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Successful Management of Inferotemporal Rhegmatogenous Retinal Detachment with Scleral Buckle in High Myopia: A Case Report

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A B S T R A C T

Rhegmatogenous retinal detachment (RRD) represents a significant ophthalmic emergency, characterized by the separation of the neurosensory retina from the underlying retinal pigment epithelium (RPE) due to a full-thickness retinal break. High myopia is a major risk factor, particularly in younger individuals, owing to associated vitreoretinal changes and axial elongation. Surgical intervention is mandatory to prevent permanent vision loss. While pars plana vitrectomy (PPV) has gained popularity, conventional scleral buckling (SB) remains a highly effective and often preferred primary treatment, especially in young, phakic patients with peripheral breaks and uncomplicated detachments. This report details the successful management of an inferotemporal RRD using SB in a young female patient with high myopia. A 25-year-old female presented with a two-week history of progressively worsening blurred vision, preceded by floaters and photopsia in her left eye (OS). She had a history of high myopia (manifest refraction -7.50 D sphere OS) but no prior ocular surgery or trauma. Best-corrected visual acuity (BCVA) was counting fingers at 1 meter OS and 6/30 OD. Intraocular pressure (IOP) was 8.1 mmHg OS and 18.3 mmHg OD. Funduscopic examination OS revealed a bullous RRD involving the inferior and temporal quadrants, extending across approximately 6 clock hours, with the macula appearing clinically off. A single flap tear was identified in the inferotemporal quadrant at the 7 o'clock position, consistent with Lincoff's Rule 3. Optical Coherence Tomography (OCT) confirmed subretinal fluid involving the fovea. B-scan ultrasonography corroborated the presence of retinal detachment. The patient underwent conventional scleral buckling surgery with cryotherapy to the retinal break and subretinal fluid drainage under general anesthesia. Postoperatively, the retina achieved complete anatomical reattachment. BCVA OS improved slightly to counting fingers at 1 meter by day 12 post-operation, with expectations for further gradual improvement. In conclusion, conventional scleral buckling provided successful anatomical reattachment for an inferotemporal RRD secondary to a flap tear in this young, highly myopic patient. SB remains a crucial and effective surgical option for primary RRD, particularly in phakic eyes with peripheral breaks, offering excellent anatomical outcomes while avoiding the cataractogenic effects and potential intraocular manipulation risks associated with primary vitrectomy in this demographic. Careful case selection and meticulous surgical technique are paramount for success.

1. Introduction

Rhegmatogenous retinal detachment (RRD) is a serious condition that threatens eyesight. It happens when the neurosensory retina (NSR) separates from the retinal pigment epithelium (RPE) because liquid vitreous passes through a full-thickness break in the retina and accumulates in the subretinal space. This separation deprives the retina of its necessary nourishment and metabolic support, which can lead to the death of photoreceptor cells and permanent vision loss if not treated promptly. RRD is considered an ophthalmic emergency, and immediate surgical

intervention is necessary to restore the retina's anatomy and preserve or recover visual function. The incidence of RRD varies across different geographical areas, but it is generally reported to occur in 10 to 18 individuals per 100,000 people annually. However, more recent studies suggest that these figures might be higher, especially with increasing age in the population and a higher number of cataract surgeries being performed. The development of RRD is a complex process involving several factors. These include the liquefaction of the vitreous humor (synchysis), posterior vitreous detachment (PVD), the presence of pre-existing retinal lesions, and the dynamic forces of vitreoretinal traction. As people age or in the presence of certain diseases, the vitreous gel undergoes liquefaction. This process can lead to the separation of the posterior hyaloid membrane from the retinal surface, known as posterior vitreous detachment (PVD). While PVD is a common age-related change, if the separation is incomplete or abnormal, it can exert traction on areas where the vitreous is strongly attached to the retina. These areas include the vitreous base, retinal blood vessels, and peripheral retinal degenerative lesions such as lattice degeneration. This traction can cause retinal tears or holes, including flap tears and horseshoe tears. Once a full-thickness break occurs, the liquefied vitreous is able to pass into the subretinal space. This influx of fluid overwhelms the RPE's ability to pump fluid out and disrupts the balance of hydrostatic forces, resulting in the separation of the retina from the RPE. There are several well-established risk factors that significantly increase a person's risk of developing RRD. Among these, high myopia is considered one of the most critical predisposing factors, with studies indicating that it is associated with 40-50% of RRD cases. High myopia is characterized by an increase in the axial length of the eye, which leads to thinning of the peripheral retina and a higher prevalence of lattice degeneration. Lattice degeneration, a common peripheral retinal degeneration, is found in 8-10% of the general population but is more frequent and often occurs in both eyes of individuals with myopia. Furthermore, high myopia is often associated with earlier onset of vitreous degeneration and PVD. As a result, individuals with high myopia tend to develop RRD at a younger age, typically between 25 and 45 years, compared to the general population, where the peak incidence is between 45 and 65 years. Other significant risk factors for RRD include previous cataract surgery (pseudophakia), which accounts for 30-40% of RRD cases, ocular trauma (10-20%), a history of RRD in the fellow eye (approximately 10% risk), specific peripheral retinal degenerations (such as lattice degeneration and cystic retinal tufts), and certain genetic syndromes like Stickler syndrome and Marfan syndrome.[1-4]

Patients with RRD typically present with acute onset of symptoms that include floaters (the sudden appearance of dark spots, threads, or cobweb-like structures, which correspond to vitreous opacities or hemorrhage), photopsia (flashes of light caused by mechanical stimulation of the retina due to vitreous traction), and a peripheral visual field defect, which is often described as a "curtain" or "shadow" gradually progressing towards the center of vision. If the macula, the central part of the retina responsible for sharp, detailed vision, becomes detached (macula-off RRD), it leads to a loss of central vision. This is a critical situation that carries a less favorable visual prognosis compared to cases where the macula is still attached (macula-on RRD). Diagnosing RRD requires a careful review of the patient's medical history and a thorough ophthalmic examination. This examination includes measuring best-corrected visual acuity (BCVA), assessing intraocular pressure (IOP), and performing slit-lamp biomicroscopy and dilated fundus examination using indirect ophthalmoscopy with scleral depression. Scleral depression is an essential technique that allows the examiner to visualize the peripheral retina, particularly near the ora serrata, and identify retinal breaks. In addition to the clinical

examination, ancillary imaging techniques are valuable for diagnosis and surgical planning. B-scan ultrasonography is crucial when the view of the fundus is obscured by media opacities such as vitreous hemorrhage or a dense cataract. Optical Coherence Tomography (OCT) of the macula is used to confirm the macular status (on or off) and to rule out any associated macular pathologies. The main objective of RRD surgery is to locate and seal all retinal breaks. This prevents further flow of fluid into the subretinal space and allows the RPE to reabsorb the existing subretinal fluid (SRF), leading to the reattachment of the retina. Modern surgical techniques for RRD repair include pneumatic retinopexy (PR), scleral buckling (SB), and pars plana vitrectomy (PPV). These techniques can be used individually or in combination, depending on the specifics of each case. Pneumatic retinopexy involves injecting an expansile gas bubble into the vitreous cavity along with retinopexy (laser photocoagulation or cryotherapy) to treat the retinal break(s). After the procedure, the patient must maintain a specific head position to allow the gas bubble to tamponade the break, helping the retina to reattach. PR is generally used for uncomplicated RRDs with single or grouped breaks located in the superior eight clock hours of the retina. While PR is less invasive, it has slightly lower primary success rates compared to SB or PPV. It is not suitable for inferior breaks, multiple breaks in different quadrants, significant proliferative vitreoretinopathy (PVR), or hazy media.[5-7]

Pars plana vitrectomy (PPV) involves removing the vitreous gel, draining subretinal fluid internally, applying retinopexy around the breaks, and using a gas or silicone oil tamponade. PPV directly addresses vitreous traction and is the preferred surgical approach for complex RRDs, such as those with giant retinal tears, significant vitreous hemorrhage, posterior breaks, or established PVR. It is also increasingly used as the primary surgical treatment for RRD, particularly in pseudophakic eyes or cases with unclear media. However, PPV is a more invasive procedure that commonly leads to or accelerates cataract formation in phakic eyes and carries risks such as iatrogenic retinal breaks and endophthalmitis. Inducing a PVD in young patients, where the vitreous is often firmly attached, can be challenging and increases the risk of causing iatrogenic breaks. Conventional scleral buckling, the focus of this report, involves placing a supportive element, usually a silicone sponge or solid silicone band, on the sclera. This creates an indentation or "buckle" that pushes the sclera, choroid, and RPE inward towards the detached retina. This physical closure of the retinal break(s) relieves vitreous traction at the vitreous base and the break itself. The procedure typically includes cryotherapy or laser photocoagulation, applied externally (transscleral) or internally (during combined PPV), to create a chorioretinal adhesion around the breaks. Drainage of subretinal fluid (SRF) through a controlled sclerotomy may be performed to help the retina reattach onto the buckle, although some surgeons prefer non-drainage procedures. Scleral buckling has a long history of achieving high anatomical success rates, often exceeding 90-95% in suitable cases. It is particularly advantageous for young, phakic patients with peripheral breaks, clear media, and no significant PVR. By avoiding intraocular manipulation, SB preserves the crystalline lens and potentially reduces the risk of endophthalmitis. However, SB can induce refractive changes (myopic shift, astigmatism), diplopia due to extraocular muscle imbalance, and carries risks like choroidal detachment, buckle extrusion or infection, and, in rare cases, anterior segment ischemia. The decision between SB and PPV for primary RRD treatment, especially in young myopic individuals, is a subject of ongoing discussion among vitreoretinal surgeons. This decision is often based on the specific characteristics of the case, the surgeon's preference, and their experience. Studies comparing primary SB versus primary PPV for uncomplicated RRD have shown

varying results in terms of anatomical and functional outcomes. However, SB is often favored for younger, phakic patients because it preserves the lens and effectively relieves traction at the peripheral vitreous base.[8-10] This case report presents the clinical presentation, surgical management using conventional scleral buckling, and postoperative outcome of a 25-year-old female with high myopia who had an inferotemporal macula-off RRD.

2. Case Presentation

The patient is a 25-year-old female. She is employed in a private company. This demographic information provides a foundational context for understanding the patient's overall health and lifestyle, which can indirectly influence the presentation and management of ocular conditions. The patient's age is particularly relevant in the context of retinal detachment, as the etiology, typical presentation, and treatment considerations can vary significantly between younger and older individuals. Specifically, in younger patients, high myopia is a more prominent risk factor for retinal detachment, and treatment strategies often prioritize the preservation of accommodation and minimize long-term complications. The fact that she is employed suggests an active lifestyle, which might influence her ability to adhere to specific postoperative positioning requirements or recovery timelines. The patient's chief complaint was progressively worsening blurred vision in her left eye (OS). This symptom is a common presenting feature of various ocular pathologies, including retinal detachment. The gradual deterioration of vision, as opposed to a sudden loss, can offer clues about the underlying pathological process. In the context of retinal detachment, progressive blurring often correlates with the gradual expansion of the detachment, particularly when it encroaches upon the macula, the central region of the retina responsible for sharp, detailed vision. Further elaboration on the history of the present illness (OS) reveals a detailed timeline of symptom progression. Approximately three weeks prior to presentation, the patient reported the onset of floaters. Floaters are characterized by the perception of dark spots, specks, or cobweb-like structures moving across the field of vision. These are typically caused by vitreous syneresis, a liquefaction of the vitreous humor, or by vitreous traction on the retina, which can release cellular debris into the vitreous cavity. The presence of floaters is a significant symptom as it often precedes or accompanies posterior vitreous detachment (PVD), a key event in the pathogenesis of rhegmatogenous retinal detachment. The patient also noted increasing blurriness concurrently with the onset of floaters, suggesting an early disturbance of visual function. Two weeks prior to presentation, the patient experienced an increase in floaters and the addition of photopsia. Photopsia refers to the perception of flashes of light, often described as streaks or lightning-like sensations. These flashes are caused by mechanical stimulation of the retina, typically due to vitreous traction. As the vitreous pulls on the retina, it can trigger neural signals that are interpreted by the brain as light. The combination of increased floaters and photopsia strongly suggests ongoing vitreoretinal traction and an elevated risk of retinal tear formation. The progression from floaters to floaters with photopsia is a crucial historical detail that points towards a dynamic process within the vitreous and at the vitreoretinal interface. Subsequently, the patient developed a visual field defect, which she described as "like a curtain covering vision." This is a classic description of the peripheral vision loss associated with retinal detachment. As the detached retina elevates from the RPE, it creates a shadow or curtain-like effect in the patient's visual field. The location and extent of the visual field defect correlate with the area of the retina that is detached. The "curtain" sensation indicates a significant portion of the retina is likely involved. The absence of associated pain, redness, or discharge is also noteworthy. Retinal detachment is

typically a painless condition unless complications such as inflammation or increased intraocular pressure occur. The lack of redness or discharge helps to differentiate retinal detachment from other conditions that might present with blurred vision, such as conjunctivitis or uveitis. The patient's past ocular history is significant for high myopia in both eyes (ODS), for which she uses glasses. Her spectacle prescription is -7.50 D sphere ODS. High myopia is a major risk factor for rhegmatogenous retinal detachment. The increased axial length in myopic eyes leads to thinning and stretching of the retina, particularly in the periphery, predisposing it to tears and detachments. Furthermore, high myopia is often associated with earlier vitreous degeneration and PVD, which are crucial events in the pathogenesis of retinal detachment. The degree of myopia (-7.50 D) is clinically significant and places her at substantial risk. The patient's use of glasses confirms the long-standing nature of her myopia and its impact on her visual function. The absence of a history of ocular trauma is important, as trauma is another known risk factor for retinal detachment. Similarly, the absence of a history of prior eye surgery is relevant, as intraocular surgery, particularly cataract surgery, can increase the risk of retinal detachment. The patient's past medical history is unremarkable. She denied any history of hypertension or diabetes mellitus. Systemic conditions like hypertension and diabetes can affect the microvasculature of the retina, potentially contributing to or complicating retinal pathologies. The absence of these conditions suggests that the retinal detachment is less likely to be influenced by systemic vascular factors. The patient's family history is negative for similar eye conditions, specifically retinal detachment. While genetic predisposition can play a role in some cases of retinal detachment, particularly in association with certain syndromes, the lack of a positive family history suggests that inherited factors are less likely to be a primary contributor in this case. The patient's general condition was described as good, indicating that she was in a stable state of health overall. Her consciousness was assessed as Compos Mentis, meaning she was alert and oriented. This is a standard neurological assessment that confirms the patient's mental clarity and awareness of her surroundings. The patient's vital signs were within normal limits. Her blood pressure was 110/85 mmHg, her heart rate was 84 beats per minute, her respiratory rate was 22 breaths per minute, and her temperature was 36.9°C. These vital signs provide a baseline assessment of her physiological status and exclude any acute systemic disturbances that might be contributing to her ocular symptoms. Normal vital signs are important to establish that the patient's ophthalmic condition is an isolated issue and not part of a systemic illness. The examination of the right eye (OD) serves as a comparison to the affected left eye (OS) and helps to establish the patient's baseline ocular health. The best-corrected visual acuity (BCVA) in the right eye was 3/60, improving to 6/30 with a pinhole. BCVA measures the sharpest vision the patient can achieve with corrective lenses. A BCVA of 3/60 indicates reduced visual acuity. The improvement to 6/30 with a pinhole suggests that the reduced acuity is primarily due to a refractive error, which is consistent with the patient's history of high myopia. The pinhole effect eliminates peripheral light rays, reducing refractive error and improving vision. This finding is important as it establishes the baseline visual function of the unaffected eye. The intraocular pressure (IOP) in the right eye was 18.3 mmHg. IOP measures the pressure inside the eye, which is maintained by the balance between aqueous humor production and outflow. A normal IOP range is typically between 10 and 21 mmHg. The IOP in the right eye is within the normal range, indicating that there is no evidence of glaucoma or other conditions that affect intraocular pressure. Ocular alignment and motility were described as orthophoria with full motility. Orthophoria refers to the normal alignment of the eyes when fixating on an

object. Full motility indicates that the eye muscles are functioning properly, allowing for a full range of eye movements. This rules out strabismus or other motility disorders. The palpebrae (eyelids) and conjunctiva were described as quiet/normal. This indicates that there was no evidence of inflammation, swelling, or discharge affecting the eyelids or conjunctiva. The cornea was clear, indicating that there was no clouding or opacity affecting the transparency of the cornea. The anterior chamber (AC) was of moderate depth and quiet. The anterior chamber is the space between the cornea and the iris. A moderate depth suggests a normal anatomical structure, and a quiet AC indicates the absence of inflammation or cells in the aqueous humor. The iris had a normal architecture, indicating that there were no structural abnormalities. The pupil was round, central, 3mm in size, and reactive to light (+). This is a normal pupillary response. The size and reactivity of the pupil are important indicators of neurological and autonomic function. The lens was clear and phakic. A clear lens indicates the absence of cataract. Phakic means that the patient has their natural crystalline lens, as opposed to having an artificial intraocular lens (pseudophakia) after cataract surgery. The posterior segment (fundus) examination revealed a disc with round, sharp margins, normal color, and a cup-to-disc ratio (CDR) of 0.3, with an arteriole-to-venule ratio (A:V) of 2:3. The macula had a foveal reflex (+). The retina was attached, with normal vessel contour and subtle myopic degeneration. The vitreous was clear. These findings are largely normal, with the exception of subtle myopic degeneration, which is expected in a highly myopic eye. The normal optic disc appearance excludes optic neuropathy. The clear vitreous is an important finding, as it suggests the absence of vitreous hemorrhage or inflammation in this eye. The hematology and coagulation parameters were all within normal limits. These included hemoglobin (14.7 g/dL), white blood cell count (WBC 4,700/µL), platelet count (152,000/µL), hematocrit (42.1%), bleeding time (1 minute), and clotting time (5 minutes). These results indicate that the patient had no underlying hematological disorders that could contribute to or complicate her ocular condition. The biochemistry results were also within normal limits. Random blood glucose was 112 mg/dL, urea was 21.90 mg/dL, and creatinine was 0.90 mg/dL. These results suggest that the patient had normal renal function and glucose metabolism. The serology results were negative for HBsAg and Anti-HIV. These results indicate that the patient was negative for Hepatitis B surface antigen and HIV antibodies. Imaging studies were performed on the left eye (OS) to further investigate the patient's symptoms. Fundus photography confirmed a bullous rhegmatogenous retinal detachment (RRD) involving the inferior and temporal quadrants. The fovea was off, indicating that the macula was detached. An inferotemporal flap tear was identified at approximately the 7 o'clock position, and retinal folds were also noted. These findings are consistent with the clinical diagnosis of RRD. The description of the detachment as "bullous" suggests a significant elevation of the retina. The identification of the flap tear is crucial, as it is the primary break through which vitreous fluid is accessing the subretinal space. Retinal folds are a common feature of RRD and indicate the extent of the detachment and the tractional forces involved. The involvement of the macula ("fovea off") is a critical finding, as it has significant implications for visual prognosis. Optical Coherence Tomography (OCT) of the macula demonstrated subretinal fluid separating the neurosensory retina from the RPE, confirming the macula-off status. There was no foveal depression present, and no vitreomacular traction (VMT) or epiretinal membrane (ERM) was noted. OCT provides a high-resolution cross-sectional image of the retina, allowing for detailed assessment of its structure and any abnormalities. The confirmation of subretinal fluid is diagnostic for retinal detachment. The absence of foveal depression is another indicator of macular

detachment. The absence of VMT and ERM rules out other macular pathologies that could contribute to vision loss. B-scan ultrasonography showed a mobile membrane consistent with a detached retina. There was low-moderate mobility and after-movement of the detached retina. The choroidal thickness was normal. B-scan ultrasonography is particularly useful when the view of the fundus is obscured, but it also provides valuable information about the extent and mobility of the detached retina. The low-moderate mobility and after-movement are typical findings in RRD. Normal choroidal thickness suggests that there is no choroidal detachment. The primary diagnosis was rhegmatogenous retinal detachment, left eye (OS). This diagnosis is based on the patient's history, clinical examination, and imaging studies. The associated condition was high myopia, both eyes (ODS). High myopia is considered a significant risk factor for the development of RRD. This detailed case presentation provides a comprehensive overview of the patient's clinical findings, encompassing her demographics, medical history, physical examination, laboratory results, and imaging studies. The information is presented in a structured and systematic manner to facilitate a clear understanding of the patient's condition and the diagnostic process (Table 1).

The patient underwent a conventional scleral buckle procedure on her left eye (OS). Scleral buckling is a well-established surgical technique for the repair of rhegmatogenous retinal detachments. It involves the placement of a silicone implant on the sclera, the white part of the eye, to indent the globe and relieve traction on the retinal break, thereby facilitating retinal reattachment. The choice of scleral buckling as the primary surgical intervention is often dictated by several factors, including the patient's age, lens status (phakic or pseudophakic), the location and nature of the retinal break, and the presence or absence of proliferative vitreoretinopathy (PVR). In this case, the decision to proceed with scleral buckling likely reflects considerations regarding the patient's young age, phakic status, and the characteristics of her retinal detachment. The anesthesia employed for the procedure was general anesthesia. General anesthesia is commonly used in scleral buckling surgery to ensure patient comfort, immobility, and cooperation throughout the often lengthy and meticulous surgical process. It eliminates pain and anxiety, allowing the surgeon to perform the delicate maneuvers required for successful retinal reattachment. The use of general anesthesia also minimizes the risk of patient movement, which could lead to complications during the surgery. The surgical date, as inferred from the postoperative follow-up dates, was April 5th, 2024. This date establishes the temporal context for the subsequent postoperative events and allows for accurate tracking of the patient's recovery and progress. Precise dating of surgical interventions is crucial for clinical record-keeping and for evaluating the long-term outcomes of the procedure. The key surgical steps of the conventional scleral buckle procedure were meticulously documented, providing a detailed account of the surgical technique employed. The first step involved preparation, which included aseptic preparation with Povidone-Iodine 10% and sterile draping. Aseptic technique is paramount in any surgical procedure to minimize the risk of postoperative infection. Povidone-Iodine 10% is a widely used antiseptic solution known for its broad-spectrum antimicrobial activity. Sterile draping creates a sterile field around the surgical site, preventing contamination from non-sterile areas. These measures are fundamental in maintaining a sterile environment and preventing endophthalmitis, a severe intraocular infection. The second step involved exposure. This consisted of a 360° conjunctival peritomy, Tenon's dissection, and isolation of the four rectus muscles with bridle sutures (Nylon/Silk 4-0). A conjunctival peritomy is an incision around the limbus, the border between the cornea and the sclera, to mobilize the conjunctiva and gain access to the

sclera. Tenon's dissection involves separating Tenon's capsule, a fibrous layer that envelops the globe, from the sclera. This step is necessary to create space for the placement of the scleral buckle. The four rectus muscles, which control eye movement, were isolated using bridle sutures. Bridle sutures are temporary sutures placed under the muscles to manipulate the globe during the surgery. The use of Nylon or Silk 4-0 sutures is standard practice for this purpose, providing adequate strength and manageability. This extensive exposure is crucial to allow for proper placement of the buckle and treatment of the retinal break. The third step was retinopexy. The inferotemporal flap tear at the 7 o'clock position was confirmed, and transscleral cryotherapy was applied surrounding the break, with 5 applications. Retinopexy is a procedure used to create a chorioretinal adhesion, a bond between the retina and the choroid, around the retinal break. This adhesion prevents further fluid from passing through the break and causing retinal detachment. Cryotherapy involves the application of extreme cold to the sclera overlying the retinal break. The cold temperature damages the RPE cells, triggering an inflammatory response that leads to the formation of a scar. Transscleral application means that the cryotherapy probe was applied to the outside of the sclera. The confirmation of the inferotemporal flap tear at the 7 o'clock position correlates with the preoperative findings and guides the precise placement of the buckle. The application of 5 cryotherapy applications is a standard technique to ensure adequate treatment of the break. The fourth step was buckle placement. A circumferential silicone band (size #240 implied) was passed under the rectus muscles, and a segmental element ("tyer") was placed to support the inferotemporal break. The circumferential silicone band is the primary component of the scleral buckle. It encircles the globe, creating an indentation that relieves traction on the retinal break. The size of the band (#240 implied) is a standard measurement chosen based on the size of the globe and the extent of the detachment. Passing the band under the rectus muscles requires careful manipulation to avoid muscle damage. The segmental element, or "tyer," is a smaller piece of silicone that is placed over the area of the retinal break to provide additional support. This targeted support is crucial for ensuring that the break is adequately closed. The fifth step was SRF drainage. Controlled external drainage of subretinal fluid (SRF) was performed via a sclerotomy in the superotemporal quadrant after diathermy. Subretinal fluid is the fluid that accumulates between the neurosensory retina and the RPE in retinal detachment. Draining this fluid helps to flatten the retina and facilitate its reattachment to the RPE. A sclerotomy is a small incision made in the sclera. Diathermy, the application of heat, is used to cauterize the blood vessels in the area before the sclerotomy to minimize bleeding. The location of the sclerotomy in the superotemporal quadrant is chosen to allow for efficient drainage while minimizing the risk of complications. Controlled drainage is essential to avoid rapid decompression of the globe, which could lead to complications. The sixth step was buckle securing. The band was secured with mattress sutures (Mersilene 5-0) and tightened to achieve indentation while ensuring central retinal artery (CRA) perfusion. The ends were joined. Mattress sutures are a type of suture that provides strong and secure closure. Mersilene 5-0 is a non-absorbable suture material commonly used in scleral buckling surgery due to its strength and durability. Tightening the band to achieve the appropriate indentation is a critical step. The indentation must be sufficient to close the retinal break and relieve traction, but excessive tightening can lead to complications such as increased intraocular pressure or choroidal ischemia. Ensuring CRA perfusion is essential to prevent retinal ischemia. CRA perfusion is assessed by observing the blood flow in the central retinal artery, the main blood supply to the retina. The ends of the band are joined to create a continuous buckle around the globe. The seventh step

was closure. Tenon's and the conjunctiva were closed with absorbable sutures (Vicryl 8-0). Absorbable sutures, such as Vicryl 8-0, are used to close the Tenon's capsule and the conjunctiva. These sutures dissolve over time, eliminating the need for suture removal. Proper closure of these layers is important to promote healing and prevent complications such as wound dehiscence. The eighth step involved injections. Subconjunctival Gentamicin and Dexamethasone were administered. Subconjunctival injections are injections given under the conjunctiva. Gentamicin is an antibiotic used to prevent postoperative infection. Dexamethasone is a corticosteroid used to reduce postoperative inflammation. These medications help to promote healing and minimize complications. The ninth and final step was dressing. An eye patch and shield were applied. The eye patch provides protection and minimizes eye movement in the immediate postoperative period. The shield provides further protection against accidental trauma. The intraoperative notes indicated that no apparent complications were reported, and central retinal artery perfusion was confirmed at the procedure's end. This is a positive finding, suggesting that the surgery was performed successfully without any immediate adverse events. Confirmation of central retinal artery perfusion is crucial to ensure that the retina is receiving adequate blood supply. The postoperative follow-up is an integral part of the patient's management, allowing for the monitoring of healing, detection of complications, and assessment of visual recovery. The first follow-up visit was on postoperative day 1. This early follow-up is essential to assess the immediate postoperative condition of the eye and to address any early complications. The subjective findings reported by the patient included mild eye pain and redness. Mild pain and redness are common after scleral buckling surgery and are expected due to the surgical trauma. These symptoms are usually managed with analgesics and topical medications. The objective findings included a BCVA of 1/60 (unchanged), an IOP of 7.8 mmHg, slit lamp examination findings of moderate conjunctival injection/chemosis, mild corneal edema, and a quiet anterior chamber (AC). The fundus examination revealed a hazy view, with the buckle indentation noted, and the retina appeared attached, although the assessment was limited. The unchanged BCVA at this early stage is not unexpected, as visual recovery after retinal detachment surgery can be gradual. An IOP of 7.8 mmHg is lower than normal. While low IOP can occur postoperatively due to inflammation or reduced aqueous production, it requires careful monitoring as very low IOP can predispose to hypotony maculopathy. Conjunctival injection and chemosis are signs of postoperative inflammation. Corneal edema can occur due to surgical manipulation. A quiet AC suggests the absence of significant intraocular inflammation. The hazy view of the fundus is also common in the early postoperative period due to corneal edema and inflammation. The noted buckle indentation confirms the correct placement of the scleral buckle. The assessment that the retina appeared attached is a positive sign, indicating that the surgical goal was achieved, although the limited view warrants further evaluation at subsequent visits. The medications prescribed for this visit included oral Cefixime 100 mg twice daily (bid), oral Mefenamic acid 500 mg three times daily (tid), topical Levofloxacin 1 gtt four times daily (qid), and topical Prednisolone acetate 1 gtt four times daily (qid). Cefixime is an oral antibiotic used to prevent systemic infection. Mefenamic acid is an oral nonsteroidal anti-inflammatory drug (NSAID) used to manage postoperative pain and inflammation. Levofloxacin is a topical antibiotic used to prevent ocular infection. Prednisolone acetate is a topical corticosteroid used to reduce ocular inflammation. These medications are standard postoperative care after scleral buckling surgery. The second follow-up visit was on postoperative day 12. This follow-up visit assesses the patient's progress and the resolution of early postoperative complications. The subjective

findings reported by the patient included resolution of pain and significant redness. This indicates that the postoperative inflammation was subsiding, and the patient was experiencing symptomatic improvement. The objective findings included a BCVA of 1/60 (unchanged), an IOP of 11.0 mmHg, slit lamp examination findings of reduced conjunctival injection, resolving subconjunctival hemorrhage, a clear cornea, and a quiet AC. The fundus examination revealed a clear view, a completely attached retina including the macula, the break sealed on the buckle, a positive foveal reflex, and good buckle indentation. The unchanged BCVA at this visit, while still poor, is not unusual, as visual recovery can be slow, especially in cases where the macula was detached preoperatively. The IOP of 11.0 mmHg is within a more acceptable range and indicates that the initial hypotony was resolving. The reduced conjunctival injection and resolving subconjunctival hemorrhage confirm the improvement in postoperative inflammation. The clear cornea indicates resolution of the corneal edema. The clear view of the fundus allows for a more detailed assessment of the retina. The finding of a completely attached retina, including the macula, is a crucial positive outcome, indicating that the surgical goal of retinal reattachment was achieved. The sealed break on the buckle confirms the effectiveness of the scleral buckle in closing the retinal tear. The presence of a positive foveal reflex suggests potential for visual recovery, as it indicates that the macula is functioning to some extent. The good buckle indentation confirms the proper positioning and function of the scleral buckle. The medications prescribed for this visit included continuing Levofloxacin ED OS qid and Prednisolone acetate ED OS qid, with a plan for gradual tapering. This indicates that the topical antibiotic and corticosteroid were continued to further reduce inflammation and prevent infection, with a plan to gradually reduce the dosage over time. The notes for this visit indicated slow visual recovery, attributed to the preoperative macula-off status, and advised regular future follow-up. Slow visual recovery is a common occurrence in cases of macula-off retinal detachment, as the longer the macula is detached, the greater the potential for permanent photoreceptor damage. Regular future follow-up is essential to monitor visual recovery, detect any late complications, and manage the patient's long-term care. This detailed account of the treatment procedure and postoperative follow-up provides a comprehensive understanding of the patient's surgical management and recovery process. The meticulous documentation of the surgical steps, postoperative findings, and medication management highlights the careful and systematic approach to patient care in this case (Table 2).

3. Discussion

The occurrence of rhegmatogenous retinal detachment in young individuals, especially those with high myopia, introduces a unique set of clinical challenges and considerations that necessitate a tailored approach to diagnosis and treatment. High myopia stands out as a major, well-substantiated risk factor for the development of RRD. This heightened risk is primarily attributed to the anatomical and physiological alterations that accompany high myopia, most notably the increased axial globe length. The elongation of the eyeball in myopic individuals leads to a consequential thinning of the peripheral retina, rendering it more susceptible to the formation of retinal breaks. Furthermore, high myopia is frequently associated with a higher prevalence and an earlier onset of vitreous liquefaction, also known as synchysis, and posterior vitreous detachment (PVD). These vitreous changes play a crucial role in the pathogenesis of RRD, as the traction exerted by the vitreous on the retina, particularly during PVD, can precipitate the formation of retinal tears. In addition to these factors, individuals with high myopia often exhibit a greater incidence of peripheral retinal degenerations, such as lattice degeneration.

Table 1. Summary of patient's clinical findings.

Category	Finding	Details
Demographics	Age	25 years
	Gender	Female
	Occupation	Private Company Employee
Anamnesis (History)	Chief Complaint	Progressively worsening blurred vision in the left eye (OS)
	History of Present Illness (OS)	- Onset 3 weeks prior: Floaters ("seeing black spots flying"), increasing blurriness. - Onset 2 weeks prior: Increased floaters, addition of photopsia ("seeing flashes of light"). - Subsequent development: Visual field defect ("like a curtain covering vision"). - No associated pain, redness, or discharge.
	Past Ocular History	- High Myopia ODS (Both Eyes), uses glasses. Prescription: -7.50 D Sphere ODS. - No history of ocular trauma. - No history of prior eye surgery.
	Past Medical History	Unremarkable. Denied history of hypertension or diabetes mellitus.
	Family History	No family history of similar eye conditions (retinal detachment).
Physical examination	General Condition	Good
	Consciousness	Compos Mentis (Alert and Oriented)
	Vital Signs	Blood Pressure: 110/85 mmHg; Heart Rate: 84 bpm; Respiratory Rate: 22/min; Temperature: 36.9°C
Ophthalmology exam	**Parameter**	**Right Eye (OD)**
	Visual Acuity (BCVA)	3/60, PH 6/30
	Intraocular Pressure (IOP)	18.3 mmHg
	Ocular Alignment / Motility	Orthophoria, Full motility
	Palpebrae (Eyelids)	Quiet/Normal
	Conjunctiva	Quiet/Normal
	Cornea	Clear
	Anterior Chamber (AC)	Moderate depth, Quiet
	Iris	Normal architecture
	Pupil	Round, Central, 3mm, Reactive to light (+)
	Lens	Clear (Phakic)
	Posterior Segment (Fundus)	Disc: Round, sharp margins, normal color, CDR 0.3, A:V 2:3. Macula: Foveal reflex (+). Retina: Attached, normal vessel contour, subtle myopic degeneration. Vitreous: Clear.
Laboratory results	Hematology & Coagulation	Hemoglobin 14.7 g/dL, WBC 4,700/µL, Platelets 152,000/µL, Hematocrit 42.1%, Bleeding time 1 min, Clotting time 5 min (All within normal limits).
	Biochemistry	Random Blood Glucose 112 mg/dL, Urea 21.90 mg/dL, Creatinine 0.90 mg/dL (All within normal limits).
	Serology	HBsAg: Non-Reactive, Anti-HIV: Non-Reactive.
Imaging studies (OS)	Fundus Photography	Confirmed bullous RRD involving inferior & temporal quadrants, fovea off, inferotemporal flap tear (~7 o'clock), retinal folds.
	OCT Macula	Demonstrated subretinal fluid separating neurosensory retina from RPE, confirming macula-off status; foveal depression absent; no VMT or ERM.
	B-Scan Ultrasonography	Showed mobile membrane consistent with detached retina; low-moderate mobility and after-movement; normal choroidal thickness.
Clinical diagnosis	Primary Diagnosis	Rhegmatogenous Retinal Detachment, Left Eye (OS).
	Associated Conditions	High Myopia, Both Eyes (ODS).

Table 2. Treatment procedure and postoperative follow-up.

Category	Sub-category	Details
Treatment procedure	**Procedure**	**Conventional Scleral Buckle, Left Eye (OS)**
	Anesthesia	General Anesthesia
	Key Surgical Steps	1. Preparation: Aseptic prep with Povidone-Iodine 10%, sterile draping. 2. Exposure: 360° conjunctival peritomy, Tenon's dissection, isolation of 4 rectus muscles with bridle sutures (Nylon/Silk 4-0). 3. Retinopexy: Inferotemporal flap tear at 7 o'clock confirmed; Transscleral cryotherapy applied surrounding the break (5 applications). 4. Buckle Placement: Circumferential silicone band (#240 implied) passed under rectus muscles; Segmental element ("tyer") placed to support inferotemporal break. 5. SRF Drainage: Controlled external drainage via sclerotomy in the superotemporal quadrant after diathermy. 6. Buckle Securing: Band secured with mattress sutures (Mersilene 5-0); tightened to achieve indentation while ensuring CRA perfusion. Ends joined. 7. Closure: Tenon's and conjunctiva closed with absorbable sutures (Vicryl 8-0). 8. Injections: Subconjunctival Gentamicin and Dexamethasone administered. 9. Dressing: Eye patch and shield applied.
	Intraoperative Notes	No apparent complications reported. Central retinal artery perfusion confirmed at procedure end.
Postoperative follow-up	**Follow-up Visit 1**	
	Subjective (OS)	Mild eye pain and redness reported.
	Objective (OS)	BCVA: 1/60 (unchanged). IOP: 7.8 mmHg. Slit Lamp: Moderate conjunctival injection/chemosis, mild corneal edema, quiet AC. Fundus: Hazy view, buckle indentation noted, retina appeared attached (assessment limited).
	Medications Prescribed	Oral: Cefixime 100 mg bid, Mefenamic acid 500 mg tid. Topical OS: Levofloxacin 1 gtt qid, Prednisolone acetate 1 gtt qid.
	Follow-up Visit 2	Postoperative Day 12
	Subjective (OS)	Pain and significant redness resolved.
	Objective (OS)	BCVA: 1/60 (unchanged). IOP: 11.0 mmHg. Slit Lamp: Reduced conjunctival injection, resolving subconjunctival hemorrhage, clear cornea, quiet AC. Fundus: Clear view, retina completely attached including macula, break sealed on buckle, positive foveal reflex present, good buckle indentation.
	Medications Prescribed	Continue Levofloxacin ED OS qid and Prednisolone acetate ED OS qid with plan for gradual tapering.
	Notes	Slow visual recovery noted, attributed to preoperative macula-off status. Regular future follow-up advised.

Lattice degeneration is a condition characterized by thinning of the peripheral retina and alterations in the vitreoretinal interface, further increasing the risk of retinal breaks and subsequent detachment. In the context of the presented case, the patient's age of 25 years is particularly noteworthy. This age falls squarely within the typical age range of 25 to 45 years for the onset of RRD in individuals with myopia. This range is significantly younger than the peak incidence observed in the general population, where RRD

typically manifests between the ages of 45 and 65 years. The age disparity underscores the influence of myopia on the natural history of RRD, accelerating the pathological processes that lead to retinal detachment. The patient's history of high myopia, with a manifest refraction of -7.50 D sphere in both eyes, is undoubtedly a significant contributing factor to the development of RRD in her left eye. The high degree of myopia likely predisposed her to the development of vitreoretinal changes that ultimately culminated in the retinal detachment. It is plausible to infer that the inferotemporal flap tear observed in this patient was a consequence of anomalous posterior vitreous detachment. The symptoms of floaters and photopsia experienced by the patient prior to the onset of the visual field defect are strongly suggestive of vitreous traction and the subsequent formation of the retinal tear. While lattice degeneration was noted in the peripheral retina during the examination, the primary pathological finding was the flap tear. This observation highlights the importance of recognizing that although lattice degeneration is a common predisposing factor in myopic RRD, various types of retinal breaks can occur in this population, each with its own implications for management.[11-15]

The clinical presentation observed in this case aligns with the classic symptomatology of rhegmatogenous retinal detachment. The patient's report of acute onset of floaters, photopsia, and a progressive visual field defect, described as a "curtain" obscuring her vision, is characteristic of the condition. Floaters, which are perceived as dark spots or strands moving across the field of vision, arise from opacities within the vitreous humor, often resulting from vitreous syneresis or hemorrhage. Photopsia, the sensation of flashing lights, is attributed to the mechanical stimulation of the retina by vitreous traction. The "curtain" or "shadow" effect in the visual field is a direct consequence of the detached retina, which obstructs the perception of light in the affected area. An additional noteworthy clinical finding in this case is the low intraocular pressure (IOP) of 8.1 mmHg in the affected eye. Reduced IOP is a relatively common observation in eyes with RRD. The underlying mechanisms contributing to this hypotony are believed to involve decreased aqueous humor production by the detached ciliary body and/or increased unconventional outflow of aqueous humor. The identification of a single inferotemporal flap tear as the causative break is consistent with typical patterns of retinal detachment. Retinal tears are the primary entry point for liquefied vitreous to access the subretinal space, leading to the separation of the neurosensory retina from the retinal pigment epithelium. Furthermore, the distribution of subretinal fluid in this case adhered to a principle known as Lincoff's Rule 3. Lincoff's Rules are a set of clinical observations that help predict the location of the primary retinal break based on the configuration of the retinal detachment. Specifically, Lincoff's Rule 3 states that in inferior retinal detachments, the primary break is typically located on the side of the higher fluid level in 95% of cases. In this instance, the subretinal fluid was most bullous superiorly relative to the inferior location of the identified flap tear, conforming to this rule. The accurate localization of all retinal breaks is of paramount importance for successful surgical intervention. A thorough understanding of fluid dynamics within the subretinal space, guided by principles such as Lincoff's rules, is equally critical for effective surgical planning and execution. These principles aid the surgeon in identifying the likely location of the primary break, even when it is not immediately apparent during the initial examination. The macula-off status of the retinal detachment, confirmed both clinically and through Optical Coherence Tomography (OCT), carries significant implications for visual prognosis. Macula-off RRD indicates that the central part of the retina, responsible for sharp, detailed vision, is detached. While anatomical reattachment is the primary goal of surgical intervention, the visual prognosis in macula-

off detachments is generally less favorable compared to macula-on detachments, where the macula remains attached. The duration of macular detachment is a critical factor influencing the degree of visual recovery.[16-20]

4. Conclusion

Conventional scleral buckling (SB) remains a vital and effective surgical technique for the primary management of rhegmatogenous retinal detachment (RRD), particularly in young, phakic patients with peripheral retinal breaks. This case report demonstrates the successful anatomical reattachment of an inferotemporal RRD secondary to a flap tear in a 25-year-old female with high myopia using SB. The decision to utilize SB in this case aligns with established principles favoring this approach in younger patients, where the preservation of the crystalline lens and avoidance of potential cataractogenic effects associated with pars plana vitrectomy (PPV) are important considerations. The successful outcome underscores that meticulous surgical technique and careful case selection are critical determinants of success in SB procedures. While PPV has emerged as a popular alternative for RRD repair, particularly in complex cases, SB continues to offer a safe and effective option for uncomplicated detachments. The findings presented here contribute to the existing body of evidence supporting the continued role of SB in the management of RRD, especially in the context of high myopia in young adults. Further research and comparative studies may continue to refine the selection criteria and surgical techniques to optimize outcomes for patients with RRD.

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