4.3 Idiopathic Epimacular Membranes

Epimacular membranes (Fig. 4.13) can be caused by trauma, inflammation, retinal vascular disease, and retinal detachment surgery. We have studied the focal macular ERGs of patients with unilateral idiopathic epimacular membrane (IEM) to determine how the altered retinal function correlates with visual acuity and OCT images [1, 2]. We found that the changes in the focal macular ERG while the macula was altered and after recovery of the macula closely resemble those seen in the presence of aphakic (pseudophakic) CME (see Section 4.2).

Focal macular ERGs demonstrating the damaged and recovered stages are shown in Fig. 4.14. A 56-year-old woman noted decreased vision in her right eye with visual acuity of 1.0; the visual acuity in her left eye was 2.0. She had an IEM in the right eye, and the a-waves and b-waves of her focal macular ERGs for the right eye were not significantly different from those in the normal fellow eye at the initial visit. However, OPs of the right eye were smaller (Fig. 4.14A).

Six months later, the best-corrected visual acuity in her right eye had decreased to 0.1, and the a-waves, b-waves, and OPs of the focal macular ERGs were markedly reduced. There was also a decrease in the b-wave/a-wave (b/a) ratio (Fig. 4.14B). Vitrectomy was then per-
formed to remove the ERM in her right eye, and 10 months after surgery her best-corrected visual acuity improved to 0.8. At this time, the a-wave amplitude had recovered nearly to the level in the fellow eye, but the b-wave and the OPs remained smaller than in the fellow eye, resulting in a lower b/a ratio (Fig. 4.14C). Fifteen months after surgery, the b-wave and OPs improved, and the b/a ratio was almost identical to that in the fellow eye (Fig. 4.14D).

In our analysis of 37 eyes with an IEM [2], the relative amplitudes (affected eye/normal fellow eye) of the a-waves, b-waves, and OPs were 75%, 69%, and 45%, respectively. The lower b/a wave ratio in the affected eyes resulted from a significantly greater reduction of the b-wave amplitude than the a-wave amplitude. The reduced amplitude of OPs was significantly greater than that of the other two components, and the implicit times were significantly prolonged for all components. These findings are similar to those for eyes with aphakic or pseudophakic CME.

There was a significant correlation between the preoperative relative b-wave amplitude and visual acuity and between the preoperative relative a-wave amplitude and postoperative visual acuity (Fig. 4.15).

The OCT examinations showed that the mean thickness of the preoperative foveal and parafoveal retina in the affected eyes was significantly thicker than the mean of the normal fellow eyes. After surgery, the thickness decreased significantly, although it was still thicker than in the normal fellow eyes [2].

The changes in the waveform of the focal macular ERG and the OCT findings before and after vitrectomy in two patients with an IEM are shown in Fig. 4.16. After surgery, the foveal thickness was decreased in both patients. In case 1, all components of the preoperative focal macular ERGs had reduced amplitudes, but the a-wave amplitude was relatively better preserved (decreased b/a ratio). The b-waves and a-waves had recovered to normal levels 3 months after surgery, in conjunction with an

![Fig. 4.14. Focal macular ERGs elicited by a 10° spot before (A, B) and after (C, D) vitrectomy in a patient with unilateral IEM. A On the patient’s initial visit, only the OPs were attenuated. B Six months later, the a-wave and b-wave amplitude and the b/a ratio were also reduced. C Ten months after successful removal of the IEM, the a-wave amplitude recovered. OPs were still absent. D Fifteen months after vitrectomy, the ERGs recovered almost to normal. (From Tanikawa et al. [1], with permission)
4.3 Idiopathic Epimacular Membranes

Fig. 4.15. A There was a significant correlation between the relative b-wave amplitude (affected eye/fellow eye) of focal macular ERGs and the best-corrected visual acuity in patients with IEM ($r = 0.5, P = 0.007$). B There was a significant correlation between the preoperative a-wave amplitude and postoperative visual acuity ($r = 0.543, P = 0.0019$). (From Niwa et al. [2], with permission)

Fig. 4.16. Changes in the waveform of the focal macular ERGs elicited by a 15° stimulus and the OCT images before and after surgery in two patients with IEM. After surgery, the foveal thickness had decreased in both patients. Top: In case 1 (eye with preserved a-wave amplitude), the b-wave amplitude first recovered at 3 months after surgery, and the change was associated with an increased b/a ratio. The focal macular ERG examined 12 months after surgery demonstrated recovery of the OPs. Bottom: In case 2 (eye with reduced a-wave amplitude), the a-wave amplitude first recovered at 5 months after surgery, and recovery was associated with a decreased b/a ratio. The focal macular ERG examined 22 months after surgery showed increased b-wave and OP amplitudes. The macular configuration in OCT was still abnormal. (From Niwa et al. [2], with permission)
increase in the b/a ratio. The focal macular ERGs examined 12 months after surgery demonstrated recovery of the OPs.

In case 2, the a-wave amplitude was first detected to have recovered at 5 months after surgery, and recovery was associated with a decrease in the b/a ratio. The b-wave and OP amplitudes of the focal macular ERGs were increased at 22 months after surgery. There were significant correlations between the preoperative a-wave amplitude and postoperative visual acuity (Fig. 4.15B) and between the postoperative OPs amplitude and postoperative parafoveal thickness (Fig. 4.17).

![Fig. 4.17. There was a significant correlation between postoperative OP amplitude and postoperative parafoveal thickness ($r = -0.460, P = 0.011$). OP amplitudes are shown as a percentage of those in the normal fellow eye. (From Niwa et al. [2], with permission)](image)

References
