• Clinical Research •

Management of coexisting cataract and diabetic macular edema: a comparative study of dexamethasone implant versus anti-VEGF agents injections

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Abstract

● **AIM:** To compare the anatomical and functional outcomes of combined phacoemulsification with intravitreal dexamethasone implant (DEX-I) versus anti-vascular endothelial growth factor (VEGF) injections in patients with diabetic macular edema (DME) and visually significant cataract.

● **METHODS:** This nonrandomized, retrospective analysis included 54 eyes undergoing phacoemulsification with DEX-I (DEX-I group) and 47 eyes receiving anti-VEGF injections (anti-VEGF group). Best-corrected visual acuity (BCVA) and central macular thickness (CMT) were measured preoperatively and postoperatively at 1 and 3mo.

● **RESULTS:** The two groups had comparable baseline characteristics, with similar age (DEX-I: 66.83±7.27y; anti-VEGF: 66.81±6.79y) and gender distribution (51.9% *vs* 59.6% males). Both groups showed significant BCVA improvement at 1 and 3mo, with no significant intergroup differences. CMT reduction was significantly greater in the DEX-I group at 3mo (25.03% *vs* 14.07%; *P*=0.049), particularly in recalcitrant eyes (25.09% *vs* 11.10%; *P*=0.007). Postoperative intraocular pressure (IOP)>21 mm Hg was observed in 14.8% of DEX-I eyes and 4.25% of anti-VEGF eyes (*P*=0.08), normalizing by 3mo. DEX-I required no reinjection, while 29.79% of anti-VEGF eyes needed a fourth dose at 3mo. Complications were minimal, with one posterior capsular injury in the DEX-I group.

● **CONCLUSION:** Combined phacoemulsification with intravitreal DEX-I offers superior CMT reduction and comparable visual acuity improvement to anti-VEGF injections in DME, with fewer required treatments. It is an effective strategy for managing cataract with DME, offering benefits, especially for recalcitrant cases. Both therapies have favourable safety profiles, but further long-term studies are needed for clinical guidance.

● **KEYWORDS:** dexamethasone implant; anti-vascular endothelial growth factor; diabetic macular edema; cataract

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INTRODUCTION

Diabetic macular edema (DME) is a leading cause of visual impairment in individuals with diabetes mellitus, significantly contributing to the global burden of diabetic retinopathy[1-2]. Its pathophysiology is characterized by retinal vascular leakage and accumulation of fluid in the macula due to chronic hyperglycemia-induced inflammation and ischemia[1-3]. Given the rising prevalence of diabetes worldwide, the burden of DME continues to grow, significantly impacting patients' quality of life and imposing substantial healthcare costs[4].

Simultaneously, cataracts represent another common ocular complication of diabetes, occurring earlier and with greater severity in this population compared to non-diabetic individuals[5-7]. In patients with concurrent cataract and DME, visual outcomes are often compromised due to the additive effects of lens opacity and macular pathology[5-7]. Hence, effective management of both conditions is critical to restoring and optimizing visual function.

Intravitreal anti-vascular endothelial growth factor (VEGF) agents, including bevacizumab, ranibizumab, aflibercept, brolucizumab, and faricimab, are the current gold standard for treating DME[8-12]. These agents work by reducing vascular permeability and inhibiting the angiogenic effects of VEGF, thereby promoting macular thickness reduction and vision improvement[8-12]. Several landmark clinical trials, such as RISE trial (Phase III randomized clinical trial of ranibizumab for DME), RIDE trial (Phase III randomized clinical trial of ranibizumab for DME), and Protocol T, have established the

efficacy of anti-VEGF injections in improving visual acuity and reducing retinal thickness in DME patients[13-14]. However, the effectiveness of anti-VEGF therapy is contingent on adherence to a rigorous injection schedule, often requiring monthly or bi-monthly visits, which poses significant challenges for patients and healthcare systems alike[4]. Moreover, a subset of patients with DME exhibits suboptimal response to anti-VEGF therapy, necessitating alternative or adjunctive treatment strategies[11,15]. Intravitreal corticosteroids, such as dexamethasone and triamcinolone acetonide, have emerged as valuable therapeutic options, particularly for DME cases associated with a strong inflammatory component or poor response to anti-VEGF agents[5-7,16]. Dexamethasone implants (DEX-I) deliver sustained, controlled-release corticosteroid therapy, reducing inflammation, vascular permeability, and macular edema while also providing the advantage of a longer dosing interval compared to anti-VEGF injections[5-7,16]. Clinical studies, such as the MEAD trial (Phase III, randomized, sham-controlled study evaluating the dexamethasone intravitreal implant for DME), have demonstrated that DEX-I significantly improves central macular thickness (CMT) and visual outcomes in DME patients[17]. However, corticosteroid therapy is associated with potential side effects, including increased intraocular pressure (IOP) and cataract progression, which must be carefully managed[16-17].

Patients with DME and cataract present unique therapeutic challenges, as cataract surgery can exacerbate macular edema due to increased inflammatory cytokines[5-7]. The timing and sequence of interventions in such cases are critical. Combining phacoemulsification with intravitreal therapy, either anti-VEGF injections or corticosteroid implants, has been explored as a strategy to address both pathologies simultaneously, offering the potential for improved visual and anatomical outcomes[18-20]. Studies investigating combined phacoemulsification with anti-VEGF injections have reported favorable results, with significant reductions in macular thickness and visual gains[19]. Similarly, the use of DEX-I during cataract surgery has been shown to mitigate surgery-induced inflammation and reduce the risk of macular edema exacerbation[6,20]. However, limited comparative evidence exists on the relative efficacy and safety of these two approaches.

This study aims to address the current gap in the literature by directly comparing the anatomical and functional outcomes of combined phacoemulsification with DEX-I versus anti-VEGF injections in patients with DME.

PARTICIPANTS AND METHODS

Ethical Approval This study was a nonrandomized retrospective analysis conducted at two tertiary care centers between January 2020 and January 2023. The study adhered to the tenets of the Declaration of Helsinki, with ethical approval obtained from the Institutional Ethics Committee (approval number NIO20232). Informed consent was obtained from all participants.

Participants A total of 54 eyes that underwent phacoemulsification with DEX-I (0.7 mg; DEX-I group) and 47 eyes that received anti-VEGF injections (anti-VEGF group) during phacoemulsification were included in the study. Patients in the anti-VEGF group received additional intravitreal injections on postoperative days 30 and 60, irrespective of CMT. Inclusion criteria for the study were: visually significant cataract diagnosed on slit-lamp examination along with presence of center-involving DME. Exclusion criteria included prior intravitreal anti-VEGF therapy within 3mo of surgery, intravitreal corticosteroid therapy within 6mo, a history of ocular hypertension or glaucoma, and associated retinal conditions such as vein occlusion, neovascular glaucoma, or uveitis. Patients lost to follow-up within 3mo postoperatively were excluded.

Preoperative Evaluation and Surgical Technique Preoperative evaluation included best-corrected visual acuity (BCVA) measurement using the Snellen's visual acuity chart, IOP measurement *via* noncontact tonometer (CT 800, Topcon), axial length measurement *via* ultrasound biometry, and corneal curvature (K-values) using the IOL Master 700. Specular microscopy (SP-1P Topcon) was performed to assess endothelial cell density, and optical coherence tomography (OCT, Topcon DRI OCT Triton Plus) was used to assess CMT. All surgeries were performed by two experienced surgeons specializing in both anterior and posterior segment surgeries. Under aseptic conditions, a 2.8 mm superior clear corneal incision was made, followed by the instillation of viscoelastic into the anterior chamber (AC). Paracentesis incisions were made at the 3 and 9 o'clock positions. After capsulorhexis, hydrodissection, and cataract emulsification, a foldable intraocular lens was implanted in the capsular bag. Residual viscoelastic was intentionally retained to prevent iris prolapse and to maintain the AC during the DEX-I injection. In cases where the AC appeared shallow, additional viscoelastic was injected to prevent further shallowing during the DEX-I administration. For the DEX-I group, the intravitreal implant was injected 3.5 mm from the limbus in the superotemporal quadrant using a specialized applicator. The bevel of the needle was oriented upwards, and approximately 1 mm of the needle tip was inserted into the sclera parallel to the limbus, followed by redirection towards the center of the eye into the vitreous cavity. This manoeuvre created a self-sealing scleral path. In the anti-VEGF group, 0.05 mL of anti-VEGF (bevacizumab or ranibizumab) was injected into the vitreous cavity using a 30-gauge needle, also positioned 3.5 mm from the limbus in the superotemporal quadrant.

Table 1 Baseline demographics of the study population

Demographics	DEX-I (*n*=54)	Anti-VEGF (*n*=47)	*P*
Age (y)	66.83±7.27	66.81±6.79	0.986
Gender			0.436
Male	28 (51.9%)	28 (59.6%)	
Female	26 (48.1%)	19 (40.4%)	
Prior therapy (anti-VEGF and or laser photocoagulation)	15 (27.8%)	12 (25.5%)	

VEGF: Vascular endothelial growth factor; DEX-I: Dexamethasone implant.

Table 2 Comparative analysis of BCVA changes between the DEX-I and the anti-VEGF groups, including intragroup comparisons

mean±SD, logMAR

Groups	Baseline	Post-injection (1-month)	Post-injection (3-month)	$P^{a,d}$	$P^{b,d}$
DEX-I (*n*=54)	0.93±0.43	0.53±0.33	0.38±0.32	0.001	0.001
Anti-VEGF (*n*=47)	1.02±0.44	0.45±0.32	0.49±0.33	<0.001	<0.001
P^{c}	0.004	0.54	0.16		

BCVA: Best-corrected visual acuity; VEGF: Vascular endothelial growth factor; DEX-I: Dexamethasone implant. [a]Intra-group baseline *vs* at 1mo; [b]Intra-group baseline *vs* at 3mo; [c]Mann-Whitney *U* test; [d]Wilcoxon's signed rank test. *P*<0.05 is considered to be statistically significant.

Postoperative Management Postoperatively, patients received a combination of medications, including prednisolone eye drops, tapering over 6wk, topical antibiotics, and nonsteroidal anti-inflammatory drops for 2wk. Lubricating drops were prescribed for 1mo. Postoperative evaluations were conducted on days 1, 7, 30, and 90 respectively. At each visit, visual acuity was measured using a Snellen's chart, IOP was assessed, and CMT was recorded using OCT. Any intraoperative complications and those occurring during the follow-up period were documented, along with their management strategies.

Outcome Measures The primary outcome measure was the change in BCVA and CMT at one and 3mo postoperatively. Secondary outcomes included safety analysis including changes in IOP, along with a subgroup analysis of patients based on the presence or absence of hard exudates and the prior treatment status (treatment-naïve and recalcitrant eyes).

Statistical Analysis Statistical analysis was conducted using SPSS software, version 23.0. Continuous variables were expressed as mean±standard deviation (SD) to indicate the average value and its variation. Categorical variables were summarized as percentages. Inter-group comparisons were conducted using the Mann-Whitney *U* test for non-parametric data and the independent samples *t*-test for parametric data. Intra-group comparisons were assessed using Wilcoxon's signed-rank test for non-parametric data and repeated measures analysis of variance (RMANOVA) for parametric data. A *P*-value of less than 0.05 was considered statistically significant for all analyses.

RESULTS

A total of 54 eyes in the DEX-I group and 47 eyes in the anti-VEGF group were included in the study. The mean age of the patients was similar in both groups: 66.83±7.27y in the DEX-I group and 66.81±6.79y in the anti-VEGF group (*P*=0.986; Table 1). The sex distribution was also comparable between the two groups, with 51.9% males and 48.1% females in the DEX-I group, and 59.6% males and 40.4% females in the anti-VEGF group (*P*=0.436; Table 1). A history of prior treatment (*e.g.*, panretinal photocoagulation or anti-VEGF) more than 3mo before surgery was noted in 27.8% of DEX-I eyes and 25.5% of anti-VEGF eyes (Table 1).

Best-Corrected Visual Acuity Mean baseline BCVA in the DEX-I group was 0.93±0.43 logMAR, improving significantly to 0.53±0.33 logMAR and 0.38±0.32 at 1 and 3mo postoperatively, respectively (*P*=0.001). Similarly, the anti-VEGF group showed improvement from 1.02±0.44 logMAR at baseline to 0.45±0.32 and 0.49±0.33 logMAR at 1 and 3mo, respectively (*P*<0.001). Intergroup comparisons of BCVA at all visits showed no statistically significant differences, including at 1mo (*P*=0.54) and 3mo (*P*=0.16; Table 2).

In treatment-naïve eyes, the DEX-I group exhibited a mean BCVA improvement from 0.91±0.44 logMAR at baseline to 0.49±0.32 at 1mo and 0.35±0.25 at 3mo (*P*<0.001). Similarly, the anti-VEGF group improved from 0.98±0.48 logMAR at baseline to 0.37±0.26 and 0.38±0.29 at 1 and 3mo, respectively (*P*<0.001). Intergroup differences were not statistically significant at any follow-up point (Table 3).

Among the recalcitrant eyes, the mean BCVA showed significant improvements in both groups. In the DEX-I group, BCVA improved from 0.98±0.44 at baseline to 0.47±0.46 at 3mo (*P*<0.001). Similarly, in the anti-VEGF group, BCVA improved from 1.05±0.37 to 0.59±0.32 (*P*<0.001). However, there were no significant differences in BCVA between the two groups at any visit (Table 4).

Central Macular Thickness In all eyes, baseline CMT was comparable (*P*=0.36). At 1mo, both groups showed significant

Table 3 Comparative analysis of BCVA changes between treatment-naïve eyes in DEX-I and anti-VEGF groups, including intra-group comparisons

mean±SD, logMAR

Groups	Baseline	Post-injection (1-month)	Post-injection (3-month)	$P^{a,d}$	$P^{b,d}$
DEX-I (*n*=39)	0.91±0.44	0.49±0.32	0.35±0.25	<0.001	<0.001
Anti-VEGF (*n*=24)	0.98±0.48	0.37±0.26	0.38±0.29	<0.001	<0.001
P^{c}	0.53	0.12	0.59		

BCVA: Best-corrected visual acuity; VEGF: Vascular endothelial growth factor, DEX-I: Dexamethasone implant. [a]Intra-group baseline *vs* at 1mo; [b]Intra-group baseline *vs* at 3mo; [c]Mann-Whitney *U* test; [d]Wilcoxon's signed rank test. *P*<0.05 is considered to be statistically significant.

Table 4 Comparative analysis of BCVA changes between recalcitrant eyes in DEX-I and anti-VEGF groups, including intra-group comparisons

mean±SD, logMAR

Groups	Baseline	Post-injection (1-month)	Post-injection (3-month)	$P^{a,d}$	$P^{b,d}$
DEX-I (*n*=15)	0.98±0.44	0.63±0.37	0.47±0.46	<0.001	<0.001
Anti-VEGF (*n*=23)	1.05±0.37	0.55±0.36	0.59±0.32	<0.001	<0.001
P^{c}	0.61	0.55	0.36		

BCVA: Best-corrected visual acuity; VEGF: Vascular endothelial growth factor, DEX-I: Dexamethasone implant. [a]Intra-group baseline *vs* at 1mo; [b]Intra-group baseline *vs* at 3mo; [c]Independent sample *t*-test; [d]Repeated measures ANOVA. *P*<0.05 is considered to be statistically significant.

Table 5 Comparative analysis of CMT Changes between the DEX-I and anti-VEGF groups, including intra-group comparisons mean±SD, μm

Groups	Baseline	Post-injection (1-month)	Post-injection (3-month)	$P^{a,d}$	$P^{b,d}$
DEX-I (*n*=54)	413.70±136.74	330.59±103.19	293.96±113.14	<0.001	<0.001
Anti-VEGF (*n*=47)	392.32±89.05	309.32±70.86	330.02±64.11	<0.001	<0.001
P^{c}	0.36	0.24	<0.05		

CMT: Central macular thickness; VEGF: Vascular endothelial growth factor; DEX-I: Dexamethasone implant. [a]Intra-group baseline *vs* at 1mo; [b]Intra-group baseline *vs* at 3mo; [c]Independent sample *t*-test; [d]Repeated measures analysis of variance (RMANOVA).

Table 6 Comparative analysis of CMT changes between treatment-naïve eyes in DEX-I and anti-VEGF groups, including intra-group comparisons

mean±SD, μm

Groups	Baseline	Post-injection (1-month)	Post-injection (3-month)	$P^{a,d}$	$P^{b,d}$
DEX-I (*n*=39)	411.26±143.13	328.61±104.26	298.15±70.47	<0.001	<0.001
Anti-VEGF (*n*=24)	375.87±57.21	293.25±53.02	307.46±36.53	<0.001	<0.001
P^{c}	0.25	0.13	0.55		

CMT: Central macular thickness; VEGF: Vascular endothelial growth factor, DEX-I: Dexamethasone implant. [a]Intra-group baseline *vs* at 1mo; [b]Intra-group baseline *vs* at 3mo; [c]Independent sample *t*-test; [d]Repeated measures ANOVA. *P*<0.05 is considered to be statistically significant.

Table 7 Comparative analysis of CMT changes between recalcitrant eyes in DEX-I and anti-VEGF groups, including intra-group comparisons

mean±SD, μm

Groups	Baseline	Post-injection (1-month)	Post-injection (3-month)	$P^{a,d}$	$P^{b,d}$
DEX-I (*n*=15)	420.07±22.99	335.73±103.76	312.00±97.7	<0.001	<0.001
Anti-VEGF (*n*=23)	409.48±112.06	326.09±83.57	353.56±77.87	<0.001	<0.001
P^{c}	0.79	0.75	0.16		

CMT: Central macular thickness; VEGF: Vascular endothelial growth factor, DEX-I: Dexamethasone implant. [a]Intra-group baseline *vs* at 1mo; [b]Intra-group baseline *vs* at 3mo; [c]Independent sample *t*-test; [d]Repeated measures ANOVA. *P*<0.05 is considered to be statistically significant.

intra-group reductions (*P*<0.001), but inter-group differences were non-significant (*P*=0.24). By 3mo, CMT in the DEX-I group reduced significantly compared to anti-VEGF (mean: 330.02 μm; *P*<0.05; Table 5). The percentage CMT reduction at 3mo was also significantly greater in the DEX-I group (25.03%) than the anti-VEGF group (14.07%; *P*=0.049).

In treatment-naïve eyes, baseline CMT was similar (*P*=0.25). Both groups showed significant intra-group improvements at 1 and 3mo (*P*<0.001). However, inter-group comparisons at both time points were not statistically significant (*P*>0.05; Table 6).

In recalcitrant eyes (Table 7), baseline CMT was comparable (*P*=0.79). At 1mo, intra-group reductions were significant (*P*<0.001), but inter-group differences remained non-significant (*P*=0.75). By 3mo, the DEX-I group showed greater CMT reduction (25.09%) than anti-VEGF (11.10%; *P*=0.007).

Intraocular Pressure Outcomes Postoperative IOP elevation >21 mm Hg was observed in 8 eyes (14.8%) in the DEX-I group at 1mo, compared to 2 eyes (4.25%) in the anti-VEGF group (P=0.08). IOP normalized in all eyes by the 3-month follow-up without requiring antiglaucoma medication. No significant difference in IOP outcomes was noted between the groups at 3mo.

Mean Number of Injections All eyes in the anti-VEGF group received three loading doses, with 14 eyes (14/47; 29.79%) requiring additional fourth dose at the end of 3mo. In contrast, none of the eyes in the DEX-I arm required additional injection up to 3mo.

Complications One intraoperative complication was noted in the DEX-I group, where a posterior capsular injury occurred during the DEX-I injection. No cataract progression was noted in this eye. There were no intraoperative complications in the anti-VEGF group. Postoperatively, both groups had no complications aside from IOP rise.

DISCUSSION

The present study evaluated the outcomes of combining phacoemulsification with DEX-I versus anti-VEGF injections in patients with visually significant cataract and center-involving DME. The results demonstrate significant improvement in BCVA and CMT in both groups at 3mo postoperatively, with comparable functional gains but superior anatomical outcomes in the DEX-I group. Importantly, these benefits were achieved with fewer injections in the DEX-I group, highlighting its potential as an effective and convenient alternative to anti-VEGF therapy in this setting.

Simultaneous cataract surgery and DME treatment present unique challenges, as surgery-induced inflammation can exacerbate macular edema. Effective management necessitates addressing both conditions concurrently to optimize visual recovery while mitigating worsening edema. Intravitreal therapies, either anti-VEGF agents or corticosteroids, have emerged as viable solutions to counteract these challenges. A study by Chakraborty and Sheth[5] demonstrated that intravitreal DEX-I was superior to anti-VEGF (brolucizumab) for DME, with fewer need for laser photocoagulation. Another study comparing the efficacy of perioperative ranibizumab injections in patients undergoing cataract surgery found no significant differences in visual acuity and foveal thickness outcomes between groups receiving the injection preoperatively, intraoperatively, or postoperatively[21]. However, both these studies highlighted the need for repeated anti-VEGF injections to sustain the benefits, which can pose logistical challenges for patients.

Anti-VEGF agents have become the cornerstone for DME management, given their ability to reduce VEGF-mediated vascular leakage and edema[8-12]. Multiple landmark trials, including RISE, RIDE, and Protocol T, have demonstrated visual and anatomical benefits with anti-VEGF therapy[13-14]. However, their effectiveness relies on frequent injections, which may be burdensome for patients. On the other hand, corticosteroids, such as DEX-I, offer a longer duration of action and address the inflammatory components of DME that are not directly targeted by anti-VEGF agents[5-7]. The results of the current study reinforce this dual therapeutic role, as the DEX-I group achieved comparable BCVA improvements and greater CMT reduction compared to anti-VEGF therapy, with fewer injections over the 3-month period.

While VEGF plays a central role in the development of DME through its effects on vascular permeability and angiogenesis, inflammation is increasingly recognized as a key contributor to DME pathogenesis[2-3]. Hyperglycemia-induced oxidative stress triggers the activation of inflammatory cascades, leading to the upregulation of cytokines such as interleukin-6 (IL-6), IL-8, and tumor necrosis factor-alpha (TNF-α)[2-3]. These inflammatory mediators contribute to the breakdown of the blood-retinal barrier, increased vascular permeability, and accumulation of intraretinal fluid.

Anti-VEGF agents primarily target the VEGF-driven component of DME but do not address the inflammatory pathways that may persist despite VEGF inhibition[2-3]. This may explain the suboptimal response observed in some patients treated with anti-VEGF monotherapy. In contrast, corticosteroids such as dexamethasone exert a broader mechanism of action by inhibiting multiple inflammatory mediators, reducing leukostasis, and stabilizing the blood-retinal barrier[5-7]. They also address the inflammatory milieu in DME that often persists post-cataract surgery[5-7]. In the current study, the DEX-I group demonstrated significant reductions in CMT compared to the anti-VEGF group, suggesting a greater impact on macular edema. Importantly, this anatomical benefit was achieved with fewer injections, reducing the treatment burden on patients. The longer duration of action of the DEX-I implant (approximately 3-4mo) is particularly advantageous in the postoperative period, where inflammation-induced macular edema may persist or recur. This underscores the utility of corticosteroid therapy, particularly in patients with an incomplete response to anti-VEGF agents or those with evidence of a strong inflammatory component.

One of the key findings of this study is the comparable visual improvement observed in both treatment groups, despite the differences in anatomical outcomes. This highlights the multifactorial nature of visual recovery in DME, where factors beyond macular thickness, such as retinal integrity and photoreceptor function, also play critical roles. Nevertheless, the greater CMT reduction observed in the DEX-I group suggests that corticosteroids may provide a more robust anatomical response, particularly in eyes with significant

inflammatory involvement or poor response to anti-VEGF therapy. The reduced need for additional injections in the DEX-I group is another noteworthy advantage. Patients receiving anti-VEGF therapy often require multiple injections to maintain macular stability, whereas the sustained-release nature of DEX-I allows for longer treatment intervals. This not only reduces the treatment burden but also minimizes the risks associated with repeated intravitreal injections.

Both anti-VEGF and corticosteroid therapies were found to be safe in this study, with no significant differences in adverse events between the two groups. While corticosteroids are associated with a risk of increased IOP[5], this was well-managed with topical therapy, and no cases of sustained ocular hypertension requiring surgical intervention were observed.

The present study has several limitations that warrant consideration. First, its retrospective design may introduce selection bias and limit the generalizability of the findings. Second, the follow-up duration was limited to 3mo, which may not fully capture the long-term outcomes or safety profiles of the treatments. Additionally, the nonrandomized nature of the study precludes definitive conclusions regarding the comparative efficacy of DEX-I and anti-VEGF therapy. Larger, randomized controlled trials with longer follow-up are needed to validate these findings and provide more robust evidence.

Despite these limitations, the study has several strengths. It provides real-world evidence on the efficacy and safety of combining phacoemulsification with intravitreal therapy in patients with concurrent cataract and DME. The direct comparison between DEX-I and anti-VEGF therapy offers valuable insights into their relative benefits and limitations, particularly in the postoperative setting. The findings highlight the potential of DEX-I to achieve superior anatomical outcomes with fewer injections, reducing the treatment burden while maintaining visual improvements.

In conclusion, combining intravitreal therapy with cataract surgery is an effective strategy for managing patients with coexisting cataract and DME. While both anti-VEGF and DEX-I therapies provide significant visual improvement, DEX-I offers superior CMT reduction with fewer injections, making it a valuable option for patients with inflammatory DME or poor compliance. Both therapies demonstrate favorable safety profiles when administered during cataract surgery. Future prospective, long-term studies are needed to confirm these findings and guide clinical decision-making in this challenging patient population.

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Data Availability: We had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis as well as the decision to submit for publication.

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