



Bubble inside bubble: Nested perfluoro-decalin within a silicone oil bubble in the anterior chamber

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1. Case report

We report the case of a 59-year-old patient referred to our hospital for bilateral total retinal detachment. The eye described here presented with a chronic total retinal detachment involving multiple retinal tears and was further complicated by extensive choroidal and ciliary body detachment. Despite the poor visual prognosis, surgery was undertaken with the goal of preserving residual visual function. The eye was left aphakic (see Fig. 1).

In the early postoperative period, slit-lamp examination revealed a perfluorodecalin (PFD) bubble fully encapsulated within a silicone oil (SO) bubble in the anterior chamber.

2. Discussion

The image of the SO bubble highlights two of its key properties. First, its lower density compared to aqueous humor explains its buoyancy within the eye. Second, the limited contact angle between the bubble and the ocular wall reflects SO's reduced mechanical tamponade efficiency.¹ Clinically, these characteristics have important implications: SO provides effective tamponade for superior retinal breaks or holes and necessitates a peripheral inferior iridotomy in cases of secondary pupillary block. Moreover, to ensure adequate tamponade, it is essential to achieve optimal filling of the vitreous cavity to maximize the contact area between SO and the retina.

The image of PFD reflects its high density, demonstrated by its tendency to sink within the eye. This property is leveraged in vitreoretinal surgery, where PFD serves as a temporary intraoperative tamponade.² It is particularly effective for draining subretinal fluid during fluid-gas exchange and for stabilizing the retina in cases of giant retinal tears.

The persistent presence of SO and PFD particles in the anterior chamber can lead to visual disturbances, corneal endothelial loss,

keratopathy or elevated intraocular pressure.

3. Conclusion

The postoperative slit-lamp image of the anterior segment following this complex vitreoretinal surgery provides valuable insight into the physical properties of intraoperative heavy and light liquids, thereby contributing to a better understanding of their optimal use in clinical practice.

CRedit authorship contribution statement

Ignacio Leonardo Pueyo-Bestue: Writing – original draft, Methodology, Formal analysis, Conceptualization. **Remi Dewispelaere:** Validation, Supervision, Resources, Investigation, Funding acquisition. **Nathan Hupin:** Writing – review & editing, Writing – original draft, Validation, Supervision, Methodology.

Patient consent

Consent to publish this case report has been obtained from the patient in writing form. This report does not contain any personal identifying information.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Funding

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<https://doi.org/10.1016/j.ajoc.2025.102428>

Received 10 June 2025; Received in revised form 4 August 2025; Accepted 30 August 2025

Available online 1 September 2025

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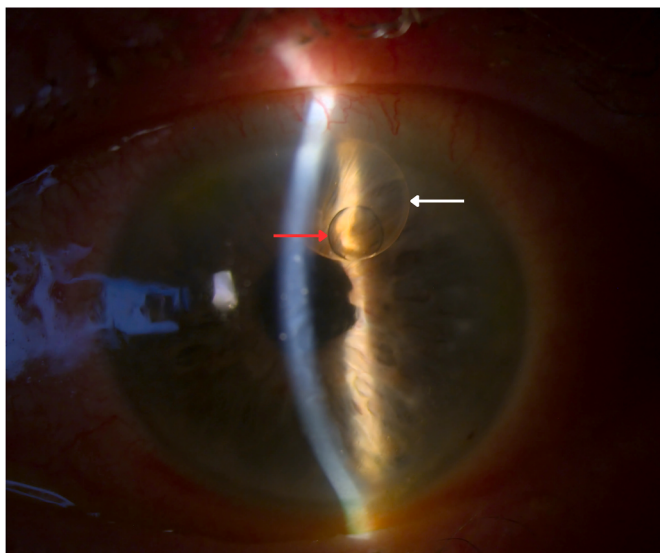


Fig. 1. 59-year-old male left eye slit-lamp image of the anterior chamber revealing a PFD bubble (red arrow) fully encapsulated within a SO bubble (white arrow) in the post-operative course of a total rhegmatogenous retinal detachment complicated by extensive choroidal and ciliary body detachment. The eye was left aphakic. Image taken with Haag-Streit BQ 900© Imagin Module 910 EyeSuite™. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

None.

References

1. Barca F, Caporossi T, Rizzo S. Silicone oil: different physical proprieties and clinical applications. *BioMed Res Int.* 2014;2014:1–7. <https://doi.org/10.1155/2014/502143>.
2. Kramer SG, Hwang D, Peyman GA, Schulman JA, Sullivan B. Perfluorocarbon liquids in ophthalmology. *Surv Ophthalmol.* 1995;39(5):375–395. [https://doi.org/10.1016/S0039-6257\(05\)80093-1](https://doi.org/10.1016/S0039-6257(05)80093-1).