

## Macular atrophy in neovascular age related macular degeneration

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### Abstract

Age related macular degeneration has been the leading cause of blindness in industrialized countries. Various treatments have been developed in the last few years. The pinnacle of treatment of neovascular age related macular degenerations have been anti-vascular endothelial growth factors. This article is an opinion on macular atrophy developing in neovascular age related macular degeneration.

**Keywords:** Age, Macular, Degeneration, Aflibercept, Ranibizumab, Atrophy, Geographic, Subretinal, Intraretinal

### Introduction

Advanced age related macular degeneration (AMD) is estimated to affect nearly 10 million people worldwide. Late AMD is associated with advancing age, smoking, positive family history, genetic susceptibility, high fat intake and obesity. It is predicted for advanced macular degeneration to increase in prevalence from the year 2020 to year 2040 by about 65%. A large percentage of that increase will be in the form of neovascular age related macular degeneration which is likely to increase in prevalence by about 47% from the year 2020 to the year 2040. Age related macular degeneration remains the leading cause of visual loss in people above 50 years old in industrialized countries.

### Discussion

Anti-Vascular endothelial growth factors (anti-VEGF) were introduced as the standard treatment of neovascular age related macular degeneration (nAMD). Initially the treatment was proposed as three injections followed by an assessment whether the disease responded or further injections were required. Since the first introduction of this treatment the number of injections has been increasing over the year. Patients have been getting injections some sometimes more than 40 injections and rarely more than 60 injections in at least one eye.

Anti-VEGFs were first introduced in the form of Ranibizumab which was advertised for monthly use. Later, Aflibercept was also introduced as a longer term anti-VEGF claiming it would work over up to two months following a loading dose of three monthly injections. Recently there has been a suggestion that those injections should be given on regular interval rather than the Pro re nata regimen. The concept of treat and extend was first introduced for one of them and later it was assumed by the other as the right way of treating nAMD End result is that patients are required to have more

and more of those injections to enable stabilization of the disease.

The benefits of ranibizumab and aflibercept are far more than the risk of developing side effects. However, it is currently believed that the increase number on injection of either drug is associated with increase of geographic atrophy. This kind of atrophy is preferably referred to as macular atrophy to distinguish it from geographic atrophy that develops as part of dry age related macular degeneration. This is no difference between commonly used medicines, ranibizumab and aflibercept, in the degree of macular atrophy. However, the significant increase in related to continuous versus pro re nata treatment. The present of macular atrophy in one eye was predictive of intralesional atrophy in the other. On the other hand, the present of subretinal fluid appeared to a protective factor against the progression of macular atrophy. Perhaps, only because the retinal pigment epithelium is maintaining the blood retinal barrier. The presence of intraregional fluid on the other hand was associated with more macular atrophy. Applying the same hypothesis, given the fact that the retinal pigment epithelium is not able to maintain the blood retinal barrier. Also with the fact that the intraretinal fluid situated in the inner retinal layer was associated with more macular atrophy raises the possibility that this fluid in general has damaging effect of ganglion cell and nerve fiber layer with a retrograde effect on photoreceptor layer and finally on retinal pigment epithelium. This relationship should be studied in more details when macular atrophy development is investigated. Different analyses were made to try to distinguish whether macular atrophy was the effect of the medicines injected, natural progression of the disease or the effects of regression of choroidal neovascularization.

Other theories were highlighted recently as a reason for macular atrophy. It is now being claimed that is the same old geographic atrophy developing in the background of a neovascular AMD. If this assumption is true, it will be usually bilateral which we normally assume as macular atrophy in one eye is predictive of it in the fellow eye. The rate of progression of this macular atrophy would follow the

same progression rate known to geographic atrophy. Another theory is the vascular endothelial growth factor is an essential element to maintain the retinal pigment epithelium. Interference with this factor will eventually interfere with this integrity. Although the desired effect is to reduce the size of choroidal neovascular membrane due to its effects on the choroid vasculature. However, as a side effect it reduces blood supply to the retinal pigment epithelium reducing its integrity. Hence when sub retinal fluid exists it creates this barrier against the effect of anti-VEGF on the RPE and therefore less macular atrophy [1-8].

### Conclusion

Age related macular degeneration is a major cause for visual loss in people over 50 years of age. This will become more of a problem as the population ages world-wide. With the pressure to give more injections, the risks to develop macular atrophy increase. Macular atrophy itself could be the effect of the medicine injection or the mere effect of the disease which include geographic atrophy playing in the background. It is essential however not to discount the effect of this macular atrophy. Research in the mechanism of developing macular atrophy is still in its infancy. It is yet to be known how it develops and what the best ways to prevent it are. Should this ever happen treatment of macular degeneration would be more effective although it has gone a long way since the Anti-VEGF have been introduced.

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