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LONGITUDINAL ASSESSMENT OF VISUAL OUTCOMES IN PATIENTS WITH AGE-RELATED MACULAR DEGENERATION UNDERGOING ANTI-VEGF TREATMENT

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Abstract:

Objective: This longitudinal research aimed to assess visual outcomes in those with "Age-Related Macular Degeneration (AMD)" undergoing "Anti-Vascular Endothelial Growth Factor (anti-VEGF)" treatment.

Methods: A cohort of 100 AMD subjects receiving anti-VEGF treatment was ensued a year. "Best-corrected visual acuity (BCVA)" and "Central Retinal Thickness (CRT)" were measured at regular intervals. Statistical analyses were performed to evaluate changes over time.

Results: Significant enhancements in BCVA ($p < 0.001$) and decreases in CRT ($p < 0.001$) were witnessed. At month 12, BCVA increased by +10 ETDRS letters, and CRT decreased from 350 µm to 260 µm. No significant adverse events were reported.

Conclusion: Anti-VEGF treatment demonstrated effectiveness in advancing visual acuity and reducing retinal edema in AMD subjects. Regular monitoring and personalized treatment approaches are crucial for optimizing outcomes.

Keywords: Age-related macular degeneration, AMD, anti-VEGF treatment, visual outcomes, longitudinal assessment.

Introduction

"Age-related macular degeneration (AMD)" represents a considerable public health concern globally, particularly in aging populations. As life expectancy rises, the prevalence of AMD continues to increase, leading to a greater burden on healthcare systems and society as a whole. The condition is characterized by progressive damage to the macula, the central part of the retina responsible for sharp, central vision. This deterioration often results in significant visual impairment and can profoundly impact the quality of life of affected individuals [1-5].

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Presently, anti-VEGF treatment stands as the primary treatment mode for neovascular AMD, aiming to halt disease progression and preserve visual function. Although anti-VEGF agents have showed significant usefulness in clinical trials, real-world outcomes may vary due to factors such as patient heterogeneity, treatment adherence, and long-term safety profiles. Therefore, there is a crucial need for longitudinal studies that closely monitor visual outcomes in AMD subjects undergoing anti-VEGF treatment over extended periods. By comprehensively assessing the efficacy, safety, and durability of anti-VEGF treatment in real-world situations, such studies can provide valuable insights for optimizing treatment strategies and improving patient care [6-10].

Materials and Methods

This prospective longitudinal research enrolled adult subjects from a tertiary care center. Diagnosis of neovascular AMD was confirmed based on clinical valuation, comprising fundus examination, “Optical Coherence Tomography (OCT)” imaging demonstrating the presence of subretinal fluid, intraretinal fluid, or pigment epithelial detachment consistent with “Choroidal Neovascularization (CNV)”, and fluorescein angiography showing characteristic patterns of leakage or staining indicative of CNV activity. Comprehensive ophthalmic evaluations were conducted at baseline and follow-up visits, including BCVA assessment using standardized protocols such as “Early Treatment Diabetic Retinopathy Research (ETDRS) charts. OCT imaging was performed to evaluate retinal morphology and CRT. Subjects received anti-VEGF treatment.

Statistical analysis was performed using SPSS ver 21, with p-values <0.05 regard as statistically significant. Ethical approval taken.

Results

Table 1: Baseline Characteristics of AMD Subjects Undergoing Anti-VEGF Treatment

The baseline characteristics of the research population provide essential insights into the demographic and clinical profile of AMD subjects receiving anti-VEGF treatment. The mean age of the participants was 75 years, indicating that the research predominantly involved elderly individuals, consistent with AMD's prevalence increasing with age. The slight male predominance witnessed (60% male) aligns with existing epidemiological data suggesting a slightly higher incidence of AMD in males.

The baseline BCVA of 58 ETDRS letters reflects moderate visual impairment, with a Snellen equivalent of approximately 20/63. This baseline level of visual acuity underscores the significant impact of AMD on subjects’ central vision and highlights the clinical relevance of evaluating visual outcomes in this population.

Table 2: Changes in CRT in AMD Subjects Undergoing Anti-VEGF Treatment

The changes in CRT measured by OCT provide worthy information concerning the anatomical response to anti-VEGF treatment in AMD subjects. At baseline, the mean CRT was 350 μm, indicating the presence of retinal edema characteristic of neovascular AMD.

Over the course of anti-VEGF treatment, significant decrease in CRT were witnessed at each follow-up visit compared to baseline. By month 12, the mean CRT decreased to 260 μm,

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reflecting a substantial reduction in retinal edema. These findings demonstrate the efficacy of anti-VEGF treatment in resolving macular edema and restoring retinal morphology, which is essential for preserving visual function in AMD subjects.

Discussion

The present research investigated the longitudinal visual outcomes of subjects with AMD undergoing anti-VEGF treatment. Current findings demonstrate significant enhancements in visual acuity and decrease in CRT following anti-VEGF treatment, consistent with previous research [1-3]. These results underscore the efficacy of anti-VEGF agents in stabilizing or even reversing disease progression in neovascular AMD, thus preserving visual function and improving subjects quality of life.

Anti-VEGF treatment has revolutionized the management of neovascular AMD, offering superior visual outcomes compared to conventional treatments such as photodynamic treatment or laser photocoagulation [4]. The observed enhancements in visual acuity highlight the importance of timely initiation and consistent adherence to anti-VEGF treatment regimens. However, it is crucial to acknowledge that treatment response may vary among individual patients, influenced by factors like disease's severity, lesion characteristics, and genetic predisposition [5, 6]. Therefore, personalized treatment approaches tailored to each patient's specific needs and risk profile are paramount to optimizing outcomes in AMD management.

While anti-VEGF treatment has demonstrated remarkable efficacy in preserving visual function, its long-term safety profile remains a subject of debate [7, 8]. Concerns regarding potential ocular and systemic adverse effects, such as retinal atrophy, geographic atrophy progression, and systemic vascular events, necessitate careful monitoring and risk-benefit assessment [9, 10]. Future research should focus on figuring out the best treatment length and dosing time to keep side effects to a minimum while still getting the most out of the treatment.

Comparative analyses with other treatment modalities, such as corticosteroids or combination therapies, can provide valuable insights into the relative efficacy and safety of different AMD treatment strategies. Additionally, investigating predictive biomarkers of treatment response and disease progression may facilitate the development of personalized treatment algorithms and improve patient stratification. Emerging technologies, such as artificial intelligence and genomic profiling, hold promise for advancing precision medicine in AMD management by enabling more accurate risk stratification and treatment selection [1-3].

It is important to be aware of the research's limits. First, the results may not be related to everyone as the study was historical and the sample size was not very big. To prove that anti-VEGF treatment is safe and effective in the long term for treating AMD, more prospective research with bigger groups and greater follow-up periods are needed. Second, the study relied on subjective outcome measures like visual acuity, which could lead to biases. This shows how important it is to use objective functional and structural measurements like microperimetry and fundus autofluorescence imaging [4-6].

Conclusion

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In conclusion, current research provides further evidence supporting the efficacy of anti-VEGF treatment in rising visual outcomes and reducing retinal edema in subjects with neovascular AMD. Despite the challenges posed by AMD's multifactorial etiology and heterogeneous clinical presentation, anti-VEGF agents remain the cornerstone of AMD management, offering significant benefits in terms of visual function preservation. However, ongoing research efforts are necessary to address remaining gaps in knowledge regarding treatment optimization, long-term safety, and personalized medicine approaches in AMD care. By collaboratively advancing current understanding of AMD pathogenesis and treatment, we can strive towards succeeding better effects and improving the quality of life for those affected by this debilitating condition.

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Tables

Table 1: Baseline Characteristics of AMD Subjects Undergoing Anti-VEGF Treatment

Characteristic	Mean ± SD (or n)
Age (years)	75 ± 6.2
Gender (M/F)	60/40
Type of AMD	
Baseline VA (ETDRS letters)	58 ± 8

Table 2: Changes in CRT in AMD Subjects Undergoing Anti-VEGF Treatment

Visit	Mean CRT (μm) ± SD	p-value
Baseline	350 ± 50	
Month 3	280 ± 40	< 0.001
Month 6	270 ± 35	< 0.001
Month 12	260 ± 30	< 0.001