Mastering Retinal Tears Management

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Retinal tears are a common occurrence. An accurate and time critical diagnosis is imperative to save sight.

Retinal tears are commonly encountered in day to day clinical practice. As optometrists are often the first clinicians to examine these patients, an accurate and time critical diagnosis is imperative. Prompt treatment, often involving retinal laser photocoagulation can, in the great majority of cases, prevent ensuing retinal detachment and greatly improve the visual prognosis.

Perhaps even more common are patients presenting with symptomatic posterior vitreous detachment (PVD). The questions we find ourselves asking are: what is the risk of a retinal tear? which retinal tears may progress to retinal detachment? and how can we predict this?

This article recommends factors for consideration when assessing patients with retinal symptoms and when assessing a retinal break.

BUILDING ON WHAT WE KNOW

Retinal tears can develop at any age, but tend to occur more commonly in the elderly. This is believed to be due to the increased incidence of PVD in older individuals; ie. approximately 60 per cent of patients with PVD are over 65-years of age.[1] Up to 26 per cent of these patients will present with a retinal tear. The chances of developing a retinal tear following the initial presentation of an acute PVD is much lower, in the order of 2 per cent to 5 per cent.[2]

The potential sequelae of PVD are outlined in Table 1.

Retinal tears are also more likely to develop in individuals with pre-disposed risk factors.

The symptoms of a retinal tear and a PVD are the same. Retinal tears can cause new floaters, a sudden shower of black dots and cobwebs. Constant rather than intermittent photopsia is often reported, and described as more intense with eye movement. Floaters from a PVD, on the other hand, are usually much more noticeable in strong light, may be associated with intermittent photopsia and may fade over time.

EMERGING RISKS IN TODAY'S PATIENTS

As a retina specialist, I am often asked to give an opinion on the 'safety' of refractive surgery for high myopia.

In essence, we must remember that a myopic eye still maintains a fragile retinal anatomical structure. Therefore the risks of a retinal tear and other retinal complications are somewhat higher than the emmetropic eye, but may differ slightly depending on the type of refractive surgery.

Corneal Refractive Surgery

A myopic eye with chorio-retinal thinning and/or breaks in Bruch's membrane are not ideal candidates for this surgery as the risk of sub-macular haemorrhage is high. As far as retinal detachments are

Table 1

POTENTIAL COMPLICATIONS OF AGE-RELATED POSTERIOR VITREOUS DETACHMENT	
Macular Pathology	Peripheral Retinal Pathology
Vitreo-macular traction	Retinal tear
Lamellar macular hole	Vitreous hemorrhage
Full thickness macular hole	Rhegmatogenous retinal detachment
Vitreo-papillary traction	Retinal or optic disc Hemorrhage

Table 2

RISK FACTORS FOR RETINAL TEARS AND/OR DETACHMENT
Retinal detachment or retinal break in the fellow eye
Previous ocular surgery
Myopia
Peripheral lattice degeneration
Familial history of retinal detachment
Inherited syndromes: Marfans, Sticklers, Ehlers Danlos

concerned, a number of larger studies reported the incidence to be present but low (0.03 per cent to 0.06 per cent at nine months) surmising that the refractive surgery alone doesn't increase the risk more than if the patient had not undergone surgery.[3]

The rate of retinal detachments after lens-based refractive surgery however, is significantly higher. Neuhann et al. studied 2,356 eyes in 1,500 myopic patients and found an incidence of retinal detachment between 1.5 per cent and 2.2 per cent, the majority occurring in the longer term at the five year follow up.[4] Additionally, the cumulative risk of retinal detachment after cataract surgery and intraocular lens implant has been reported to be up to 2.3 times the natural occurrence, that is one in 10,000 per year.[5] The risk factors for development of a retinal detachment following cataract surgery were found to be younger age, male gender, long axial lengths and surgical complications at the time of cataract surgery, in particular posterior capsular breach.

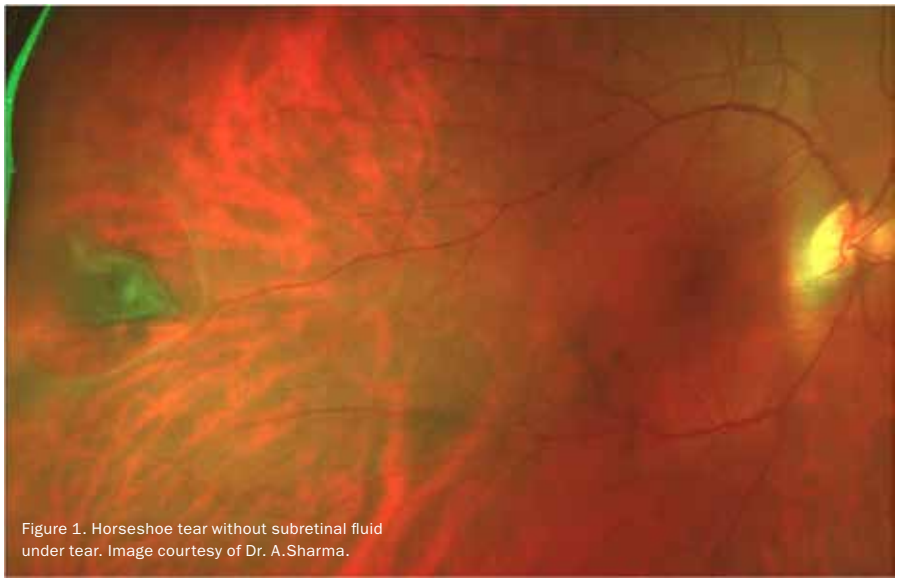

Figure 1. Horseshoe tear without subretinal fluid under tear. Image courtesy of Dr. A.Sharma.

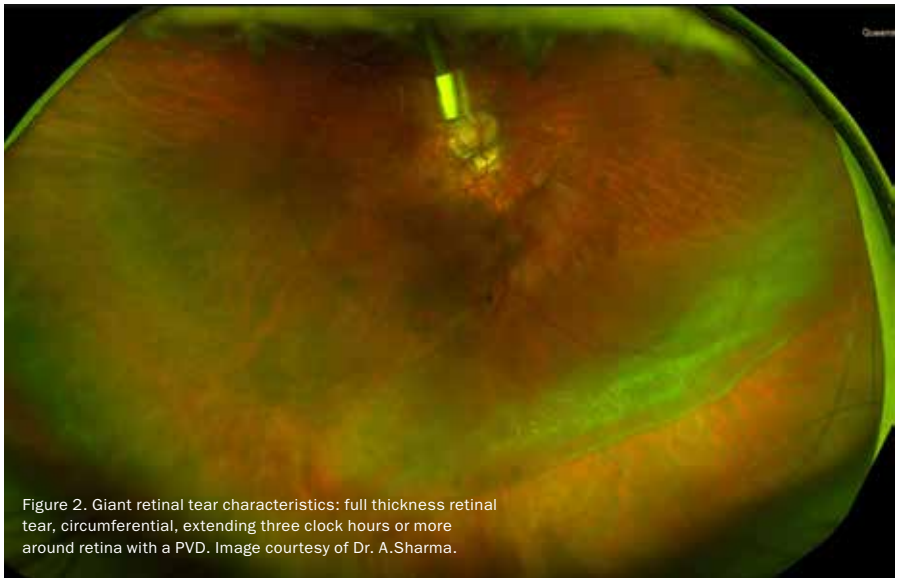

Figure 2. Giant retinal tear characteristics: full thickness retinal tear, circumferential, extending three clock hours or more around retina with a PVD. Image courtesy of Dr. A.Sharma.

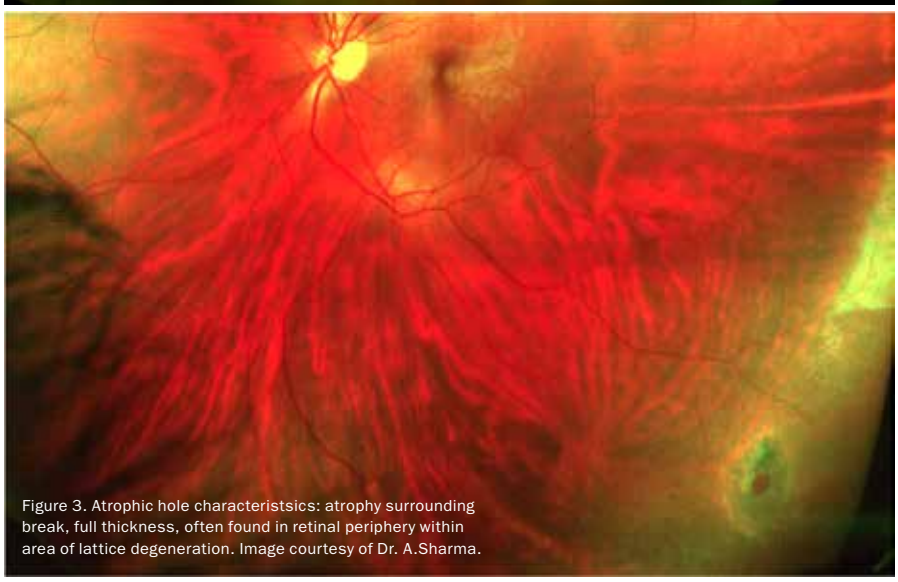

Figure 3. Atrophic hole characteristsics: atrophy surrounding break, full thickness, often found in retinal periphery within area of lattice degeneration. Image courtesy of Dr. A.Sharma.

With a large number of our young patients today electing for refractive surgery, we do need to be aware of these statistics in order to counsel our patients appropriately and offer close follow up post-operatively.

HOW TO ASSESS: MAKING THE MOST OF YOUR SKILL SET

When examining patients at the slit lamp, it is important to examine the anterior segment carefully. Vital clues to a retinal tear can exist here, including pigmented cells in the anterior vitreous from liberated retinal pigment epithelium (RPE) cells. This is associated with a 90 per cent risk of retinal break.[6] Other important signs are the presence of vitreous haemorrhage and whether the patient is phakic or pseudo-phakic. Moving onto the posterior segment examination, pay careful attention to the vitreous: look for an obvious PVD and any haemorrhages – 50 to 70 per cent of vitreous haemorrhages associated with a PVD are also associated with a concomitant retinal tear.[7]

Characteristics of the retinal tear, summarised in table 4, are also important to focus on. This will ultimately make the difference between tears that can be managed conservatively and those warranting treatment.

In examining the peripheral retina, there is no substitute for an indirect ophthalmoscope or three-mirror contact fundus lens. This will enable better visualisation of retinal changes, including subtle tracking of sub retinal fluid or the transparency of a retinoschisis, lattice degeneration and atrophic retinal breaks.

There are four common types of tears to look out for.

Operculated Tears

Seen as a whitish, disc-shaped floater over a well circumscribed retinal tear or hole, an operculated tear moves with eye movement as it is generally attached to the vitreous. Operculated breaks usually do not progress to retinal detachment if there is no traction. Therefore, determining the presence of traction or symptoms of flashes and floaters in these cases becomes important in guiding treatment.

Horseshoe Tears

This U-shaped tear develops as a result of vitreal traction. The apex of a horseshoe

Figure 4. Degenerative retinoschisis: transparency, visibility of choroidal vessels beneath, commonly in inferotemporal location. Image courtesy of Dr. A.Sharma.

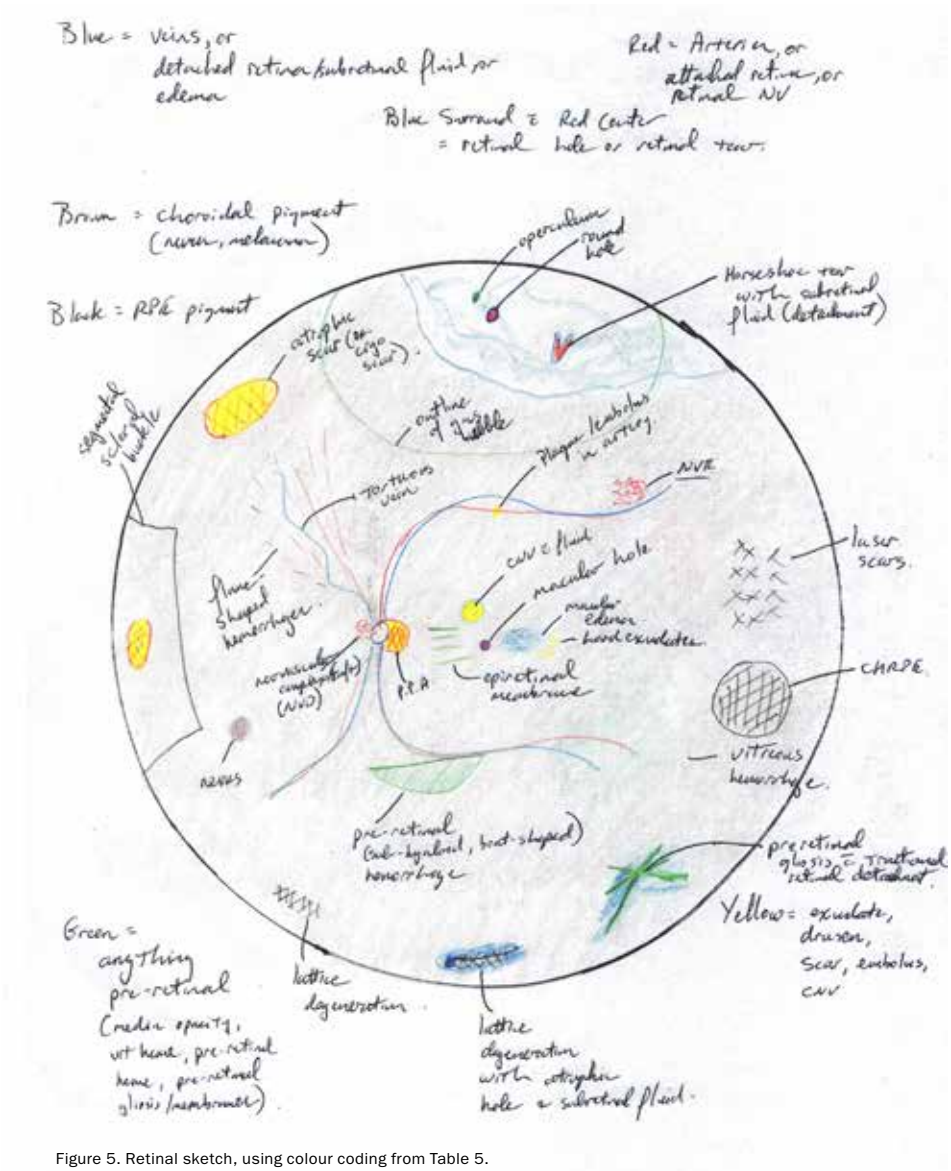

Figure 5. Retinal sketch, using colour coding from Table 5. Reproduced with permission from www.shortwhitecoats.com

tear usually points toward the posterior pole and the base points to the anterior retina. Approximately 50 per cent of patients with horseshoe tears will develop a detachment.

Giant Retinal Tears

Giant retinal tears are full-thickness neurosensory retinal tears that extend around the retina for three or more clock hours in the presence of a PVD.

Atrophic Retinal Holes

These full-thickness retinal breaks are commonly round-shaped with or without surrounding pigment and often exist in areas of lattice degeneration. Associated pigment is a sign of chronicity and carries a very low risk of developing a retinal detachment, however if there is evidence of vitreal traction, the risk of progression increases.

The OCT can be a valuable tool for evaluating the stage of the PVD, as well as any macula involvement. B-scan ultrasonography is invaluable in assessing the fundus in the presence of dense cataract or vitreous haemorrhage.

Having made the diagnosis of retinal pathology, it is imperative to make a salient recording of your findings both as a communication means and for medico-legal purposes. A retinal photograph may not always be possible considering the majority of tears are in the far periphery. Even if it can be captured on camera, the areas to focus on simply may not be highlighted as well as is possible with a hand or e-drawing.

DECISION MAKING: RETINAL TEAR OR RETINOSCHISIS?

Retinoschisis, which results from a splitting between the outer plexiform and inner nuclear layers of the retina, is often mistaken for retinal detachment.

Table 3 (next page) summarises the differences, but this can occasionally be difficult to elicit on examination.

Clinically, degenerative retinoschisis appears as a smooth, transparent elevation,

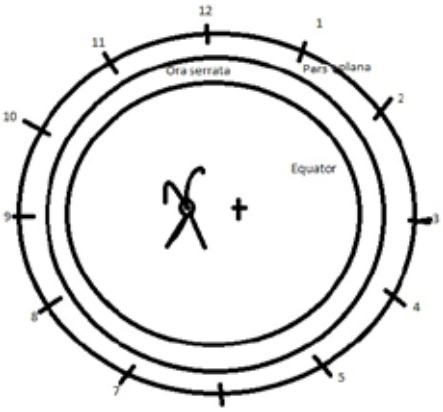

Figure 6. This e-drawing represents a typical retinal sketch outline: three concentric circles representing: 1. the quator; 2. ora serrata; and 3. pars plana. It should also include 12 clock hour markings.

Table 3

CHARACTERISTICS OF A RETINA TEAR, WHICH INCREASE THE RISK OF RETINAL DETACHMENT
Horseshoe retinal tear
Cuff of sub-retinal fluid under retinal break
Superior-temporal location
Persistent vitreoretinal traction
Retinal tear in area of lattice at its edge
Persistent symptoms of photopsia and/or floaters

Table 4

DIFFERENTIATING BETWEEN RETINOSCHISIS AND RETINAL DETACHMENT	
Characteristics of degenerative retinoschisis	Characteristics of retinal detachment
Commonly infero-temporal or supero-temporal location	Can occur at any location
Commonly bilateral	Often unilateral
Smooth, non-circumscribed elevation of retina	Well demarcated retinal elevation
Non-mobile	May be mobile with eye movement
Choroidal vessels easily seen	Chordal vessels absent

Table 5. Adapted from www.shortwhitecoats.com

COLOUR CODING FOR RETINAL DRAWINGS
RED: Normal retinal colour; darker red indicates a retinal tear
BLUE: Indicates sub-retinal fluid, macular edema or frank retinal detachment
BLACK: Indicates alterations in RPE: lattice, chorio-retinal scars, laser treatment etc
YELLOW: Indicates exudative process; drusen, choroidal neovascular membranes, retinal scars
GREEN: Indicates anything in the pre-retinal space; epiretinal membrane, gliosis, pre-retinal hemorrhage

often with visibility of the underlying choroidal vasculature.

Often this is better appreciated with an indirect ophthalmoscopy. In comparison, retinal detachments are more well demarcated, not transparent and choroidal details are often lost. In some cases a retinal detachment can be seen to be mobile while a retinoschisis is often stationary. The outstanding feature of a chronic retinal detachment is often a pigment demarcation line or 'watermark' defining the junction between the attached and detached retina. This is not seen in a retinoschisis as the pathology is not associated with changes in the outer RPE layer.

Combined retinoschisis and retinal detachment occurs in up to 6 per cent of eyes that have retinoschisis.[8] If suspicious of this on examination, the hallmark features to look for are retinal holes within the area of retinoschisis. The typical appearance is a hole with rounded margins and rolled edges. They may be multiple in number.

While a large majority of these combined cases will progress to surgery, in a published natural history series of 218 eyes (123 patients) with asymptomatic retinoschisis, none of the cases progressed at nine-year follow-up.

Degenerative retinoschisis without retinal detachment, on the other hand, is generally a benign condition and can be followed at six-monthly intervals.[9]

> "Combined retinoschisis and retinal detachment occurs in up to 6 per cent of eyes that have retinoschisis"

AVOIDING PITFALLS

The greatest opportunity for prevention exists in the hours to weeks following PVD. The initial evaluation of a patient with an acute PVD includes a careful case history. Symptoms may carry a greater propensity towards the development of a retinal break. Asymptomatic new retinal breaks lead to detachment in about 5 per cent of cases but symptomatic new retinal breaks progress to detachment in 50 per cent of cases.[10] Symptomatic retinal breaks may be surrounded with laser or cryogenic burns to create a chorioretinal scar that prevents fluid access into the subretinal space. This treatment is over 95 per cent effective in preventing progression of retinal tear to retinal detachment.[11]

Most patents with symptomatic PVD may be managed conservatively with regular follow up providing that vision is unchanged; there is an absence of pigment in the anterior vitreous; and there is no retinal tear or detachment present on a well dilated retinal fundus exam.

It is always in the best interest of both the patient and clinician to inform our patients well about what symptoms to expect and where or who to contact for immediate review, should their symptoms change. Their sight depends on your confidence.

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