

# Rare Complication during Retinal Detachment Surgery: A Case Report

IQRA MUSHTAQ<sup>1</sup>, RUTUJA PATIL<sup>2</sup>, NILESH GIRI<sup>3</sup>

## ABSTRACT

Retinal Detachment (RD) surgery, though routinely performed, carries the risk of rare but significant intraoperative complications that can affect surgical success. One such complication is subretinal air migration during fluid–air exchange, which can hinder retinal reattachment. We report a case of a 69-year-old man with progressive vision loss in the right eye over six months, diagnosed with Rhegmatogenous Retinal Detachment (RRD) involving a large horseshoe tear. The patient underwent Pars Plana Vitrectomy (PPV), during which the doctor peeled the membrane, used endolaser photocoagulation, performed a fluid–air exchange, and planned to use silicone oil as a tamponade. During the fluid–air exchange, an air bubble inadvertently entered the subretinal space and migrated to the posterior pole, where it was inaccessible for removal. This complication interfered with proper retinal reattachment and impacted the surgical outcome. The case highlights the need for surgical caution in managing large retinal tears and emphasises the importance of recognising and preventing subretinal air migration to optimise postoperative results in complex RD surgeries.

**Keywords:** Fluid air exchange, Pars plana vitrectomy, Rhegmatogenous, Silicone oil, Subretinal air bubble, Superotemporal

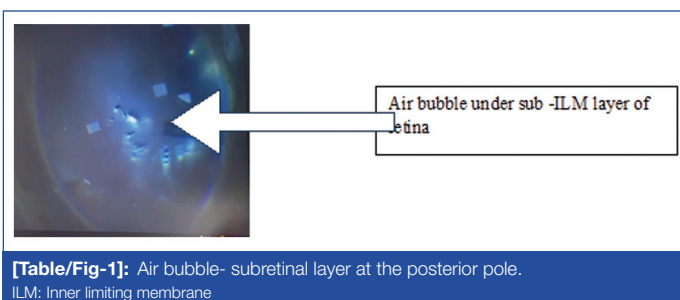
## CASE REPORT

A 69-year-old male presented to the outpatient department with complaints of diminished vision in the right eye for the past six months. He was a known case of hypertension and had been under treatment for the past 15 years. He had also been on blood thinners (Aspirin 75 mg once a day) for 2-3 years following an episode of stroke three years ago. He underwent cataract surgery 10 years ago for both eyes, after which he initially had good vision. However, he noticed a sudden and progressive decrease in vision in the right eye over the last six months, without any associated pain.

Upon examination, both anterior segments of the eyes appeared normal with no inflammatory signs present, and the intraocular lens was properly positioned. Following pharmacologic dilation with tropicamide 0.5% eye drops, the right eye fundus showed RRD from 4 to 10 o'clock with a large break from 7 to 11 o'clock, while the left eye fundus was within normal limits. Therefore, the patient was diagnosed with right eye RRD and both eyes were pseudophakic. After considering available treatment options, such as pneumatic retinopexy and scleral buckling, we decided to proceed with PPV due to the presence of a large break and associated RD.

The patient was scheduled for surgery on the right eye to perform PPV, including membrane peeling, endolaser treatment, fluid–air exchange, and silicone oil implantation under local anaesthesia. PPV was performed under peribulbar anaesthesia using a standard three-port 23-gauge vitrectomy system. Following proper port placement, a core vitrectomy was carried out, followed by meticulous removal of the vitreous base using scleral indentation. The detached retina and the large break from 7 to 11 o'clock were visualised and cleared of any tractional elements. Posterior vitreous detachment was either confirmed or induced, and any residual epiretinal membranes were peeled, if present. Endolaser photocoagulation was applied in multiple rows surrounding the retinal break and other suspicious areas to achieve adequate chorioretinal adhesion. During the surgery, during fluid–air exchanges, an air bubble entered the subretinal layer at the posterior pole (as shown in [Table/Fig-1]).

**Inner Limiting Membrane (ILM):** A small air bubble measuring half to one disc diameter made it challenging for the doctor to reattach the retina during surgery. However, the retina was



successfully attached with the air bubble in the subretinal layer, and the patient was advised to maintain a prone position for 48 hours. On subsequent fundus examination, the retina was observed to be attached; Optical Coherence Tomography (OCT) was not performed due to hazy media resulting from silicone oil implantation. During follow-up visits, the retina remained attached.

## DISCUSSION

The RD occurs when there is a complete tear in the sensory retina. This tear allows fluid from the liquefied vitreous to enter the space beneath the retina. RD mostly involves breaks in the retina [1]. Each year, roughly one in every 10,000 individuals develops RD, with about 10% of these cases eventually affecting both eyes. This condition involves a tear in the retina that permits fluid from the vitreous to accumulate underneath the neurosensory retina. In eyes with RD, the distribution of breaks is approximately as follows: 60% occur in the superotemporal quadrant, 15% in the superonasal area, another 15% in the inferotemporal quadrant, and 10% in the inferior section.

In general, if someone experiences sudden symptoms of RD, it should be surgically repaired as quickly as possible, especially if the macula is not yet affected. Many simple cases of RD can be treated effectively using scleral buckling methods, but vitrectomy (PPV) has significantly improved outcomes [1].

Some common complications that can arise during surgery include low eye pressure (hypotony), fluid accumulation in the space around the choroid (suprachoroidal effusion), bleeding in the same area (suprachoroidal hemorrhage), bleeding within the vitreous (vitreous

haemorrhage), swelling in the macula (cystoid macular edema), damage to the optic nerve (optic neuropathy), and phototoxicity [2-4].

Tractional RD can occur in 5% of diabetic retinopathy cases. A systematic review found that the overall failure rate of retinal reattachment after one surgery was 5.9% {95% Confidence Interval (CI), 1.4%-8.3%}, and the mean final Visual Acuity (VA) was 0.94 (95% CI, 0.82-1.05) logMAR [5]. Another systematic review examined the outcomes of PPV for RD and discovered that the rate of retinal reattachment was 72%. It also found that some negative side effects, such as cataract progression and new iatrogenic breaks, occurred more frequently in the PPV group [6].

Vitrectomy, introduced by Machemer in 1972, has become the primary line of treatment [7].

The challenges include large peripheral breaks, poor visibility due to intraocular bleeding, and mild nuclear sclerosis [8]. Previous literature has reported on the presence of Perfluorocarbon Liquid (PFCL) in the subretinal space and its successful removal [9].

Surgical complications can be distressing, especially in vitreoretinal surgery, as surgeons may feel they have harmed a patient due to a mistake. Injecting silicone oil into the suprachoroidal space can lead to problems during surgery, as shown in a previous case report. This issue might be prevented by carefully checking the position of the infusion cannula and injecting silicone oil while directly monitoring the process [10]. In some cases, high air infusion flow during air-fluid exchange has caused retinal damage during PPV [11]. In the present case, it was observed that an air bubble entered the subretinal fluid, and although the surgeon was unsuccessful in removing it, the surgery continued with silicone implantation. Postoperatively, the patient was advised to maintain a prone position for an extended period, and follow-up evaluations showed an attached retina.

As a result, training supervisors are concerned about the potential harm to their patients' eyes when teaching vitreoretinal residents, even under the supervision of a senior surgeon. Therefore, subretinal air migration during fluid-air exchange is an uncommon but important complication. Subretinal air bubbles are the most common complication reported during pneumatic retinopexy surgery [12]. Residents frequently encounter various problems during vitrectomy. While complications are a normal part of any operation, even for the best surgeons, vitreoretinal residents should aim to achieve good surgical results with as few issues as possible. It is important to understand the vitrectomy machine's settings, concentrate on the retina, and learn how to use the probes effectively. These skills are crucial for becoming proficient and ensuring that vitrectomy procedures run smoothly with fewer complications [7]. One potential complication of this technique is persistent detachment due to subretinal gas [13].

## CONCLUSION(S)

The insights gained from this analysis can inform the development of more comprehensive and targeted training programs for vitreoretinal surgeons in training. Enhanced surgical education is expected to improve patient care and outcomes in procedures such as PPV for RD. Although rare, subretinal air is a critical complication of PPV that can significantly impact anatomical and visual outcomes, underscoring the need for heightened awareness and preventive strategies during surgery.

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### PARTICULARS OF CONTRIBUTORS:

1. Ophthalmologist, Department of Ophthalmology, Dr. D. Y. Patil Medical College and Hospital, Pune, Maharashtra, India.
2. Postgraduate Student, Department of Ophthalmology, Dr. D. Y. Patil Medical College and Hospital, Pune, Maharashtra, India.
3. Vitreoretinal Surgeon, Department of Ophthalmology, Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pune, Maharashtra, India.

### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Rutuja Patil,  
A76, Carnation Hostel, Sant Tukaram Nagar, Pune-411018, Maharashtra, India.  
E-mail: rutujapatil255@gmail.com

### AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

### PLAGIARISM CHECKING METHODS: (Lain H et al.)

- Plagiarism X-checker: Mar 31, 2025
- Manual Googling: Jun 25, 2025
- iThenticate Software: Jul 09, 2025 (2%)

### ETYMOLOGY: Author Origin

EMENDATIONS: 7

Date of Submission: Mar 18, 2025

Date of Peer Review: Jun 06, 2025

Date of Acceptance: Jul 11, 2025

Date of Publishing: Aug 01, 2025