

References

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HKJO Quiz



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Question

A 49-year-old gentleman had right tractional retinal detachment secondary to proliferative diabetic retinopathy. Posterior vitrectomy, membrane removal, encircling, endolaser and injection of 5700-centistoke silicone oil were done. He had uneventful recovery after the operation.

Fundal examination two months after operation showed retinal traction with shallow subretinal fluid inferior to the macula. Postoperative examination at three months revealed the same fundal findings, but with an open break inferior to the macula, which was tamponaded by silicone oil.

What is the diagnosis ?

(Answer and discussion on page 13)

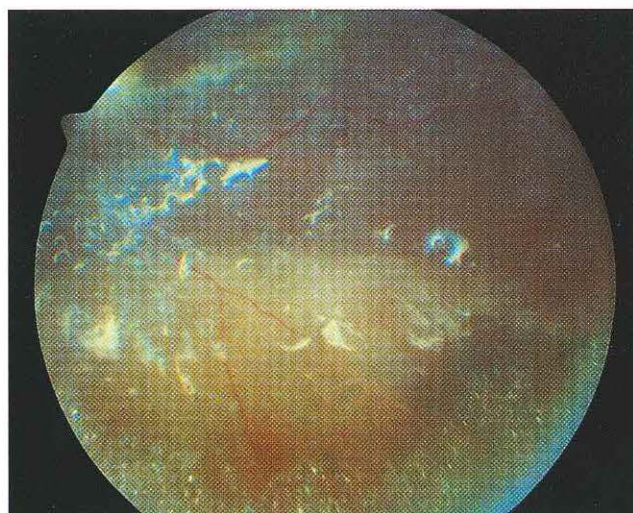


Figure 1. The fundal picture of the right eye eight months after the operation.

HKJO Quiz



Answer

Subretinal 'reverse hypopyon' (emulsified subretinal silicone oil).

(Question on page 7)

Discussion

Silicone oil is used when long-term support and tamponade is needed to maintain the neural retina in apposition to retinal pigment epithelium. It is most frequently indicated in cases complicated by proliferative vitreoretinopathy, giant retinal tears and retinal detachment caused by proliferative diabetic retinopathy.

Silicone oil is a linear synthetic polymer made of repetitive [-Si-O-] units. The physicochemical properties depend on the length and the side groups of the polymer. Emulsification is one of its special physical properties. It depends on the molecular weight and purity of the oil, and *in vivo* emulsification may be due to proteins and phospholipids in the physiological aqueous, which are progressively adsorbed to the silicone globule and lower its surface tension.

Complications of intravitreal silicone oil include cataract, band keratopathy, glaucoma, fibrous epiretinal and subretinal proliferation, and oil emulsification. One large series by Riedel reviewed 415 patients with intravitreal silicone oil injection. The complications and their incidence were: re proliferation of epiretinal and subretinal fibrous membrane (40%), glaucoma (6%), keratopathy (5.5%), subretinal silicone oil (4%), and biomicroscopic visible silicone oil emulsification (0.7%). The authors concluded that the use of highly purified silicone oil can decrease the incidence of emulsification.¹ Another series by Federman, which audited 150 eyes with silicone oil injection, had similar findings, and also found without exception that silicone oil showed some degree of emulsification within one year of injection.²

A case of subretinal silicone oil was reported by Honda *et al.*³ In that patient, the subretinal oil resembled beads, which were mobile among subretinal strands with changing eye position, and which were subsequently removed through a retinotomy.

In our patient two complications are well illustrated in the fundus photograph: emulsification and subretinal silicone oil. These probably resulted from the entry of emulsified silicone oil through the inferior retinal break into the subretinal space during prone positioning, which then

ascended upwards when the patient was in the erect posture. Subretinal silicone oil is a rare but known condition, which occurs when the retinal detachment is not settled, with open break(s), either intraoperatively or postoperatively. In the former, this complication arises when silicone oil is injected before the retina is completely free of traction. In the postoperative situation, the risk of the oil going into the subretinal space is higher when the oil is emulsified; it then has lower surface tension and does not act as a tamponade. This could have been avoided by relieving all traction on the retina. In this case, the fact that the early postoperative course was uneventful but was then followed by retinal traction with subretinal fluid two months after operation suggested that proliferation of the preretinal membrane and traction was ongoing, a common complication after silicone oil injection. Surgical intervention could have prevented retinal break formation and subretinal silicone oil, but the patient was not keen on surgery at that time. With emulsified silicone oil in the subretinal space, complete removal of it will be more difficult. A study done by Shikishima in rabbit eyes showed that subretinal silicone oil can induce excessive subretinal and epiretinal proliferation with abundant phagocytes containing silicone oil particles.⁴

Our plan of management includes silicone oil removal, supplementary vitrectomy, residual membrane removal, air-fluid exchange, internal drainage of subretinal fluid and emulsified oil, endolaser around the break and gas tamponade with C3F8.

In conclusion, although silicone oil is very useful in vitreoretinal surgery, serious complications can occur. They are sometimes very difficult to manage. The optimal time to remove the oil can also be a difficult decision. We welcome any comments or suggestions on other management options.

References

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