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Short Communication

# Retinal Detachment: Understanding Risks, Advances in Surgery, and Future Perspectives

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## DESCRIPTION

Retinal detachment is a potentially blinding condition characterized by separation of the neurosensory retina from the underlying Retinal Pigment Epithelium (RPE). This anatomical disruption deprives photoreceptors of their essential metabolic support, leading to progressive and often irreversible vision loss if untreated. Although relatively uncommon compared to other eye diseases, retinal detachment represents a true ophthalmic emergency. Advances in surgical techniques have significantly improved outcomes, yet timely diagnosis and intervention remain critical determinants of prognosis.

There are three major types of retinal detachment: Rhegmatogenous, tractional, and exudative. Rhegmatogenous Retinal Detachment (RRD), the most common form, occurs due to retinal breaks that allow vitreous fluid to seep into the subretinal space. Risk factors include myopia, posterior vitreous detachment, lattice degeneration, ocular trauma, and prior intraocular surgery. Tractional Retinal Detachment (TRD) results from fibrous or fibrovascular tissue pulling on the retina, commonly seen in proliferative diabetic retinopathy or retinopathy of prematurity. Exudative retinal detachment arises from fluid accumulation beneath the retina due to inflammatory, vascular, or neoplastic conditions, without a retinal break [1-3].

The clinical presentation of retinal detachment is often dramatic. Patients may report flashes of light (photopsia), sudden onset of floaters, or a curtain-like shadow obscuring part of their visual field. Central vision loss occurs when the macula becomes detached, underscoring the urgency of intervention. Fundoscopic examination, Optical Coherence Tomography (OCT), and ultrasonography are essential for diagnosis and surgical planning [4,5].

Management of retinal detachment has evolved considerably. For RRD, surgical repair remains the cornerstone. Techniques include scleral buckling, Pars Plana Vitrectomy (PPV), and pneumatic retinopexy. Scleral buckling, a traditional approach, involves placing a silicone band around the eye to indent the sclera and close retinal breaks. While effective, it has declined in popularity with the advent of vitrectomy. PPV has become the dominant technique, allowing removal of vitreous traction, sealing of retinal breaks with laser photocoagulation or cryotherapy, and internal tamponade with gas or silicone oil. Pneumatic retinopexy, which involves intravitreal injection of a gas bubble combined with laser or cryotherapy, is minimally invasive but best suited for select cases with superior retinal breaks.

Surgical outcomes have improved dramatically with advances in instrumentation, visualization systems, and tamponade agents. High-speed vitrectomy cutters, wide-angle viewing systems, and perfluorocarbon liquids have enhanced surgical precision and success rates. Anatomical reattachment is now achieved in over 90% of cases with a single procedure, though visual outcomes depend heavily on preoperative macular status and duration of detachment [6,7].

TRD management often requires complex vitrectomy with membrane peeling, sometimes combined with adjunctive anti-VEGF therapy to reduce neovascular proliferation. Exudative detachments are treated by addressing the underlying cause, such as corticosteroids or immunosuppressive therapy for inflammatory diseases, or targeted therapy for tumors.

Complications of retinal detachment surgery include recurrent detachment, Proliferative Vitreoretinopathy (PVR), cataract progression, and glaucoma. PVR, characterized by cellular proliferation and membrane formation on both surfaces of the retina, remains the leading cause of surgical failure. Strategies to prevent and treat PVR, including pharmacologic agents and modified surgical techniques, are active areas of research [8].

Future directions in retinal detachment management include biologic and regenerative therapies. Stem cell transplantation and retinal prostheses are being explored as means to restore photoreceptor function in advanced cases. Gene therapy for inherited retinal disorders associated with detachment risk, such

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as retinitis pigmentosa, also holds promise. Furthermore, artificial intelligence-driven predictive models may enhance early detection and optimize surgical decision-making [9].

Public health efforts should emphasize patient education on warning symptoms of retinal detachment, particularly for high-risk populations such as individuals with high myopia or prior ocular surgery. Prompt referral and access to specialized surgical care are essential for preserving vision. Teleophthalmology platforms and mobile diagnostic units may play an increasing role in early detection, especially in underserved regions [10].

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