

## Editorial

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Volume 1 : Issue 1

Article Ref. #: 1000OJ1e002

### Article History

Received: October 18<sup>th</sup>, 2015

Accepted: October 19<sup>th</sup>, 2015

Published: October 20<sup>th</sup>, 2015

### Citation

Parmeggiani F. Preferential hyperacuity perimetry: perspectives of self-monitoring of neovascular activity in patients with age-related macular degeneration. *Ophthalmol Open J.* 2015; 1(1): e3-e5. doi: [10.17140/OOJ-1-e002](https://doi.org/10.17140/OOJ-1-e002)

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# Preferential Hyperacuity Perimetry: Perspectives of Self-Monitoring of Neovascular Activity in Patients with Age-Related Macular Degeneration

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The socio-economic burden of age-related macular degeneration (AMD) has strongly increased in public health importance due to the aging of the general population, and in clinics because of the world-wide use of anti-vascular endothelial growth factor (anti-VEGF) drugs in patients with neovascular AMD (NV-AMD).<sup>1-5</sup> In all health care services of the developed countries, a large portion of NV-AMD burden is related to the growing human resources employed to carry out those frequent monitoring visits required to verify the necessity of anti-VEGF repetition. In view of recent findings in earlier diagnosis of AMD-related choroidal neovascularization (CNV) by means of the self-monitoring with preferential hyperacuity perimetry (PHP) device,<sup>6-8</sup> possibilities and limitations of this innovative self-monitoring approach, whose rationale exploits the human “Vernier acuity” visual function,<sup>9,10</sup> should be investigated to verify its ability in detecting the need for anti-VEGF retreatments among patients with NV-AMD, and to prospectively reduce the costs for the clinical governance of this sight-threatening disease.

AMD is the leading cause of irreversible vision loss and legal blindness in the developed countries.<sup>5,11</sup> Before the large-scale utilization of intravitreally injected anti-VEGF drugs in the everyday clinical practice, NV-AMD accounts for more than 80% of the cases of severe visual deterioration caused by AMD.<sup>12,13</sup> At present, appropriate anti-VEGF utilization makes possible an outstanding reduction of patients eligible for legal blindness certification,<sup>14-16</sup> maintaining or improving their vision-related quality of life.<sup>17-19</sup> However, none of these benefits can be obtained without scheduling periodic anti-VEGF retreatments, whose correct decision-making process is practicable only after the execution of frequent monitoring visits because of: i. the limited intravitreal duration of the administered anti-VEGF drug; ii. the unpredictability of individual NV-AMD response to all different anti-VEGF regimens. In fact, considering the lack of a validated best clinical practice for anti-VEGF therapy in NV-AMD<sup>20</sup> and the risk of dramatic vision loss related to the protraction of follow-up intervals,<sup>21</sup> an intensive clinical monitoring of NV-AMD patients is currently mandatory to maintain the best outcomes possible, with consequent exponential growing of Medicare costs for the management of anti-VEGF injections regardless of the drug utilized during these interventional invasive procedures. The comprehensive appraisal of these aspects strongly recommends the realization large and independent clinical studies in view of the fact that PHP devices might also be an effective self-monitoring strategy to assess CNV activity in NV-AMD patients, allowing a substantial reduction of the socio-sanitary burden due to the great number of monitoring visits required for a correct application of anti-VEGF regimen, without risk of irreversible visual loss and legal blindness for an unmonitored extension of the monthly follow-up intervals. However, the appropriate utilization of PHP device for patient’s self-monitoring in real-world setting could be feasible only after the acquisition of well-detailed data regarding its potential and limitations in a large population of NV-AMD patient. In particular, future investigations should be aimed to: i. assess the ability of a self-monitoring test based on PHP to detect the need for retreatment with intravitreal anti-VEGF drugs in NV-AMD patients using, as gold standard, the

ophthalmologist's yes/no therapeutic decision after monitoring visits performed in accordance with good clinical practice; ii. verify whether the PHP monitoring data are influenced by individual demographic, clinical and ocular characteristics, which might be able to decrease the reliability of the test as a consequence of inadequate learning capacity, functional ability and/or compliance of each different NV-AMD patient treated with PRN anti-VEGF regimen.

Although the large-scale utilization of anti-VEGF drugs has made possible a reduction of up to 50% in incidence of legal blindness, the growing burden related to the appropriate monitoring of NV-AMD candidates for these treatment courses is becoming unsustainable for health care services. This emerging public health issue is currently faced without be aware of the potential applications of the innovative self-monitoring PHP device which, in turn, has been successfully utilized for the earlier detection of AMD-related CNV occurrence.<sup>6</sup> Considering the lack of large, population-based, studies assessing the accuracy of PHP device in patient's self-recognition of anti-VEGF retreatment necessity for NV-AMD, specific observational health care researches is recommended to provide those real-world clinical data helpful to maintain the best outcomes possible, yet rationally reduce the management cost of a chronic disease that reduces our accessibility to others in need.

NV-AMD represents a major burden to the modern society, and its all-inclusive cost for National Health Systems is continuously growing in terms of prevention, diagnosis, treatment, and rehabilitation. Diagnostic strategies for appropriate check of NV-AMD patients periodically treated with anti-VEGF injections are very expensive, posing a big translational emphasis on those innovative self-monitoring approaches developed to improve the methodological strategies for the surveillance of chronic sight-threatening diseases. However, although some pilot studies have shown that PHP device is a very promising tool to improve the early diagnosis of NV-AMD,<sup>22-24</sup> large-scale outcomes research programs will need to demonstrate that unconventional procedures for NV-AMD monitoring are methodologically robust and, thus, applicable in the real-world practice, also considering their tele-diagnostic potential if integrated into modern data transaction systems.

#### CONFLICTS OF INTEREST

The author declares no conflicts of interest.

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