New sight test detects early AMD

March 29 2016, by Ade Deane-Pratt

Researchers based at the National Institute for Health Research (NIHR) Biomedical Research Centre (BRC) at Moorfields Eye Hospital and UCL Institute of Ophthalmology designed a new test that can spot the first stages of sight loss in age-related macular degeneration (AMD). The test could lead to earlier diagnosis for millions of people worldwide. Professor Roger Anderson led the research team.

AMD affects the macula – the central part of the light-sensitive layer of the eye (the retina). In the UK, more than half a million over-50s have a form of AMD, and the figure is set to rise as the population ages.

Most sight loss from AMD happens in the later stages. But until now, there has been no quick and reliable sight test that can detect the earliest changes in the retina in AMD.

Standard letter charts are not consistent or sensitive enough to give an early diagnosis accurately or to monitor AMD's progress. This will become especially important as new treatments are developed that can prevent sight loss from AMD.

To address the problem, the team invented a new test chart, called the Moorfields Acuity Chart (MAC), that uses letters – known as 'high-pass' letters – built up from fine (high spatial frequency) black-and-white stripes. Their previous work showed that the high-pass letters are more equally readable than standard letters and that they seem to vanish altogether at the point when they are too small to be recognised.

In the current study, the team compared the sensitivity of the new MAC test with the standard test used to measure clarity of visual perception in 80 AMD patients from Moorfields Eye Hospital and 38 people with normal vision. Participants were asked to read the letters from two versions of each type of chart, shown in random order. They were then given a visual acuity score based on the number of letters they could read before making four mistakes on one line.

Results showed that MAC charts produced more reliable results from one test to the next than using the standard charts for people with AMD. This was not the case for participants with normal vision. Importantly, the difference between MAC chart and standard chart scores was approximately 4.5 lines in people with AMD and better visual acuity compared to people without AMD who had similar visual acuity, where the difference was 1.5 lines.

Professor Roger Anderson supervised the Fight for Sight PhD student on the study. He said: "Through this important project, funded by Fight for Sight and supported by the NIHR Moorfields Biomedical Research Centre, we have designed a new vision test – the Moorfields Acuity Chart – that can more reliably detect the earliest vision loss associated with age-related macular degeneration so that we can enter patients on treatment regimes more quickly, and monitor them more reliably than ever before."

Dr Dolores M Conroy, Director of Research at Fight for Sight, said: "Having a test that is sensitive to the changes specifically seen in early AMD, that is easily understood by patients and that can be administered routinely in the clinic is a very important development that addresses a high priority for research as identified by the Sight Loss and Vision Priority Setting Partnership. We're delighted to see that there has been worldwide interest in using the new charts."

Professor Sir Peng Tee Khaw, Director of the NIHR Moorfields Biomedical Research Centre, said, "This marks a significant advancement in our ability to diagnose vision loss arising from the leading cause of sight loss in industrialised countries. This is exciting for us all, as improved testing methods lead to better diagnosis and treatment development."

The results are published in the *British Journal of Ophthalmology*. The chart will be produced commercially under licence by Peter Allen and Associates and the team is currently preparing to assess the MAC chart's performance in a larger clinical trial.

More information: Shah N, Dakin SC, Dobinson S, Tufail A, Egan CA, Anderson RS. Visual acuity loss in patients with age-related macular degeneration measured using a novel high-pass letter chart. *Br J Ophthalmol*. 2016.

Provided by Fight for Sight

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