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Case Report Open Access

Intraretinal Silicone Oil Infiltration following Traumatic Macular Hole Repair

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Abstract

Purpose: To present a case study describing incorporation of silicone oil into a traumatic macular hole following surgical correction.

Methods: Case report

Results: A nine-year-old male presented with a traumatic macular hole. After waiting for spontaneous closure, pars plana vitrectomy with standard 1000 centistroke silicone oil tamponade was performed. Postoperatively, spectral-domain optical coherence tomography, demonstrated closure of the macular hole, but with infiltration of silicone oil into the foveal architecture. A second surgical approach with different attempts to remove the retained silicone oil's bubble was successfully performed using a soft-tip cannula. However, the macular hole reopened intraoperatively. Therefore silicone oil was replaced with no infiltration and adequate closure of the macular hole.

Conclusion: Previous reports have demonstrated small droplets of retained silicone oil within the retinal layers, but to our knowledge, this is the first report of a large globule of oil becoming incorporated into a healing macular hole.

Keywords: Silicone oil; Traumatic macular hole; Vitrectomy

Introduction

Compared to idiopathic macular holes, traumatic macular holes tend to occur in younger patients, present with worse initial vision, and are thought to be related to the transmission of tangential tractional forces on the macula. [1,2]. It is well known that traumatic MHs may spontaneously close with time. However the choice and the timing for surgery may be debated and patients may undergo a surgical approach in some cases. Once spontaneous resolution is not achieved, pars plana vitrectomy (PPV) with internal limiting membrane peel and endotamponade is typically the treatment of choice, using either gas or silicone oil. Studies have shown both to be successful in anatomic closure of macular holes, with gas showing some advantages in visual acuity[3]. Silicone oil may provide an advantage compared to gas by being less dependent upon postoperative positioning; however, a second procedure is needed for oil removal. There have been some reports of emulsified oil migrating into the retina across the internal limiting membrane (ILM)[4]. Chung and colleagues hypothesized that ILM peeling enabled emulsified oil droplets to enter the retina[5].

Herein, we present a surgical case complicated by incorporation of silicone oil into the healing macular hole, requiring additional intervention.

Case Report

A nine year old male presented to the retina service with loss of central vision in the left eye, two months after a baseball injury to the left periocular adnexa. Best-corrected visual acuity, (BCVA) left eye was 20/100, intraocular pressure 14 mmHg, and the anterior segment and periorbita were without signs of trauma or active inflammation, other than mild posterior subcapsular cataract. Dilated fundus examination was remarkable only for a full-thickness macular hole of the left eye as seen with optical coherence tomography (Figure 1A). The perifoveal region had mild retinal pigment epithelial changes thought to be secondary to resolved commotio retinae.

After waiting an additional six weeks for signs of spontaneous closure, the decision was made to perform surgery. A 25 gauge pars plana vitrectomy with kenalog-assisted induction of a posterior vitreous separation and internal limiting membrane peeling was performed. The ILM peeling was completed with indocyanine green (ICG) staining, with the final concentration of 2.5 mg/cc applied for 60 seconds. Silicone oil (1000 centistroke) tamponade with was used rather than gas, as the patient lived at an altitude of 6,500 feet compared with our surgical center's altitude of 5,280 feet, and travel home required traversing mountain passes in excess of 10,000 feet.

Three weeks post-operatively, the macular hole appeared to be closed on exam under silicone oil, but the patient complained of a large circle in his central vision. Spectral-domain optical coherence tomography, (SD-OCT, Heidelberg Engineering) demonstrated closure of the macular hole and dimpling of the inner retinal surface consistent with an ILM peel [6], but with infiltration of silicone oil into the foveal architecture (Figure 1B). BCVA was 20/400.

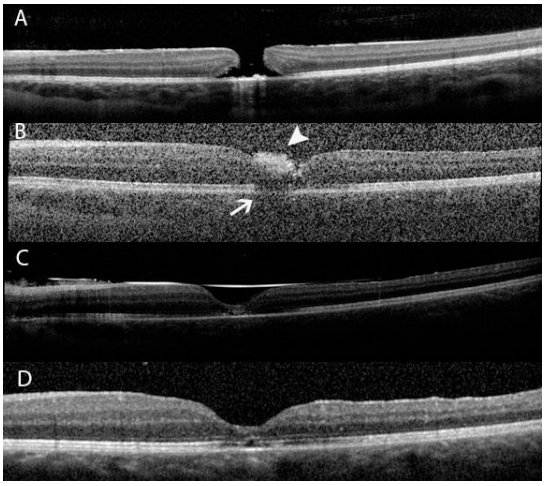

Figure 1: Optical coherence tomography of patient's progression. A) Full-thickness traumatic macular hole upon presentation. B) Large globule of silicone oil (arrowhead) which has become incorporated into the healing macular hole, 3 weeks after surgery. Note the shadowing of the underlying retina and RPE (arrow). C) Return of normal foveal architecture following aspiration of the oil globule from the macular hole, and repeat SO placement (10 weeks after initial surgery) D) Final OCT with closure of the macular hole, mild underlying outer retinal changes (8 months after initial trauma).

Four weeks later, pars plana vitrectomy and silicone oil replacement was performed. After the main silicone oil bubble had been removed, there was a small oil globule which appeared trapped in the foveal tissue. Attempts were made to manually dislocate it using a soft tip cannula and a brush, but without success. The intraretinal oil could only be removed by using a soft-tip cannula with active aspiration, which caused the macular hole to re-open. Silicone oil tamponade was repeated, with instructions to maintain upright positioning during the day, and right side down at night.

Post-operatively, the patient noted that the circle in the center of his vision had resolved, and BCVA under silicone oil was 20/100. SD-OCT demonstrated closure of the macular hole without silicone oil infiltration into the retina (Figure 1C).

Two months later, and six months after initial presentation, silicone oil was removed, final visual acuity was 20/80, and SD-OCT with enface view demonstrated closure of the macular hole with some persistent subfoveal ellipsoid zone disruption (Figures 1D and 2C).

Discussion

The most common etiology for MHs is idiopathic, though some vascular retinal disease have been observed [7,8]. However, it has been postulated that both anteroposterior and tangential tractions could play an important role in MH formation. Traumatic macular holes spontaneously close at higher rates than idiopathics. Typically these are smaller holes, without a fluid cuff [9], therefore there is some controversy whether to wait or perform early surgery. However, when surgery is pursued, in most cases macular holes are successfully treated by PPV with ILM peeling and endotamponade (70-96% closure rate) [10,11]. Nevertheless, the management, duration and type of tamponade are still debated.

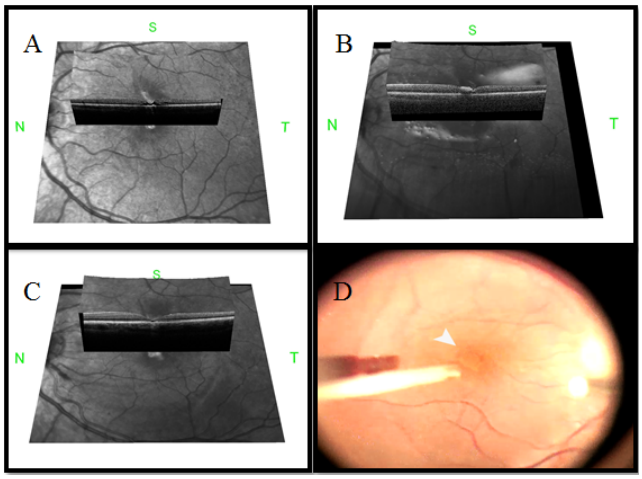

Figure 2: A) Enface OCT image displaying a full-thickness macular hole (2 months after initial trauma) B) Enface OCT image taken through SO, displaying silicone oil droplet trapped in the macular hole and dimpling of the retinal surface post-ILM peel (3 weeks following initial surgery) C) Final enface OCT image displaying closure of the macular hole, 8 months after initial trauma D) Intraoperative image displaying silicone oil droplet trapped in the macular hole (arrowhead).

Standard silicone oil migration into the retina is an uncommon occurrence following vitrectomy, and may be related to duration of silicone oil placement, oil emulsification, and presence or absence of the ILM [12]. Previous reports have demonstrated small emulsified droplets within the substance of the retina, but to our knowledge, this is the first report of a large globule of oil becoming incorporated into a healing macular hole. Emulsification of silicone oil is more common in patients with higher activity levels, which may have played a role in this case.

In patients that live at an altitude significantly higher than the location of surgery, silicone oil is often the default choice, even though it is not free from potential complications.

Disclosures

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