

Quantitative analysis of multifocal electroretinogram in eyes with silicone oil-filled vitreous cavity and changes following silicone oil removal.

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Purpose

Controversy exists regarding the effect of intravitreal silicone oil (SO) on the electrophysiology of the retina. We performed a prospective case-control study to determine the effect of SO on multifocal electroretinogram (mfERG) and the changes in mfERG following SO removal.

Methods

Twelve eyes of 12 patients with silicone oil in vitreous cavity with clear media, attached retina, normal macular morphology and corrected distance visual acuity (CDVA) better than 20/200, were enrolled as cases over a period of two years (July 2016 to June 2018). The fellow normal eyes served as control. The eyes were evaluated with mfERG at baseline, one week and four weeks after silicone removal. The comparison of amplitude and implicit time of P1 and N1 wave of mfERG was performed between the cases and controls at baseline and within the cases pre and post surgery.

Results

The mean age of patients was 44.9 ± 18.9 (range 18-74) years. The indication for SO

injection was endophthalmitis (n=4) and rhegmatogenous retinal detachment (n=8, macula-on 4 eyes, macula-off 4 eyes). The median CDVA at baseline was 0.54 (0.18-0.78) and 0 (0- 0.18) in cases and controls respectively (p=0.0001) and did not change in cases post SO removal (p=0.29). At baseline, there was a significant decrease in average P1 and N1 wave amplitude (p=0.0001 and 0.0001 respectively) and delay/increase in average P1 and N1 wave implicit time (p=0.010 and 0.018 respectively) in affected eyes as compared to controls. The macular status (attached/detached) and duration of SO tamponade did not have a significant correlation with any of the mfERG parameters. There was a significant increase in average P1 and N1 wave amplitude (p=0.02 and 0.032 respectively) at one week following SO removal but no change in average P1 and N1 wave implicit time (p=0.62 and 0.47 respectively). There was no further change noted in any parameter at four weeks follow-up.

Conclusions

Intra-vitreous SO exerts an insulating effect on the retina. The amplitude of mfERG increases shortly following SO removal. Since the implicit time is not affected by the intra-vitreous SO, it may be reliably used for the assessment of retinal function in SO filled eyes.