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Anti-VEGF therapy in a tertiary eye care centre for various ocular pathologies and outcomes for the treatment of diabetic macular edema (DME)

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Abstract
Aim: To determine the indications for Anti-VEGF injection use and the outcomes of the most common pathology in a tertiary eye care centre.
Methodology: This retrospective study analyzed 124 patients from the ASG Eye Hospital in Agarpara. Participants were selected based on specific inclusion and exclusion criteria, with 44 chosen for the DME condition. Central macular thickness (CMT) and visual acuity outcomes were evaluated in these participants before and after a single Accentrix anti-VEGF injection.
Results: Using paired t-test analysis, it was found that among 36 patients administered with one Accentrix injection, there was a statistically significant difference between pre- and post-injection visual acuity and CMT measurements. Diabetic macular edema (DME) emerged as the most prevalent indication for anti-VEGF injection among other ocular pathologies.
Conclusion: Despite various limitations, anti-VEGF therapy has become the new standard of care for treating many ocular pathologies, including diabetic macular edema (DME), due to its effectiveness in enhancing anatomic and visual outcomes. Future research should aim for more detailed examinations, diagnostic procedures, and larger population studies for more accurate results.

Keywords: Anti-VEGF therapy, diabetic macular edema (DME), visual acuity, central macular thickness (CMT), ocular pathologies

Introduction
Diabetic macular edema (DME) is a common complication of diabetic retinopathy and a leading cause of vision loss in patients with diabetes. Anti-VEGF (vascular endothelial growth factor) therapy has emerged as a significant treatment modality, showing promising results in reducing macular thickness and improving visual acuity. Anti-VEGF injections are a common treatment for various retinal conditions that cause abnormal blood vessel growth and leakage under the retina, such as wet age-related macular degeneration (AMD), diabetic macular edema, and macular edema from retinal vein occlusions [1]. The procedure involves injecting anti-VEGF medications directly into the vitreous cavity at the back of the eye. These medications block vascular endothelial growth factor (VEGF), a protein that promotes the growth of abnormal blood vessels and increases vascular permeability [1, 2]. The most commonly used anti-VEGF drugs are bevacizumab (Avastin), ranibizumab (Lucentis), aflibercept (Eylea), and brolucizumab [2, 3]. While Lucentis and Eylea are specifically designed for intraocular injection, Avastin is more cost-effective as it can be used to treat multiple patients from a single vial [1]. Anti-VEGF (Vascular endothelial growth factor) therapy is a cornerstone in the treatment of diabetic macular edema (DME), a prevalent complication of diabetes that can lead to significant vision loss. This approach focuses on inhibiting the effects of VEGF, a protein that promotes abnormal blood vessel growth and increased vascular permeability, which are characteristic of DME [4]. Diabetic macular edema (DME) is a common cause of mild visual impairment among diabetic meletus patients. The absolute number of DME cases in India is noteworthy due to the country's growing diabetes population. In order to modify the blood-retinal barrier, vascular endothelial growth factor (VEGF) is essential [7]. Furthermore, tractional and inflammatory factors may make the pathophysiology of DME more difficult. Optical coherence tomography (OCT), in addition to clinical evaluation and fundus fluorescein angiography (FFA), has emerged as crucial

diagnostic tool in the identification and treatment of DME [7]. Study done by W. Patrick *et al*. states that, there was no statistically significant association between the visual and ocular outcomes, nor was there a significant effect of anti-VEGF treatment type on logMAR VA. Although OCT analysis, including CMT measurements, will remain an important aspect of DME care, more research is needed into additional anatomic factors that may influence visual results [11]. This study aims to evaluate the indications for anti-VEGF injection use and to assess the outcomes in patients treated for DME at a tertiary eye care centre.

Methods

This retrospective study was conducted at the ASG Eye Hospital in Agarpara. A total of 124 patients were reviewed, and 44 patients with DME were selected based on inclusion and exclusion criteria. The primary outcomes measured were central macular thickness (CMT) and visual acuity before and after one Accentrix anti-VEGF injection. Statistical analysis was performed using a paired t-test to compare pre- and post-injection results.

Inclusion Criteria

- Patients diagnosed with diabetic macular edema.
- Patients who received at least one Accentrix anti-VEGF injection.
- Availability of pre- and post-treatment CMT and visual acuity data.

Exclusion Criteria

- Patients with other significant ocular pathologies.
- Patients who received treatments other than Accentrix.
- Incomplete medical records.

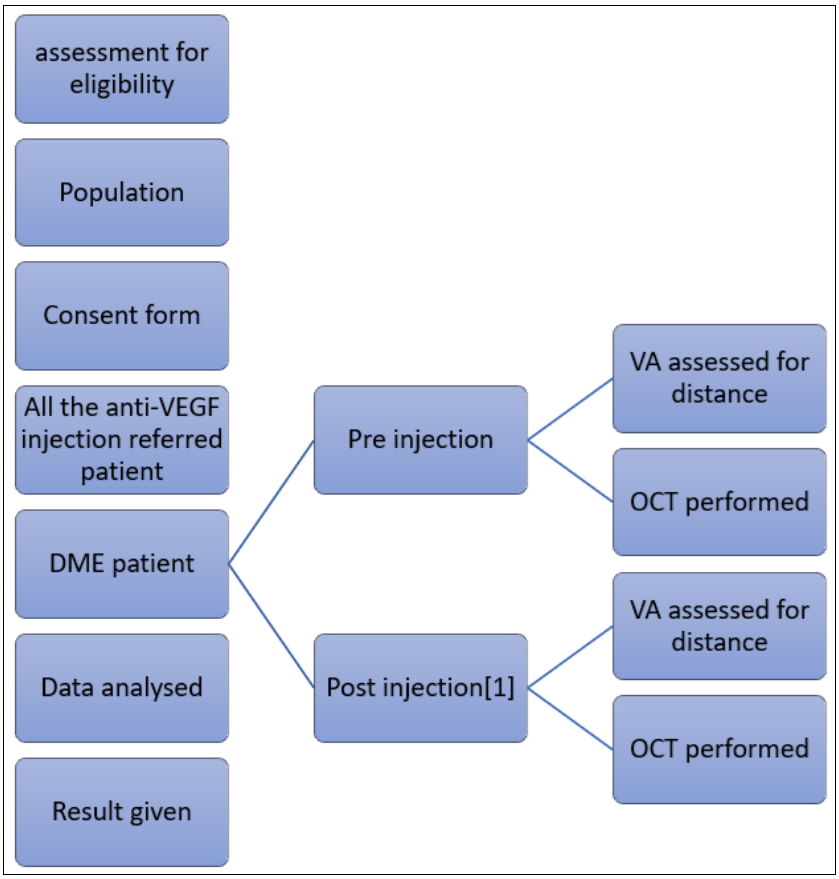
Methodology

Data collection was done by following the below steps: (Shown in table: 1)

- Based on inclusion and exclusion criteria, participants who are willing to participates, are asked to go through the information sheet and then fill the consent form.
- History taken including their demographic data, systemic illness and ocular history.
- Visual acuity will be checked for distance and near.
- OCT will be performed.
- For the patient with DME, after 1 injection similar visual acuity for distance and near and OCT will be performed.
- And after 3-4 injection similarly Visual acuity for distance and near and OCT will be performed.
- Then all the data will be entered in MS. Excel and with statistical analysis data will be analyzed with appropriate process, and result will be discussed.

Data Analysis

The data collected were t Excel Sheet and was analysed using MS Excel software and Primer application. The result is represented in tabular and graphical format. The mean was used to describe the measured parameters. A Paired T-test was conducted to determine the difference ocular and visual outcomes of pre and post injection. P value < 0.05 was considered as significant, negative value states the relation between two variables are inversely proportional.



Results

A total no of 124 patients is administered anti-VEGF injection, it includes different indication of ocular pathologies for anti-VEGF injection. This study includes total 124 patient

who has been administered at least 1 anti-VEGF injection for various ocular pathologies with mean age of 59.31 ±9.18. out of them 44.36% were DME, 25.20% were CNVM, 14.11% were BRVO and 9.7% are BRVO with ME and rest ocular pathologies conditions were <7%. [shown in figure 2]

While analyzing the improvement of visual acuity after treatment in cases of DME, it shows with paired t-test, it is seen that out of 36 patients, who has been administered 1 Accentrix injection, there improvement in visual acuity shows a statistically significant value (p=0.047) at 95% confidence interval. It states that there is a statistical difference between pre and post visual acuity for an individual. [shown in figure 3] While analysing the status of CMT after treatment in cases of DME, it shows with paired t-test, it is seen that out of 46 patients, who has been administered 1 Accentrix injection, there improvement in CMT shows a statistically significant value (p value <0.05) at 95% confidence interval. It states that there is a statistical difference between pre and post CMT for an individual. [shown in figure 4]

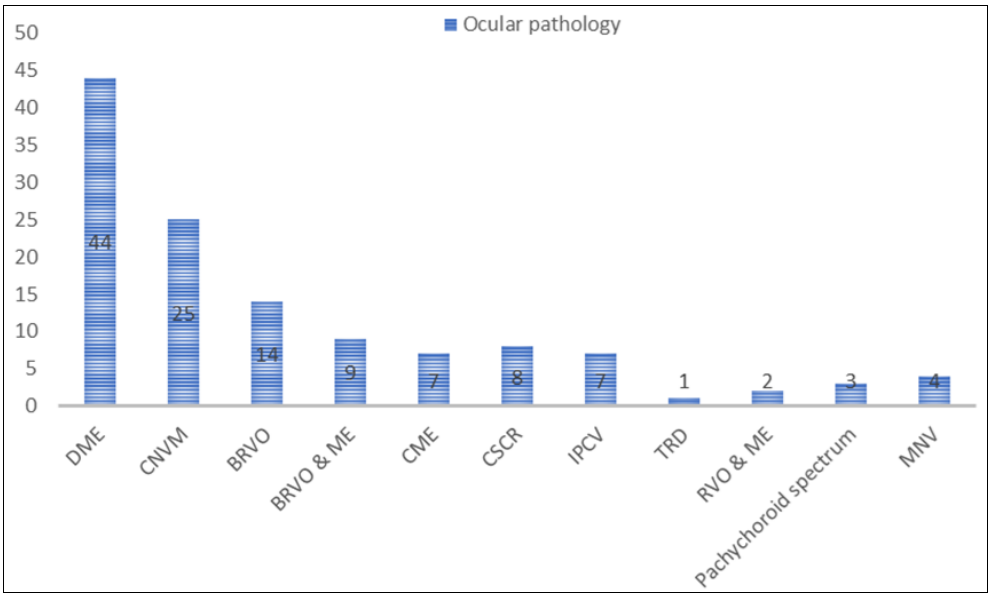


Fig 1: Ocular Pathology

Group	N	Mean	Std Dev	SEM
1	36	0.6	0.3521	0.05869
2	36	0.4944	0.3079	0.05132
Difference		0.1056	0.3079	0.05132

95% confidence interval for difference: 0.001365 to 0.2097
t = 2.057 with 35 degrees of freedom; P = 0.047

Discussion

From this study, it is observed that the following is a brief reply to the question on anti-VEGF therapy for ocular disorders, with an emphasis on the results of treating diabetic macular edema (DME) with Accentrix injections & the indication of Anti-VEGF use in a tertiary eye care centre.

In this study out of 124 patients it is been observed that the prevalence of DME is more than any other indication ocular pathologies of anti-VEGF injection. Study done by W. Patrick *et al*. states that, there was no statistically significant association between the visual and ocular outcomes, nor was there a significant effect of anti-VEGF treatment type on logMAR VA [5]. But in this study with paired t test while analysing the outcome of pre and post visual acuity and CMT improvement, it shows a statistically significant result. Which states that there is significant improvement in CMT and VA after 1 Accentrix injection administration.

In tertiary eye care facilities, the use of anti-VEGF therapy-such as Accentrix injections-has taken hold as the accepted method of treating DME. Research indicates that a solitary intravitreal injection of Accentrix can considerably enhance visual acuity and decrease central macular thickness in individuals suffering from diabetic macular edema.

Although this study has some limitation which need to consider, i.e. limited study period with limited sample size. The severity of DR is not assessed and along with that detail ocular condition is not assessed for this study. And only after one injection visual and ocular outcome is assessed, which can affect the result. For future research these limitations need to be taken care of.

Group	N	Mean	Std Dev	SEM
1	46	405.1	114.1	16.82
2	46	360.9	106	15.62
Difference		44.15	80.63	11.89

95% confidence interval for difference: 20.21 to 68.1
t = 3.714 with 45 degrees of freedom; P = 0.000

Conclusion

Anti-VEGF medication has become the new standard of care for the treatment on many ocular pathologies including diabetic macular edema (DME) due to its effectiveness in enhancing anatomic and visual outcomes. Anti-VEGF medications, such as ranibizumab (Accentrix), aflibercept (Eyelia), bevacizumab (Pagenax), and), have been demonstrated to be safe and efficient in thinning the retina and enhancing vision in Many ocular pathologies including DME patients. Anti-VEGF treatment is regularly linked to a quick resolution of DME and notable visual improvements, as evidenced by the findings of multiple sizable, prospective, randomized clinical trials. There are no appreciable variations in the frequencies of systemic major adverse events between anti-VEGF therapy and alternative treatment, according to extensive research on the safety profiles of these medicines. Since tertiary eye care institutions have access to cutting-edge technology and specialist knowledge, anti-VEGF therapy is a beneficial treatment choice for patients with DME.

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Conflicts of Interest: The authors declare no conflicts of interest related to this study.

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