEGF are effective and safe for the treatment of worsening DMO or cystoid macular oedema (CMO) up to 3 months following uncomplicated cataract surgery.

Intraoperative Ozurdex® resulted in better anatomical outcome compared to perioperative anti-VEGF in uncomplicated cataract surgery.

Intraoperative Ozurdex® reduces the burden of additional treatment up to 6 months postoperatively in eyes with DMO and this may have a positive impact on patient experience and healthcare service delivery.

Careful patient selection for intraoperative Ozurdex® and regular IOP monitoring are essential in preventing complications such as endophthalmitis and secondary glaucoma.


References:

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