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# COMPARISON OF TWO REGIMENS USING BEVACIZYMAB FOR WET AGE-RELATED MACULAR DEGENERATION

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## ABSTRACT

**Aim:** to compare the effect and visual outcome using fixed regimen to treat and extend regimen. **Method:** this retrospective study was conducted at the ophthalmology clinic in King Hussein medical center between January 2022 and July 2023. All patient who were known to have wet AMD and received bevacizumab were included in the study. The visual acuity, central macular thickness, and the presence of any sign of activity were recorded at each visit. The patients were randomly divided into two groups; group A are those who used the pro re nata (PRN) regimen and group B who used the treat and extend regimen. The results of the two groups will be compared and analyzed. **Results:** 60 patients (70 eyes) with a mean age of (67.0 ±4.9 years) were enrolled. There was no statistically significant difference between the two groups regarding the baseline BCVA and CRT. At 48 weeks, there was significant improvement in both groups regarding BCVA, CRT, percentage of eyes with retinal free fluids when compared to the baseline indices. However, there was no statistically significant difference between the two groups at this time regarding the baseline BCVA, CRT, percentage of reduction in CRT, percentages of eyes with retinal free fluids and number of injections. At 96 weeks more, significant improvement in BCVA and CRT was noted in both groups. However, the improvement, was more significant in group B when compared to group A. **Conclusion:** The T&E regimen demonstrated long-term superior effect compared to PRN regimen. The T&N regimen showed capacity to achieve greater vision improvement with fewer injections and smaller number of visits.

**KEYWORDS:** Bevacizumab, pro re nata regimen, Treat and Extend regimen, Wet age-related macular degeneration.

## INTRODUCTION

Age-related macular degeneration (AMD) is a progressive ocular disorder that represents a leading cause of visual impairment and blindness among the elderly population.[1]

AMD primarily affects the macula, the central portion of the retina responsible for high-acuity vision.[2] The disease is categorized into two main forms: dry (non-neovascular) AMD and wet (neovascular) AMD. The underlying mechanisms contributing to AMD involve a complex interplay of genetic, environmental, and age-related factors.[3]

The pathogenesis of AMD involves the accumulation of drusen, extracellular deposits beneath the retinal pigment epithelium, and choroidal neovascularization, characterized by abnormal blood vessel growth beneath the retina.[4] These processes disrupt retinal integrity, leading to photoreceptor degeneration and central vision impairment.[5]

The treatment of Age-Related Macular Degeneration (AMD) depends on the specific type and stage of the disease; Lifestyle modifications, dietary Supplements, and low Vision Aids are the main modalities of treatment for the dry type.[6] On the other hand, intra vitreal anti-vascular endothelial growth factor (anti-VEGF) and Photodynamic Therapy (PDT) are the treatments of choice for the wet type.[7]

Treatment with anti VEGF consists of giving a three-monthly loading doses of intra vitreal injection followed by a maintenance dose which is adjusted based on patient's response or presence.[8,9] This treatment includes treat and extend (T&E) regimen, fixed regimen, and pro re nata (PRN) regimen.[9,10]

Bevacizumab is commonly used off-label for the treatment of wet AMD due to its ability to inhibit abnormal blood vessel growth and reduce fluid leakage.[11] Its effectiveness and cost-effectiveness have made it a viable treatment option.[12]

The aim of this study is to compare the effect and visual outcome using two different regimens; the fixed regimen and extend regimen.

## RESULTS

60 patients (70 eyes) with wet AMD were enrolled in the study. The mean age of the patients was (67.0 ±4.9 years) and 48.6% of them were males. there was no statically significant difference between the two groups regarding age and gender. The demographic features are summarized in table 1.

**Table 1: The demographic features of the patients.**

| | Group A (no. = 40) | Group B (no. = 30) | P value |
|---|---|---|---|
| Mean age (years) | 66.1±4.1 | 68.2 ±5.2 | 0.624 |
| Males ratio | 21 (52.5%) | 13 (50.0%) | 0.865 |
| Duration of the disease | 16 (64.0%) | 17 (68.0%) | 0.765 |
| Patients with previous treatment | 10 (25%) | 7 (23.3%) | 0.775 |
| Mean number of previous injections | 9.2 | 9.3 | 0.932 |

There was no statistically significant difference between the two groups regarding the baseline BCVA and CRT. At 48 weeks, there was significant improvement in both groups regarding BCVA, CRT, percentage of eyes with retinal free fluids when compared to the baseline indices. However, there was no statistically significant difference between the two groups at this time regarding the baseline BCVA, CRT, percentage of reduction in CRT, percentages of eyes with retinal free fluids and number of injections. At 96 weeks more, significant improvement in BCVA and CRT was noted in both groups. However, the improvement, was more significant in group B when compared to group A. In addition, the number of injections in group B was statistically significant less than group A. the values of BCVA, CRT, percentages of eyes with retinal free fluids and mean number of injections for both groups are summarized in table 2.

**Table 2: BCVA, CRT, percentages of eyes with retinal free fluids and mean number of injections for group A and B.**

| Visit | Group | BCVA | CRT (µm) | % of reduction in CRT | % of eyes with retinal-free fluids | Number of injections |
|---|---|---|---|---|---|---|
| Baseline | Group A | 0.12 | 465 | 0.0% | 0.0% | 0.0 |
| | Group B | 0.13 | 472 | 0.0% | 0.0% | 0.0 |
| P value | | 0.711 | 0.623 | ------ | ------ | 0.690 |
| 48 weeks | Group A | 0.16 | 355 | 23.7% | 52.5.0% | 6.2 |
| | Group B | 0.15 | 345 | 26.9% | 50.0% | 6.1 |
| P value | | 0.701 | 0.723 | 0.547 | 0.966 | 0.432 |
| 96 weeks | Group A | 0.18 | 310 | 33.3% | 50.0% | 12.6 |
| | Group B | 0.31 | 239 | 49.3% | 70.0% | 9.3 |
| P value | | 0.035 | 0.042 | 0.012 | 0.048 | 0.039 |

## DISCUSSION

Age-related Macular Degeneration (AMD) stands as the most prevalent affliction affecting the macula in individuals aged 50 and above.[11] Of particular note, the wet type of AMD constitutes the primary cause of visual impairment associated with this condition. In this study, an examination of two treatment regimens, namely the "PRN" (pro re nata) and "T&E" (treat-and-extend) regimens, was conducted.[5,12] The essence of an ideal anti-VEGF (vascular endothelial growth factor) treatment lies in its efficacy and lasting impact. Notably, several factors interplay to influence patient compliance, including financial constraints, transportation challenges, visit frequency, and patient contentment with the medication itself.[6,8]

The findings of this study underscore the marked effectiveness of bevacizumab in enhancing both best-corrected visual acuity (BCVA) and macular edema, irrespective of the treatment regimen pursued.

These outcomes remained closely comparable at the 48-week mark. Notably, following approximately six injections within each regimen, BCVA exhibited notable improvement, ascending from 0.12 to 0.16 and from 0.13 to 0.15 in groups A and B, respectively. Concomitant with this, improvements in central retinal thickness (CRT) were observed, coupled with a significant upswing in the prevalence of eyes exhibiting freedom from retinal fluids. Specifically, group A witnessed a 23.7% reduction in CRT, while group B exhibited a 26.9% reduction, with nearly half of cases in both groups attaining fluid-free status by week 48.

Noteworthy divergence in results emerged at the 96-week juncture. Amidst ongoing enhancements in BCVA and CRT, the T&E regimen exhibited more pronounced improvements compared to the PRN regimen. BCVA levels reached 0.18 in group A and 0.31 in group B, with CRT improvements to 239 µm and 310 µm in groups B and A, respectively. This translated to a more substantial CRT reduction (49.3%) in group B relative to 33.3% in group A. Significantly, a greater number of eyes in group B achieved retinal freedom from fluids, and this was accomplished with a lower injection count.

Ultimately, the T&E regimen showcased parallel results at 48 weeks, but at the 96-week mark, it demonstrated notably superior outcomes. The regimen's capacity to achieve greater vision improvement with fewer injections and reduced visit frequency is expected to significantly enhance patient adherence to treatment. This underscores the potential for substantial improvement in patient compliance, lending further weight to the efficacy of this regimen as an optimal choice for AMD management

## CONCLUSION

After 48 weeks of treatment, the Treat and Extend (T&E) regimen exhibited a comparable impact on both vision and macular edema in comparison to the Pro Re Nata (PRN) regimen. Nevertheless, the T&E regimen demonstrated superior efficacy at the 96-week mark, and notably, this superiority was attained while utilizing a reduced number of injections and requiring less frequent visits.

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