

Sir,
Visual hallucinations after intravitreal injection of ranibizumab in neovascular age-related macular degeneration

I read with interest the report by Mitrut *et al*¹ describing the changes in visual hallucinations after intravitreal injection of ranibizumab for neovascular age-related macular degeneration (AMD). The authors mention early in the article the term Charles Bonnet syndrome (CBS). I feel it is important to point out that not all of the visual experiences described in this series should be described with this term. CBS occurs in patients with poor vision secondary to various ophthalmic conditions, not just AMD,^{2,3} and its definition includes the presence of formed, complex visual hallucinations.^{2,3} Hence, colours, patches, spots, or lights may not be manifestations of CBS. In particular, the experiences of the two patients in group III who developed 'hallucinations' after the intravitreal injection could be explained by alternative mechanisms, such as visualization of the injected drug and vitreous traction on the retina following the injection. It would be interesting to know the time of onset of these phenomena and whether they persisted.

Regardless of whether the hallucinations constitute actual CBS, there are other interesting points that merit discussion. The authors do not mention a possible increase in intensity of visual hallucinations in Table 1, and it would be interesting to know whether this was investigated. It has been shown that visual hallucinations may increase in frequency or even begin for the first time following a change in the patient's ocular condition.^{4,5} The dynamic change in visual acuity may be more important in precipitating hallucinations rather than the absolute visual acuity.⁴

One of the difficulties of describing the characteristics of hallucinations is their rarity, and it would be difficult to draw any definitive conclusions based on the small numbers in this series. Of the four patients in group II, only two experienced a decrease in intensity of the visual phenomenon. However, it has been shown that the frequency of visual hallucinations changes with time,^{4,5} and may decrease or cease spontaneously.

I agree with the authors that this is an important symptom to enquire about, as patients are often reluctant to discuss their hallucinations.^{2,3} A long-term study will be required, probably including a larger baseline population, in order to determine the course of hallucinations following intravitreal injections.

Conflict of interest

The author declares no conflict of interest.

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Sir,
Short-term changes of visual hallucinations after intravitreal injection of ranibizumab in age related macular degeneration

We thank Tan¹ for his interest and the response to our letter. Tan is correct in pointing out that the term Charles Bonnet Syndrome that we used early in our report² relates just to the complex or structured visual hallucinations that some of our patients had experienced. Visual hallucinations in our patients may be compounded by iatrogenic entoptic phenomena. We did investigate the possibility of increase of visual hallucinations after the intravitreal injection of ranibizumab in our patients and found that it was not a notable phenomenon in this small series; therefore we did not mention this in Table 1. We agree that it is difficult to draw any definite conclusions about the change of visual experiences that had already existed in the small number (15) of our patients, but our results are valid for the 85 patients that we described in group III. Visual hallucinations are an under-investigated area given the widespread use of intravitreal therapy world-wide. A recent study published in this journal showed that the visual perceptions experienced following 15% of intravitreal injection of therapeutic agents gave cause for concern to the patient and more than half of the patients believed that preoperative counselling would have averted the concern.³

Conflict of interest

The authors declare no conflict of interest.

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- Tan CSH. Visual hallucinations after intravitreal injection of ranibizumab in neovascular age-related macular degeneration. *Eye* 2011; **25**: 1374.
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