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Successful Management of Rhegmatogenous Retinal Detachment with Concomitant Cataract Using Combined Phacoemulsification, Pars Plana Vitrectomy, and Scleral Buckling: A Case Report

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A B S T R A C T

Rhegmatogenous retinal detachment (RRD) coexisting with significant cataract presents a complex surgical challenge, often necessitating combined phacoemulsification, pars plana vitrectomy (PPV), and potentially scleral buckling (SB) for optimal anatomical and visual outcomes. This report details the successful management of such a case using a combined surgical approach. A 43-year-old female presented with a one-week history of a sudden-onset black shadow in the nasal visual field of her right eye (OD), preceded by photopsia for one month. Visual acuity was 1/60 OD and 1/60 OS, non-improving with pinhole. Ophthalmic examination revealed an RRD with a superior retinal tear between the 1-2 o'clock position in the OD, associated undulation, and retinal folds. Bilateral immature senile cataracts (Nuclear Opalescence Grade 2, Nuclear Color Grade 2) were also noted. The patient underwent combined phacoemulsification with intraocular lens (IOL) implantation, 360° SB, 23-gauge PPV, endolaser photocoagulation around the break, and silicone oil tamponade in the OD. Postoperatively, the retina remained attached under silicone oil. Visual acuity improved to 6/21 OD at the 8-day follow-up. Postoperative intraocular pressure (IOP) elevation (39.4 mmHg OD) was managed medically. In conclusion, combined phacoemulsification, PPV, and SB proved effective in achieving both retinal reattachment and significant visual improvement in this patient with RRD and concomitant cataract. Careful surgical planning and postoperative management, including IOP control, are crucial for successful outcomes in these complex cases.

1. Introduction

Rhegmatogenous retinal detachment (RRD) represents a significant threat to visual health globally, characterized by the separation of the neurosensory retina from the underlying retinal pigment epithelium (RPE). This separation occurs due to a full-thickness break in the retina, highlighting the critical role of retinal breaks in the pathogenesis of RRD. The estimated annual incidence of RRD is approximately 1 in 10,000 individuals, but this figure can vary across different populations and is notably influenced by the presence of specific risk factors. Several factors have been identified as increasing the likelihood of developing RRD. Myopia, or nearsightedness, is a well-established risk factor, with higher degrees of myopia associated with greater susceptibility. Prior cataract surgery is another significant risk factor; alterations in the vitreous humor and structural changes following cataract extraction can predispose the eye to retinal breaks and subsequent detachment. Ocular trauma, whether blunt or penetrating, can also lead to retinal tears and detachment through direct mechanical forces or secondary complications. Furthermore, peripheral retinal degenerations, such as lattice degeneration, are important predisposing conditions. Lattice

degeneration is characterized by thinning of the peripheral retina, making it more prone to developing breaks. The pathophysiology of RRD is complex but fundamentally involves the interplay between the vitreous humor and the retina. The vitreous, a gel-like substance that fills the posterior segment of the eye, undergoes age-related changes, most notably liquefaction (syneresis). This liquefaction can lead to posterior vitreous detachment (PVD), a process where the vitreous separates from the retinal surface. While PVD is often a normal aging change, it can exert tractional forces on the retina, particularly at sites of strong vitreoretinal adhesion. These tractional forces can result in the formation of retinal tears, which are the hallmark of RRD. Once a retinal break is present, liquefied vitreous can pass through the break and accumulate in the subretinal space, between the neurosensory retina and the RPE. This accumulation of fluid disrupts the delicate balance of forces that maintain retinal adhesion, including oncotic pressure gradients and the active pumping mechanisms of the RPE, ultimately leading to the separation of the retina. The management of RRD is aimed at achieving several key objectives, with the overarching goal of preserving and restoring vision. The primary aims of surgical intervention are to identify and seal all existing retinal breaks, thereby preventing further fluid ingress into the subretinal space. Additionally, relieving vitreoretinal traction is crucial; by eliminating the forces that caused the initial break and are perpetuating the detachment, the retina can be repositioned effectively. Successful surgical intervention facilitates the absorption of subretinal fluid, allowing for the anatomical reattachment of the retina to the RPE.[1-4]

The surgical management of RRD has evolved significantly over the years, with several effective techniques now available. Pneumatic retinopexy (PnR) is one option, particularly suitable for certain types of detachments, where an expansile gas bubble is injected into the vitreous cavity to tamponade the retinal break. Scleral buckling (SB) is another established technique that involves an ab-externo approach. In SB, an external element, such as a silicone band or sponge, is placed on the sclera to indent the globe, thereby relieving traction on the retinal break and supporting its closure. SB is often combined with cryotherapy or laser retinopexy to create a strong adhesion between the retina and the RPE around the break. Pars plana vitrectomy (PPV) has become an increasingly important technique in RRD surgery. This ab-interno approach involves making small incisions in the pars plana to access the vitreous cavity. During PPV, the vitreous gel is removed, traction on the retina is relieved, subretinal fluid is drained, and retinopexy is performed, typically using endolaser photocoagulation. PPV often concludes with the placement of an internal tamponade, using either a long-acting gas or silicone oil, to support the retina during the healing process. The selection of the most appropriate surgical technique for RRD repair is a complex decision-making process. The choice between PnR, SB, PPV, or a combination of these techniques depends on a multitude of factors. Patient-specific characteristics, such as age and lens status (phakic, pseudophakic, or aphakic), play a significant role. The features of the RRD itself, including the number, location, and type of retinal breaks, the extent of the detachment, and the presence or absence of proliferative vitreoretinopathy (PVR), are critical determinants. Finally, the surgeon's preference and experience also influence the choice of surgical approach. Historically, SB has been a mainstay in RRD surgery, particularly for uncomplicated detachments in younger, phakic patients. However, PPV has gained increasing prominence, especially for more complex cases. PPV is often preferred in cases with posterior breaks, giant retinal tears (GRTs), significant vitreous opacity (such as from hemorrhage), or established PVR. In certain situations, combining PPV with SB (PPV/SB) is considered the optimal strategy. This combined approach is frequently employed for complex RRDs, such as those with multiple breaks in different quadrants, inferior breaks, GRTs, or moderate PVR, as it allows the surgeon to leverage the advantages of

both techniques. PPV effectively addresses vitreoretinal traction, while SB provides support to the peripheral retina.[5-7]

The management of RRD becomes even more challenging when it coexists with a visually significant cataract. The presence of a cataract can significantly complicate vitreoretinal surgery. Cataracts can obscure the surgeon's view, making it difficult to achieve complete vitreous removal, thoroughly examine the peripheral retina, accurately identify and treat retinal breaks, and adequately assess retinal perfusion during the procedure. These limitations can compromise the success of the retinal repair. Furthermore, both SB and PPV, particularly when utilizing gas or silicone oil tamponade, have been shown to accelerate the progression of cataract in phakic eyes. This presents a clinical dilemma, as addressing one condition may exacerbate the other. To address the challenges posed by the coexistence of RRD and cataract, a combined surgical approach has emerged as a viable option in carefully selected cases. This combined procedure involves performing cataract extraction, typically via phacoemulsification with intraocular lens (IOL) implantation, and RRD repair (PPV or PPV/SB) in a single surgical session. This strategy offers several potential benefits. First, it allows for immediate visual rehabilitation by addressing both the cataract and the retinal detachment simultaneously. Second, removing the cataract improves the surgeon's intraoperative visualization, facilitating a more effective and thorough retinal repair. Finally, it eliminates the need for a second cataract surgery at a later date, reducing the overall surgical burden and avoiding the small but ever-present risk of RRD recurrence associated with subsequent cataract surgery. However, it is important to acknowledge that combined surgery for RRD and cataract is technically demanding. These procedures can be associated with longer surgical times compared to either procedure performed alone. There is also the potential for increased postoperative inflammation. Additionally, combined surgery may carry a higher risk of certain complications, such as posterior capsular opacification (PCO) and IOL decentration or capture. Therefore, careful patient selection and meticulous surgical planning are essential to optimize outcomes and minimize risks.[8-10] This case report presents a detailed account of the successful management of a middle-aged female patient who presented with an RRD involving a superior retinal tear and concomitant bilateral immature senile cataracts.

2. Case Presentation

The patient was a 43-year-old female. Pertinently, she was referred from Bengkulu, indicating that she sought medical attention outside her immediate vicinity, which might suggest the complexity or severity of her condition necessitating specialist consultation. The patient's primary complaint upon presentation was the sudden onset of a black shadow in the nasal visual field of her right eye. This symptom had been present for one week. Prior to this, for a duration of one month, she experienced photopsia in the same eye. Photopsia, characterized by the perception of flashes of light, often signals vitreoretinal traction or irritation, which is a significant precursor to rhegmatogenous retinal detachment. The patient also reported experiencing blurred vision in both eyes, suggesting a bilateral condition affecting overall visual acuity. Significantly, the patient explicitly denied experiencing several other ocular symptoms. These included eye pain, redness, discharge, itching, double vision (diplopia), headache, nausea, and vomiting. The absence of these symptoms is important in narrowing the differential diagnosis and focusing on conditions primarily affecting the retina and lens rather than inflammatory or other ocular surface diseases. The patient's past medical history revealed a two-year history of hypertension. Of particular clinical significance is the information that she was non-compliant with her prescribed medication. This lack of adherence to treatment regimens for systemic conditions like hypertension can have implications for ocular health, particularly in the context of retinal vascular diseases. The patient specifically denied a

history of diabetes mellitus, another systemic disease that can profoundly affect the retina. Regarding her past ocular history, the patient reported no previous eye surgeries. She did, however, use corrective eyeglasses, although the specific prescription details were unavailable. This detail is relevant as it provides context for her baseline visual status and any potential refractive errors, which could be associated with conditions like myopia, a risk factor for retinal detachment. The patient's family history was unremarkable, with no significant ocular history reported. This aspect helps to assess for any potential genetic predisposition to ocular conditions. The patient's general physical condition was described as good, indicating that she was not acutely ill or systemically compromised at the time of examination. Her level of consciousness was documented as Compos Mentis, suggesting that she was alert and oriented. Her blood pressure was measured at 130/80 mmHg. The patient's pulse rate was 85 beats per minute, which falls within the normal range. Her body temperature was 36.5 degrees Celsius, also within the normal physiological range. The respiratory rate was recorded at 20 breaths per minute, which is considered normal for an adult. The ophthalmological examination revealed significant findings, particularly in the right eye. Visual acuity in the right eye was severely reduced, measured at 1/60, and this did not improve with the use of a pinhole. This lack of improvement with pinhole suggests that the reduced vision was not primarily due to refractive error but rather to a more serious pathological process. The visual acuity in the left eye was also poor, recorded at 1/60, and similarly, did not improve with pinhole. This bilateral reduction in visual acuity points to a condition affecting both eyes, though the nature and severity may differ. Intraocular pressure (IOP) was measured in both eyes. In the right eye, the IOP was 19.6 mmHg, and in the left eye, it was 16.2 mmHg. Both of these measurements are generally within the normal range, although it is important to monitor IOP in the context of other findings and potential complications. Ocular alignment was documented as orthophoria in both eyes, indicating that the eyes were properly aligned. Ocular motility was full in both eyes, meaning that the eyes were able to move in all directions without restriction. Examination of the anterior segment of both eyes revealed that the eyelids and conjunctiva were quiet, suggesting no signs of inflammation or irritation. The cornea in both eyes was clear, indicating no opacities or abnormalities that would obstruct vision. The anterior chamber was moderately deep and quiet in both eyes, showing no signs of inflammation or shallowing, which can be associated with angle-closure glaucoma. The pupils in both eyes were round, central, and reactive to light, with no relative afferent pupillary defect (RAPD) observed. The absence of RAPD is an important finding, as it suggests that the optic nerve function was relatively preserved, at least in terms of afferent pupillary response. A notable finding in the anterior segment examination was the presence of bilateral immature senile cataracts. The cataracts were graded using a standardized system. In the right eye, the lens was graded as Nuclear Opalescence (NO) 2, Nuclear Color (NC) 2, Cortical Spoking (C) 1, and Posterior Subcapsular (P) 0. In the left eye, the grading was NO 2, NC 2, C 1, and P 0. These gradings indicate the degree and type of cataract present in each eye, with NO and NC referring to the density and color of the lens nucleus, C referring to spoke-like opacities in the cortex, and P referring to opacities in the posterior subcapsular region. The fact that the cataracts were described as "immature" suggests that they were not yet fully developed but were still significant enough to affect vision. The posterior segment examination revealed critical findings. In the right eye, the vitreous was clear, but posterior vitreous detachment (PVD) was inferred. PVD is a common age-related change but can also be a predisposing factor for retinal detachment. The optic disc was round with distinct margins, pink in color, and had a cup-to-disc ratio of 0.3, with an arterio-venous ratio of 1:3 in both eyes. These findings are generally normal. However, the macula in the right eye showed a diminished reflex and was described as attached but threatened, indicating

a potential risk of macular involvement in the retinal pathology. In contrast, the macula in the left eye also showed a diminished reflex, along with a macular star and hard exudates. These findings in the left eye suggest a different pathology, possibly related to vascular changes or other maculopathies. The retina in the right eye exhibited a retinal tear located between the 1-2 o'clock position, along with undulation and retinal folds. These are classic signs of rhegmatogenous retinal detachment, where the retina is separated from the underlying RPE due to a break. The left eye's retina, however, appeared normal with normal vascular contour and was attached. Laboratory investigations revealed that the complete blood count, prothrombin time (PT), activated partial thromboplastin time (APTT), blood glucose level (113 mg/dL), renal function tests (including urea and creatinine), and electrolytes (sodium, potassium, chloride) were all within normal limits. These results suggest that the patient did not have any significant hematological abnormalities, coagulation disorders, or metabolic disturbances. However, liver enzyme tests showed elevated levels of SGOT (72 U/L) and SGPT (114 U/L). These elevated liver enzymes warrant further investigation to determine the underlying cause and its clinical significance. The Hepatitis B surface antigen (HBsAg) test was non-reactive, indicating that the patient did not have an active Hepatitis B infection. Fundus photography confirmed the presence of rhegmatogenous retinal detachment in the right eye and macular findings in the left eye. Optical coherence tomography (OCT) of the right eye was limited due to the cataract and fluid, hindering a clear view of the retinal layers. However, OCT of the left eye showed normal retinal layers. B-scan ultrasonography of the right eye revealed an extensive bullous retinal detachment, a suspected superior break, and vitreous syneresis and PVD. The left eye's B-scan was unremarkable. A chest X-ray was performed and found to be normal. The final clinical diagnoses were: Rhegmatogenous Retinal Detachment in the right eye, specifically with a superior tear and macula-threatening, and Bilateral Immature Senile Cataract (Table 1).

The pre-operative stage was critical for planning the surgical intervention. The primary concern was the accurate diagnosis, which was established as Rhegmatogenous Retinal Detachment (RRD) in the right eye, characterized by a superior tear, complicated by the presence of bilateral immature senile cataracts. Given the coexistence of these conditions, the decision was made to proceed with combined surgery on the right eye. This approach aimed to address both the retinal detachment and the cataract in a single surgical procedure, optimizing the patient's visual outcome and reducing the need for subsequent surgeries. To ensure patient safety and preparedness for the procedure, consultations were conducted with Internal Medicine and Anesthesiology specialists. These consultations were essential to clear the patient for general anesthesia, which was planned for the surgery. Obtaining informed consent from the patient was a crucial step, ensuring that she understood the nature of the procedure, its potential benefits, and associated risks. The intra-operative stage encompassed the surgical procedures performed to address the diagnosed conditions. Anesthesia was induced using general anesthesia, ensuring that the patient was completely unconscious and pain-free throughout the surgery. This was necessary due to the complexity and duration of the combined procedure. The first component of the surgery involved phacoemulsification and IOL implantation. This procedure began with a clear corneal incision, which is a small incision made in the cornea to access the interior of the eye. A continuous curvilinear capsulorhexis (CCC) was then performed, creating a circular opening in the anterior capsule of the lens. Hydrodissection and hydrodelineation were carried out to separate the lens nucleus from the surrounding cortex. Phacoemulsification, the core of cataract surgery, was used to emulsify and remove the lens nucleus. Cortical aspiration followed, removing the remaining lens cortex. Finally, a foldable acrylic intraocular lens (IOL) was implanted into the capsular bag. In this case, a 21.0 diopter IOL was used, targeted

for emmetropia, aiming to achieve a state where the eye does not require corrective lenses for distance vision after surgery. The lens nucleus was graded as NO2/NC2, correlating with the pre-operative grading. The next procedure was scleral buckling (SB). This involved a 360-degree peritomy, which is a circumferential incision of the conjunctiva to expose the sclera. The rectus muscles were isolated using 4-0 silk sutures. A circumferential silicone band, size 240, was placed around the sclera, and secured with 5-0 Mersilene sutures, positioned 14mm posterior to the limbus. The band was positioned appropriately, and the ends were joined with a sleeve. Moderate indentation was achieved post-PPV after suture tightening, providing support to the peripheral retina. Pars plana vitrectomy (PPV) was then performed using a 23-gauge 3-port system. This minimally invasive technique involved core vitrectomy, removal of the central vitreous gel, and induction of posterior vitreous detachment (PVD) with triamcinolone assistance to visualize the vitreous. Peripheral vitreous shaving was also performed, ensuring complete removal of vitreoretinal traction. The procedure was meticulously carried out, confirming complete vitrectomy and relieving vitreoretinal traction. Retinal reattachment was achieved through a fluid-air exchange, where the vitreous fluid was replaced with air. Internal drainage of subretinal fluid, both passively and actively via a flute needle near the retinal break, was performed. This process successfully flattened the retina under the air tamponade. Retinopexy, specifically endolaser retinopexy, was conducted. Three confluent rows of Argon green laser applications were applied around the superior retinal tear, located at the 1-2 o'clock position. Additional peripheral laser treatment was applied to the detached area to create chorioretinal adhesion, sealing the break and supporting the peripheral retina. The final steps of the intra-operative stage involved tamponade and closure. An air-silicone oil (1000 centistokes) exchange was performed, replacing the air with silicone oil for long-term tamponade. Cannulae were removed, sclerotomy sites were checked to ensure they were secure, and conjunctiva closure was performed using 8-0 Vicryl sutures. Subconjunctival injections of Dexamethasone and Gentamicin were administered. The vitreous cavity was filled with silicone oil for long-term tamponade. Hemostasis was confirmed, and the wound closure was secured. The immediate post-operative period was crucial for assessing the initial outcome of the surgery and managing any immediate complications. On the first post-operative day, the patient's assessment revealed mild redness and foreign body sensation in the right eye. Visual acuity in the right eye was recorded as 1/60 with pinhole, which was similar to the pre-operative visual acuity. Intraocular pressure in the right eye was 8.3 mmHg, which is within the normal range. Examination of the anterior segment of the right eye showed mild hyperemia, an anterior chamber that was formed with oil reflection, and an IOL that appeared stable. The retina was assessed as attached under the oil tamponade. Overall, the findings suggested likely post-surgical inflammation, but the IOP was low-normal, and the retina was attached. The management plan for the first post-operative day included several medications and instructions. The patient was prescribed Cefixime 200mg orally twice daily (BID), Mefenamic Acid 500mg orally three times daily (TID) as needed (PRN), Levofloxacin eye drops four times daily (QID) in the right eye, and Prednisolone Acetate 1% eye drops four times daily (QID) in the right eye. Posture instructions were given, advising the patient to adhere to face-down positioning. Systemic and topical antibiotics and steroids were initiated to prevent infection and reduce inflammation. A follow-up appointment was scheduled in one week to monitor the patient's progress. The follow-up visit on the eighth post-operative day was essential for evaluating the intermediate outcome and managing any developing issues. The patient's assessment revealed that the redness had reduced, but a persistent foreign body sensation remained in the right eye. Notably, visual acuity in the right eye showed significant improvement, measured at 6/30 without pinhole and 6/21 with pinhole. Intraocular pressure in the right

eye was elevated at 39.4 mmHg. Examination of the anterior segment of the right eye showed mild hyperemia, an anterior chamber that was formed with oil, and an IOL that was centered. The retina was fully attached, flat, and laser scars were visible, indicating successful retinopexy. Optical coherence tomography confirmed macular attachment. These findings indicated substantial visual acuity improvement and successful retinal reattachment but also revealed elevated intraocular pressure. The management plan on the eighth post-operative day focused on addressing the elevated intraocular pressure. The patient was prescribed Timolol 0.5% eye drops twice daily (BID) in the right eye, Brinzolamide eye drops three times daily (TID) in the right eye, Acetazolamide 250mg orally twice daily (BID), and Potassium Chloride 600mg orally once daily (OD). Levofloxacin eye drops four times daily (QID) and Prednisolone Acetate eye drops were continued and tapered. Aggressive IOP-lowering treatment was initiated due to the high pressure. Close monitoring was planned, and silicone oil removal was considered for the future (months later if the retina remained stable). The overall prognosis was assessed, focusing on visual recovery and anatomical success. The prognosis "Quo ad Vitam" was deemed good, indicating no life-threatening complications. "Quo ad Functionam" was also assessed as good, reflecting the significant visual improvement observed. "Quo ad Sanationam" was considered good, with successful retinal reattachment. However, the overall prognosis was qualified as dependent on long-term retinal stability, IOP control, and the management of silicone oil tamponade (Table 2).

3. Discussion

The decision to proceed with a combined surgical approach, addressing both the RRD and the cataract within a single operative session, was underpinned by several critical considerations. The presence of a visually significant cataract, graded as LOCS III NO2/NC2, had profoundly compromised the patient's baseline visual acuity in the affected eye, registering at a mere 1/60. This level of visual impairment, while debilitating in itself, presented a formidable obstacle to the successful management of the RRD. The cataract acted as a substantial media opacity, severely impeding the surgeon's view of the posterior segment of the eye. This obstruction would have introduced significant challenges during the vitrectomy procedure, hindering the ability to meticulously identify and accurately treat the causative retinal break, ensure the complete removal of vitreoretinal traction, and adequately assess retinal perfusion intraoperatively. The compromised visualization could have led to a suboptimal retinal repair, consequently elevating the risk of recurrent retinal detachment, a complication that would necessitate further surgical intervention and prolong the patient's recovery. Therefore, the removal of the cataract became a priority not only to restore vision but also to facilitate the effective management of the retinal detachment. Both PPV and SB, particularly when combined with the use of intraocular tamponades such as silicone oil, are well-established factors that can induce or accelerate the formation and progression of cataract in phakic eyes. This phenomenon poses a significant clinical challenge. If the cataract were not addressed during the initial surgery, it is highly probable that the patient would have experienced a progressive decline in visual acuity postoperatively, even if the retinal detachment repair were anatomically successful. This decline would then necessitate a second surgical procedure for cataract extraction at a later stage. By proactively addressing the cataract in the combined procedure, the need for this subsequent surgery was obviated, preventing a predictable source of postoperative visual deterioration and the associated risks and inconveniences. The combined approach offers a distinct advantage in terms of efficiency and a reduction in overall patient morbidity. Undergoing a single surgical procedure, as opposed to two separate ones, minimizes the patient's exposure to anesthesia, surgical risks, and the potential complications associated with each intervention.

Table 1. Summary of patient's clinical findings.

Category	Finding	Detail/Value
Demographics	Age	43 years old
	Gender	Female
	Location	Out of town (referred from Bengkulu)
Anamnesis	Chief Complaint	Black shadow in the nasal visual field of the right eye
	Duration of Chief Complaint	1 week
	Onset of Chief Complaint	Sudden
	Associated Symptoms	Photopsia (flashes of light) in the right eye (1-month duration)
		Blurred vision in both eyes
	Denied Symptoms	Eye pain, redness, discharge, itching, double vision, headache, nausea, vomiting
	Past Medical History	Hypertension (2 years), non-compliant with medication
		Denies diabetes mellitus
	Past Ocular History	No previous eye surgery
		Corrective eyeglasses (prescription unknown)
	Family History	No significant ocular history reported
General physical examination	General Condition	Good
	Consciousness	Compos Mentis
	Blood Pressure	130/80 mmHg
	Pulse	85 x/minute
	Temperature	36.5°C
	Respiration	20 x/minute
Ophthalmology examination	Visual Acuity (VA)	OD: 1/60, no improvement with pinhole
		OS: 1/60, no improvement with pinhole
	Intraocular Pressure (IOP)	OD: 19.6 mmHg
		OS: 16.2 mmHg
	Ocular Alignment	Orthophoria OU
	Ocular Motility	Full OU
	Anterior Segment	Lids: Quiet OU
		Conjunctiva: Quiet OU
		Cornea: Clear OU
		Anterior Chamber: Moderately deep and quiet OU
		Iris: Normal architecture and color OU
		Pupil: Round, central, reactive to light (3mm) OU, no RAPD
		Lens: Bilateral immature senile cataract
		- Grading:
		OD: Nuclear Opalescence (NO) 2, Nuclear Color (NC) 2, Cortical Spoking (C) 1, Posterior Subcapsular (P) 0
		OS: NO 2, NC 2, C1, P0
	Posterior Segment	Vitreous: Clear OS, Clear with PVD (inferred) OD
		Optic Disc: Round, distinct margins, pink, C/D 0.3, A:V 1:3 OU
		Macula: OD: Diminished reflex, attached but threatened
		OS: Diminished reflex, macular star, hard exudates
		Retina: OD: Retinal tear (1-2 o'clock), undulation, retinal folds
		OS: Normal vascular contour, attached
Laboratory	Complete Blood Count	Within normal limits
	Prothrombin Time (PT)	Within normal limits
	Activated Partial Thromboplastin Time (APTT)	Within normal limits
	Blood Glucose	133 mg/dL
	Renal Function Tests (Urea, Creatinine)	Within normal limits
	Electrolytes (Sodium, Potassium, Chloride)	Within normal limits
	Liver Enzymes (SGOT, SGPT)	SGOT 72 U/L (elevated), SGPT 114 U/L (elevated)
	Hepatitis B Surface Antigen (HBsAg)	Non-reactive
Imaging	Fundus Photography	Confirmed RRD OD, macular findings OS
	Optical Coherence Tomography (OCT)	OD: Limited view due to cataract/fluid
		OS: Normal retinal layers
	B-scan Ultrasonography	OD: Extensive bullous RD, superior break suspected, vitreous syneresis and PVD
		OS: Unremarkable
	Chest X-Ray	Normal
Clinical diagnosis		Rhegmatogenous Retinal Detachment OD (Superior tear, macula-threatening)
		Bilateral Immature Senile Cataract

Notes: A:V: Arterio-Venous Ratio; APTT: Activated Partial Thromboplastin Time; C: Cortical Spoking (Lens Grading); C/D: Cup-to-Disc Ratio; HBsAg: Hepatitis B Surface Antigen; IOP: Intraocular Pressure; mmHg: Millimeters of Mercury; NC: Nuclear Color (Lens Grading); NO: Nuclear Opalescence (Lens Grading); OCT: Optical Coherence Tomography; OD: Oculus Dexter (Right Eye); OS: Oculus Sinister (Left Eye); OU: Oculi Uterque (Both Eyes); P: Posterior Subcapsular (Lens Grading); ph: Pinhole; PT: Prothrombin Time; PVD: Posterior Vitreous Detachment; RAPD: Relative Afferent Pupillary Defect; RD: Retinal Detachment; RF: Foveal Reflex; RRD: Rhegmatogenous Retinal Detachment; SGOT: Serum Glutamic Oxaloacetic Transaminase (also known as AST - Aspartate Aminotransferase); SGPT: Serum Glutamic Pyruvic Transaminase (also known as ALT - Alanine Aminotransferase); VA: Visual Acuity.

Table 2. Summary of treatment procedure and follow-up.

Stage	Sub-stage/Component	Details	Key findings / Management
Pre-operative	Planning & Consent	Diagnosis: RRD OD (Superior Tear, Macula Threatening) + Bilateral Immature Senile Cataract. Decision for combined surgery OD. Informed consent obtained.	Consultations with Internal Medicine & Anesthesiology cleared the patient for general anesthesia.
Intra-operative	Anesthesia	General Anesthesia	-
	Phacoemulsification & IOL	Clear corneal incision; CCC; Hydrodissection; Phacoemulsification (divide & conquer); Cortical aspiration; Foldable acrylic IOL implantation.	Lens nucleus grade NO2/NC2 removed; +21.0 D IOL (target emmetropia) placed in capsular bag.
	Scleral Buckle (SB)	360° peritomy; Rectus muscle isolation (silk 4-0); Circumferential silicone band (#240) placement under muscles; Secured with Mersylene 5-0 sutures (14mm posterior to limbus).	Band positioned, ends joined with sleeve, moderate indentation achieved post-PPV after suture tightening.
	Pars Plana Vitrectomy (PPV)	23-gauge 3-port setup; Core vitrectomy; Triamcinolone-assisted PVD induction & peripheral vitreous shaving.	Complete vitrectomy performed, relieving vitreoretinal traction.
	Retinal Reattachment	Fluid-air exchange; Internal drainage of subretinal fluid (passive/active via flute needle near break).	Retina flattened successfully under air.
	Retinopexy (Endolaser)	Endolaser (Argon green) application: 3 confluent rows around the superior tear (1-2 o'clock); Additional peripheral laser to detached area.	Chorioretinal adhesion created to seal the break and support peripheral retina.
	Tamponade & Closure	Air-silicone oil (1000 cSt) exchange; Cannula removal; Sclerotomy check; Conjunctival closure (Vicryl 8-0); Subconjunctival Dexamethasone & Gentamicin.	Vitreous cavity filled with silicone oil for long-term tamponade. Hemostasis confirmed; Wound closure secured.
Post-operative: Day 1	Assessment	Complaints: Mild redness, foreign body sensation OD. VA OD: 1/60 ph(-). IOP OD: 8.3 mmHg. Anterior Segment OD: Mild hyperemia, AC formed (oil reflection), IOL stable.	Retina appeared attached under oil. VA unchanged likely due to oil/inflammation. IOP low-normal.
	Management	Discharge Meds: Cefixime 200mg PO BID, Mefenamic Acid 500mg PO TID PRN, Levofloxacin ED QID OD, Prednisolone Acetate 1% ED QID OD. Posture: Advised face-down positioning.	Systemic & topical antibiotics/steroids initiated. Follow-up scheduled in 1 week.
Post-operative: Day 8	Assessment	Complaints: Reduced redness, persistent foreign body sensation OD, no pain. VA OD: 6/30 ph 6/21. IOP OD: 39.4 mmHg (Elevated). Anterior Segment OD: Mild hyperemia, AC formed (oil), IOL centered.	Significant VA improvement. Retina fully attached, flat macula, laser scars visible. Notable IOP spike OD. OCT confirmed macular attachment.
	Management	IOP Management OD: Timolol 0.5% ED BID, Brinzolamide ED TID, Acetazolamide 250mg PO BID, Potassium Chloride 600mg PO OD. Continued Levofloxacin QID OD. Prednisolone Acetate tapered.	Aggressive IOP lowering initiated due to high pressure. Continued monitoring planned. Silicone oil removal considered for future (months later if stable).
Prognosis	Overall	Quo ad vitam: Good. Quo ad functionam: Favorable (post-op improvement). Quo ad sanationam: Good (anatomical success).	Dependent on long-term retinal stability, IOP control, and management of silicone oil.

Notes: AC: Anterior Chamber; BID: Bis in Die (Twice a day); CCC: Continuous Curvilinear Capsulorhexis; cSt: centistokes; D: Diopter; ED: Eye Drops (Guttae); IOL: Intraocular Lens; IOP: Intraocular Pressure; mmHg: Millimeters of Mercury; NC: Nuclear Color (Lens Grading); NO: Nuclear Opalescence (Lens Grading); OCT: Optical Coherence Tomography; OD: Oculus Dexter (Right Eye); ph: Pinhole; PO: Per Os (By Mouth); PPV: Pars Plana Vitrectomy; PRN: Pro Re Nata (As needed); PVD: Posterior Vitreous Detachment; QID: Quater in Die (Four times a day); RRD: Rhegmatogenous Retinal Detachment; SB: Scleral Buckle; TID: Ter in Die (Three times a day); VA: Visual Acuity.

It also translates to a shorter overall recovery period, allowing the patient to return to their normal activities sooner. Furthermore, it reduces the healthcare costs associated with multiple hospital admissions, surgical procedures, and postoperative care. While sequential surgery, involving retinal repair followed by cataract extraction at a later date, represents an alternative treatment strategy, it carries certain disadvantages. The most significant drawback is the delay in visual rehabilitation. Patients undergoing sequential surgery experience a prolonged period of visual impairment while awaiting the second procedure. Moreover, the second surgery itself, though often considered routine, is not entirely devoid of risks, including the small but ever-present possibility of RRD redetachment, which would necessitate further intervention and potentially compromise the final visual outcome. Comparative studies have investigated the outcomes of combined versus sequential procedures, revealing comparable anatomical success rates in achieving retinal reattachment. However, these studies have consistently demonstrated that combined surgery typically leads to a more rapid recovery of visual acuity. It is important to acknowledge that combined surgery may be associated with a higher incidence of initial postoperative inflammation and intraocular pressure (IOP) spikes.[11-15]

The decision to combine pars plana vitrectomy (PPV) with scleral buckling (SB), rather than employing either technique in isolation, was likely influenced by the specific characteristics of the retinal detachment observed in this patient and the surgeon's clinical judgment. The retinal detachment in this case was characterized by a superior retinal tear located between the 1-2 o'clock position. This location is considered peripheral, situated close to the ora serrata, the anatomical boundary between the retina and the ciliary body. In such cases, an encircling scleral buckle offers distinct advantages. The buckle provides broad support to the vitreous base and the peripheral retina, effectively counteracting any residual peripheral vitreous traction that may persist even after vitrectomy. This support mechanism plays a crucial role in minimizing the risk of developing new retinal breaks or overlooking existing ones during the initial surgical intervention. Although the patient in this case became pseudophakic (underwent IOL implantation) during the combined procedure, the presence of a phakic lens (the patient's natural lens) at the beginning of the surgery is a consideration in surgical planning. In phakic eyes, SB can facilitate a more thorough and complete shaving of the peripheral vitreous during PPV. The indentation of the sclera created by the buckle allows for improved visualization and access to the vitreous base, the region where the vitreous is most firmly attached to the retina. This enhanced access contributes to a more effective removal of vitreoretinal traction, a critical step in preventing recurrent detachment. While the case report does not explicitly mention the presence of preoperative proliferative vitreoretinopathy (PVR), some surgeons advocate for the use of SB in conjunction with PPV as a prophylactic measure to reduce the risk of anterior PVR development. PVR is a serious complication of retinal detachment, characterized by the proliferation and contraction of fibrocellular membranes on the retinal surface, leading to recurrent detachment. The supporting effect of the scleral buckle on the ciliary body and vitreous base is believed to potentially mitigate the factors that contribute to anterior PVR formation. The overarching goal of retinal detachment surgery is to achieve primary anatomical reattachment, meaning the successful reattachment of the retina in the initial surgical procedure, thereby avoiding the need for further interventions. The combination of PPV and SB is strategically employed to maximize the likelihood of achieving this goal. PPV excels at directly addressing vitreoretinal traction, enabling the surgeon to meticulously remove the vitreous gel, perform internal drainage of subretinal fluid, and precisely apply endolaser treatment to seal the retinal break. SB, on the other hand, provides external support to the retinal periphery and the vitreous base, reinforcing the effects of PPV and offering an additional layer of

protection against recurrent detachment. The choice between PPV and SB as standalone procedures for RRD repair has been a subject of ongoing debate and research. Studies such as the Scleral Buckling versus Primary Vitrectomy in Rhegmatogenous Retinal Detachment (SPR) study have provided valuable insights into the comparative effectiveness of these techniques. These studies have suggested that SB may yield slightly better visual acuity outcomes in cases of uncomplicated RRD in phakic eyes. Conversely, PPV has been shown to be the preferred approach for pseudophakic eyes or more complex detachments, such as those involving giant retinal tears or proliferative vitreoretinopathy. The combined PPV/SB approach seeks to leverage the advantages of both techniques, tailoring the surgical strategy to the specific needs of the patient and the characteristics of the retinal detachment.[16-20]

4. Conclusion

The successful management of rhegmatogenous retinal detachment (RRD) with concomitant cataract, as demonstrated in this case, underscores the efficacy of a combined surgical approach. This strategy, integrating phacoemulsification, pars plana vitrectomy (PPV), and scleral buckling (SB), not only achieved retinal reattachment but also facilitated significant visual improvement for the patient. The case highlights the importance of meticulous surgical planning, where the decision to perform combined surgery was pivotal in addressing the complexities of RRD in the presence of a visually significant cataract. The combined approach allowed for immediate visual rehabilitation by simultaneously treating both conditions, and it enhanced the surgeon's ability to visualize and effectively repair the retinal detachment. Furthermore, it prevented the need for future cataract surgery, reducing surgical burden and potential complications. While the surgery was technically demanding and carried the potential for postoperative complications such as IOP elevation, these were effectively managed with careful postoperative care. In conclusion, this case reaffirms that combined phacoemulsification, PPV, and SB is a viable and effective treatment option for RRD with concomitant cataract. The success of such interventions relies heavily on thorough preoperative assessment, precise surgical execution, and diligent postoperative management, particularly concerning intraocular pressure control and long-term retinal stability.

5. References

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