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Retinal Detachment

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Introduction

Vision is one of a few senses people take for granted . Just imagine the shift in quality of life if suddenly there was a black curtain covering a patient's visual field. Symptoms of retinal detachment (RD) can present as benign visual disturbances that could be dismissed by the patients and providers. For example, floaters are one of the early signs of RD and "are usually benign. Flashes may be associated with successful vitreous separation without retinal tears or detachment or may have non-ocular etiologies such as transient ischemic attack and acephalgic migraine" (Rafieetary, Huddleston, & Attar, 2017, p. 80). The symptoms can be so subtle that patients present as asymptomatic. "RDs are usually detected during primary care visits" (Rafieetary et al., 2017, p. 80). RD can be more common as people age and visual structures become weakened or in those with chronic medical conditions.

This topic was selected as an area of great interest due to the author's personal journey with her sons diagnosis of traumatic RD. Some head traumas with young boys are unavoidable. Closed blunt traumas account for 70-86% of traumatic retinal detachment (Hoogewood et al., 2016). Even if appropriate measures are taken to have an injury evaluated, these traumas can appear benign even to providers. Ultimately, a pediatrician was able to detect RD with an otoscope exam during a routine well child visit, coincidentally following a head trauma 10 days before. The otoscope exam revealed no red reflex in one eye, leading to additional testing, which determined there was no vision in the affected eye. This lead to further evaluation by a pediatric ophthalmologist and a retinal surgeon. Surgical repair took place the following morning. His treatment is ongoing.

Children may not express signs and symptoms of vision loss like one would expect and may not complain of visual disturbances. Children are incredibly resilient and therefore are able to compensate remarkably well, making diagnosis more challenging. As stated previously, this is not just a concern with young children, even adults have difficulty discerning the significance of RD symptoms. This demonstrates how significant thorough eye exams are during primary care visits and emergency department visits following head trauma. In order to restore vision and have the best possible outcome, early diagnosis and prompt referral are imperative. (Coronica, & Murty, 2015).

Signs & Symptoms

According to Roberts (2017) the following symptoms could present suddenly or gradually and need further evaluation for possible RD:

- Photopsia: flashes of light.
- Floaters.
- Increase in number of floaters (showers).
- Heavy feeling in the eye.
- Shadow (black or gray) that begins in the peripheral vision and spreads.
- Curtain or cloud covering part of the visual field.
- Straight lines appear curved.
- RD is painless.

Some RD symptoms are subtle, patients can present asymptomatic and are diagnosed with RD during a primary care visit. "A non-central RD can be asymptomatic as patients may not be as sensitive to slowly progressive peripheral vision loss" (Rafieetary et al., 2017, p. 80). Many patients present with vague symptoms such as floaters that are assumed to be a natural part of the aging process. Others can experience a trauma that lead to symptoms but the patient and providers are preoccupied with symptoms of concussion and fail to diagnose RD.

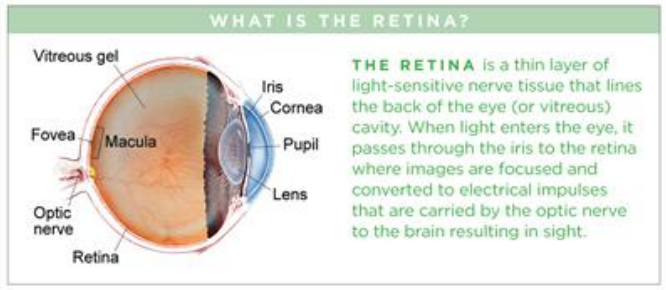

Image 1. American Society of Retina Specialists. (2018).

Underlying Pathophysiology

The retina becomes detached from the back of the eye when vitreous fluid leaks under the retina through a hole or tear, resulting in the loss of vital nutrients and blood supply that are necessary for the retina to transmit light sensitive images to the brain (Roberts, 2017). Without nutrients and blood supply, the tissue of the retina starts to deteriorate quickly and can lead to blindness if not treated promptly. When RD is found and treated quickly, "90 percent of treatments for retinal detachment are successful, although some patients require additional treatment" (Roberts, 2017, p. 74).

Patient's with RD are at increased risk of recurrence and a complication known as proliferative vitreoretinopathy (PVR). This is a form of membrane that can reek havoc on the retina by attaching to surrounding tissues and threaten to detachment the retina due to traction. PVR is the biggest complication accounting for 75% of failed surgical retinal detachment repairs (Brady, Baltimore, & Kaiser, 2015).

PVR is an inflammatory process of "migration and proliferation of cells following a break in the retina or trauma, leading to formation of membranes in the periretinal area, followed by contraction of the cellular membrane" resulting in excessive scar tissue formation (Sadaka & Giuliari, 2013, p. 1325). This interferes with the body's natural healing process immensely.

According to Sadaka & Giuliara (2013) the following is what occurs in PVR formation:

- The breakdown in blood-retinal barrier triggers cell migration and proliferation involving retinal pigment epithelial (RPE) , fibrous astrocytes, fibroblasts, myofibroblasts and macrophages.
- Leading to chemotaxis of inflammatory cells.
- RPE cells migrate and form dedifferentiated cells with a extracellular matrix containing collagen, fibronectin, thrombospondin and other matrix proteins.
- RPE cells lose contact and signaling from photoreceptors.
- Glial cells proliferate and migrate on both sides of the detached retina.
- The detachment of choroid leads to ischemia, causing death of photoreceptors by necrosis and apoptosis.
- Growth factors linked with PVR include: platelet-derived growth factor (PDGF), epidermal growth factor (EGF), tumor necrosis factor-alpha (TNF- α), tumor growth factor-beta (TGF- β), fibroblast growth factor (FGF), interleukin-1 (IL-1), IL-6, IL-8, IL-10 and interferon-gamma (INF-γ)
- Many studies have found that patients with elevated growth factors have a higher chance of developing PVR.

Image (A) Retinal detachment with a retinal tear identified with arrow. (B) Retina attached after surgical repair and gas tamponade. American Society of Retina Specialists. (2018).

Significance of Pathophysiology

The significance of RD can be devastating if not detected and treated early. Patients can present with symptoms with something as minor as a small tear or hole in the retina could progress over time into RD. Not all retinal tears, holes or detachments present the same. Following a trauma, symptoms occur "immediately or within several days. Blood cells from a torn retina may take hours or a few days to permeate the vitreous and cause symptomatic floaters or "veil"; however, sometimes patients disregard symptoms or may be conscious of them only much later" (Hoogewood et al., 2016, p. 158).

Some retinal tears can take anywhere from hours to months to progress to retinal detachment, but most tears if detected early can be treated with laser or cryotherapy in the office to prevent progression (Rafieetary et al., 2017). "Horseshoe tears should be treated immediately, while round holes are less urgent" (Rafieetary et al., 2017, p. 82). Untreated RD involving just one quadrant can progress over time involving multiple quadrants of the retina. As RD becomes more complex, the greater the chance of macular involvement. "With macular involvement, the photoreceptors in the site of acute vision can be permanently damaged because the fovea is devoid of blood supply, and total loss of vision may occur if reattachment is not done promptly", preferably within 24hrs (Coronica, & Murty, 2015, p.9). The more complex the RD, the more invasive the surgical treatments become to ensure the retina is reattached.

According to Roberts (2017) the options for surgical repair to restore vision and prevent progression of further damage are:

- Laser photocoagulation produces scarring around a tear.
- Cryosurgery freezes and seals tear.
- Vitrectomy removes vitreous fluid and is replaced with either a gas bubble or a silicon bubble that acts as a tamponade to reattach the retina.
- Pneumatic retinopexy is utilized for RD that are less invasive. The tear is froze with cryopexy and a gas bubble is injected.
- Scleral buckling is placement of a rubber or plastic ring around the outer edge of eye to relieve tension on the retina.

Managing PVR scar tissue and epiretinal membrane (ERM) can be challenging because those membranes could lead to traction of retina and subsequently cause detachment. After surgical repair, these patients need to be monitored very closely for complications that should be managed promptly. They should have retinal post operative appointments very frequently to assess healing, intraocular pressure, scar tissue formation and visual acuity. If PVR or ERM are detected, it can be treated with eye drops and corticosteroids to prevent progression of PVR. "A randomized controlled trial of systemic steroids for prevention of epiretinal membrane following primary RD repair showed a lower rate of ERM" (Brady, Baltimore, & Kaiser, 2015, p. 3). Another experiment "found a 50% reduction in the incidence of RD and 64% reduction in neovascularization when triamcinolone was injected intravitreally" (Sadaka & Giuliari, 2013, p. 1328). Without prompt, comprehensive treatment these cases could result in the patient being permanently blind.

Implications for Nursing

Early diagnosis is a key aspect to ensure vision is restored promptly. Once any retinal abnormality is detected by an advanced practice nurse, prompt referral to an ophthalmologist or retinal specialist is imperative to get treatment expedited. RD can present with vague symptoms and it is important not to ignore theses symptoms as inconsequential. Roberts (2017) depicts the disheartening challenges a patient experienced for 7 months before ultimately being diagnosed with RD. This patient complained of classic RD symptoms that progressed. He was evaluated on five occasions and his symptoms were deemed insignificant. Suddenly, the day after an exam for new glasses, "the patient began to notice a "shower" of "floaters" in the right eye" and a blackened area that began spreading (Roberts, 2017, p. 70). This patient went for surgery the next morning to repair retinal detachment that was accompanied by several retinal tears. Diligence and patient education can be important when it comes to something as sensitive as a patients vision. Advanced practice nurses should educate their patients to call if symptoms progress and not to ignore those symptoms as things can change quickly.

Advance practice nurses need to be advocates for their patients. RD can be challenging to diagnose, especially in cases that present as a result of a trauma. Another complicated RD case reviewed by Bedgood, Rand & Major (2015) detailed a 10 year old who suffered a concussion following a head on collision with a fellow baseball player. The primary focus of the case was to monitor for neurological changes. Subsequently a month later, the child presented for a routine ophthalmologic exam with complaints of flashes of light, headaches, difficulty reading and was diagnosed with RD. "The overlap of visual disturbances in retinal detachment with that often seen in concussion can make it easy to overlook" (Bedgood, Rand, & Major, 2015, p. 27).

There are additional opportunities for advanced practice nurses to educate patients. According to Coronica & Murty (2015) risk factors for RD are:

- Lattice degeneration of retina or signs of retinal thinning.
- Myopia
- Diabetic retinopathy
- History of cataract surgery.
- Individuals older than 40.

According to Roberts (2017) patients should be educated on the following possible complications:

- Bleeding
- Infection
- Cataract
- Glaucoma
- Recurrence of RD is more likely, especially in unaffected eye.
- PVR or ERM
- Vision may be blurry, sensitive to light and depth perception could be altered.

Patients need to be educated on lifestyle changes and preventing recurrence of RD following repair. Roberts (2017) detailed lifestyle changes after RD as:

- Bed rest for 1 week (face down or side lying only dependent on doctor orders).
- No physical activity for 6-8 weeks including lifting, pushing or pulling.
- No driving for 2 weeks.
- No riding a lawn mower for 8 weeks.
- No contact sports ever.
- Wear protective eye wear such as glasses.

Conclusion

RD can be a devastating and life altering diagnosis. The fear of the unknown prognosis could touch many lives. Routine ophthalmic exams should never be overlooked as being unnecessary, especially if patients present with symptoms. Unfortunately, retinal detachment presents in many ways and if left untreated it could prove detrimental. Educating advanced practice nurses on subtle signs of RD could help salvage the vision of many patients.

In terms of prognosis, "vision should return with a few weeks following treatment. Sometimes it is not possible to reattach the retina, and the individual's vision will be lost" (Roberts, 2017, p. 74). Less complicated cases, could have better visual outcomes. Vision may not stabilize for one year following repair of RD (Roberts, 2017).

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Additional Resources

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