

# Retinal dialysis: are we missing diagnostic opportunities?

BJ Vote and AG Casswell

CLINICAL STUDY

## Abstract

**Aims** To review medical records of those patients managed by our department for retinal dialysis, and establish whether the initial assessment had been adequate to make the diagnosis. That is, to establish if an adequate initial assessment had been performed that would reasonably exclude the likelihood of retinal dialysis and other trauma-related sequelae such as angle recession.

**Methods** A retrospective review was made of all patients managed for retinal dialysis at Sussex Eye Hospital between 20 March 1997 and 20 September 2002 (66 months). In addition to general demographic data, surgical management and outcome, patient files were reviewed for history of trauma, prior ophthalmic review, and whether such review included documentation of peripheral retinal examination and gonioscopy.

**Results** A total of 580 primary procedures were performed for retinal detachment during the review period, of which 32 eyes of 29 patients underwent surgery for retinal dialysis (6%). There were 21 male and eight female patients, with a history of trauma obtained in 55% (17 eyes, 16 patients). Of the 16 patients with prior trauma, nine had undergone prior ophthalmic review at the time or soon after their trauma; however, only 2 (22%) had documented evidence of indented peripheral retinal examination. Only one (3%) patient in the whole series had documented gonioscopy.

**Conclusions** Patients with history of trauma often present at the time or soon after their injury (eg hyphaema, orbital fractures). Thus, an opportunity exists to screen patients for known sequelae of trauma such as retinal dialysis and angle recession. It was disappointing to learn that this opportunity was not always being utilized, with some patients consequently developing macula-off

## retinal detachments and potential for reduced visual outcome.

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**Keywords:** retinal dialysis; blunt trauma; audit indentation; gonioscopy

## Introduction

A retinal dialysis is a tear in the retina whose anterior edge is at the ora serrata and whose posterior edge is attached to the vitreous base.<sup>1</sup> The majority of patients presenting for surgical management of retinal dialysis are known to have a significant past history of trauma to the affected eye.<sup>1–6</sup>

Blunt contusion trauma to the globe is also recognised to cause anterior segment trauma especially angle recession, which can lead to ocular hypertension and glaucoma.<sup>5,7–10</sup>

Patients with posterior segment pathology frequently have normal visual acuity, and although retinal and drainage angle pathology secondary to blunt trauma is more likely in patients presenting with hyphaema, the severity of anterior segment injury is not a good predictor of posterior segment damage.<sup>10</sup> Thus, early peripheral retinal and gonioscopic examination has been previously identified as important in preventing morbidity after ocular trauma, with visual prognosis worse in patients who escape initial examination or are lost to follow-up.<sup>5,9–11</sup>

We were interested in reviewing whether patients managed in our unit for retinal dialysis had undergone prior ophthalmic review, and if so, whether an adequate initial assessment had been performed that would reasonably exclude the likelihood of retinal dialysis or angle recession (ie indented peripheral fundus examination and gonioscopy).

Department of  
Ophthalmology  
Sussex Eye Hospital  
Brighton, UK

Correspondence:  
AG Casswell  
Department of  
Ophthalmology  
Sussex Eye Hospital  
Brighton BN2 5BF, UK  
Tel: +44 1273 606126  
Fax: +44 1273 693674  
E-mail: a.casswell@  
mistral.co.uk

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**Table 1** Summary of retinal dialysis patient data

Patient no.	Sex	Age (years)	Side	Location	Trauma	Mechanism (all vs affected eye)	Time from injury to dialysis presenting	Prior ophthal. review	If trauma history but not seen prior-reason given by patient	Clinical problems seen at prior review/initial injury
1	M	27	L	Temp	No			No		
2	F	21	R	Sup-temp	No			No		
	F	21	L	Inf-temp	No			No		
3	F	20	R	Inf-temp	No			Yes		
4	F	35	R	Inf-temp	No			Yes		
5	M	34	L	Sup-temp	No			No		
6	M	38	R	Inf-temp	No			Yes		
7	F	33	L	Inf-temp	No			No		
8	M	49	R	Inf-temp	No			No		
9	M	49	R	Inf-temp	No			No		
10	F	25	R	Inf-temp	No			Yes		
11	M	40	R	Inf	No			Yes		
12	M	39	L	Inf-temp	No			No		
13	M	16	L	Inf-temp	No			No		
14	M	48	L	Inf-temp	No			No		
	M	48	R	Inf-temp	Yes	Squash	9 years	No	Vision unaffected	
15	M	38	L	Inf-temp	Yes	Not specified	1 month	Yes		Normal initial examination
	M	38	R	Inf-temp	Yes	Not specified	1 month	Yes		Normal initial examination
16	F	50	L	Inf-temp	Yes	Fell on to skipole	6 months	No	Bruised eye and cheek but normal vision next day (was on holiday)	
17	M	25	L	Inf-temp	Yes	Hockey ball	1 month	Yes		Hyphaema, mydriasis, lid swelling/cut
18	M	29	L	Inf-temp	Yes	Punch	1 month	No	Vision unaffected	
19	M	21	L	Inf-temp	Yes	Punch (boxer)	2 months	Yes		Vitreous pigment seen, normal slit lamp fundal examination
20	M	22	L	Inf	Yes	Explosion	0 months	No	Seen at presentation	Conj lac'n, commotio macula, inf angle recession, choroid rupture hyphaema
21	M	30	R	Sup-nasal	Yes	Assault	1 month	Yes		Microhyphaema, IOP40mmHg
22	M	35	L	Nasal	Yes	Ball-bearing	3 weeks	Yes		Conjunctival laceration
23	M	42	R	Inf-temp	Yes	Kick (rugby)	28 years	Yes		Dialysis followed for 2 years without treatment
24	M	22	L	Inf-temp	Yes	Alleged assault	5 years	No	Drug addict did not seek care after injury	
25	M	15	L	Sup-nasal	Yes	Severe blunt-unspecified	1 month	Yes		Traumatic mydriasis, severe macula commotio
26	F	41	L	Inf-temp	Yes	Golf club	2 years	Yes		Normal initial examination
27	M	19	L	Inf-temp	Yes	Kick (rugby)	2 years	No	Normal vision but black eye	
28	M	36	L	Sup-temp	Yes	Alleged assault	1 month	Yes		Scleral lac'n/rupture sup-temp circum, soft eye deep AC, hyphaema, vit haem
29	F	58	R	Inf-nasal	Yes	Facial/orbital injuries after RTA	3 weeks	Yes		Total hyphaema, subluxed lens, vit haem, incr IOP

**Methods**

A retrospective review was made of all patients managed for retinal dialysis at Sussex Eye Hospital between 20 March 1997 and 20 September 2002 (66 months). Patients were identified from a prospectively maintained surgical

database and subsequent case record analysis performed. General demographic data and surgical management and outcome (visual acuity and retinal reattachment) data were obtained. In addition, patient files were reviewed for: history of trauma; prior ophthalmic review; whether such review included documentation of

Table 1 (continued)

<i>Indented peripheral retinal examination</i>	<i>Gonio-scopy</i>	<i>Ocular hypertension requiring treatment at final follow-up</i>	<i>Macula-on</i>	<i>Presenting VA</i>	<i>Final VA</i>	<i>Follow-up (months)</i>	<i>First procedure notes</i>	<i>Further proc notes</i>	<i>Successful reattachment</i>
No	No	No	No	6/24			Cryo/276/C3F8		Yes
No	No	No	No	6/60	6/60	1	Cryo/276	Vity/cryo/276/SF6	Yes
No	No	No	Yes	6/9	6/6	1	Cryo		Yes
Yes	No	No	Yes	6/6	6/9	57	Cryo/240/276/ext drain	Laser barrier	Yes
No	No	No	No	6/24	6/18	13	Cryo/276/ext drain		Yes
No	No	No	Yes	6/6	6/6	56	Cryo/276		Yes
Yes	No	No	Yes	6/6	6/5	2	Cryo/276/ext drain		Yes
No	No	No	No	CF	CF	3	Cryo/276/ext drain		Yes
No	No	No	Yes	6/6	6/6	23	Cryo/276/ext drain/SF6		Yes
No	No	No	Yes	6/18	6/12	3	Cryo/276/ext drain/SF6	Cryo/276/ext drain	Yes
Yes	No	No	Yes	6/6	6/6	2	Cryo/277		Yes
No	No	No	No	6/18	6/9	5	Cryo/277	277/240/cryo/ext drain	Yes
No	No	No	Yes	6/5	6/6	13	Cryo/277/ext drain		Yes
No	No	No	No	6/36	6/18	19	Cryo/5mm sponge		Yes
No	No	No	Yes	6/9	6/6	33	Cryo/276/ext drain		Yes
No	No	No	Yes	6/6	6/5	33	Cryo/276/ext drain		Yes
No	No	No	Yes	6/18	6/5	6	Cryo/276/ext drain		Yes
No	No	No	Yes	6/9	6/5	6	Cryo/276		Yes
No	No	No	Yes	6/9	6/12	2	Cryo/240/276/ext drain		Yes
No	No	No	Yes	6/6	6/5	13	Cryo		Yes
No	No	No	No	HM	6/24	30	Cryo/276		Yes
No	No	No	Yes	6/9	6/9	1	Cryo/276		Yes
No	Yes	No	Yes	6/24	6/12	3	Cryo/276		Yes
No	No	Yes	Yes	6/24	6/24	3	Cryo/276	Cryo/277/240/ext drain	Yes
No	No	No	Yes	6/5	6/6	1	Cryo/276/ext drain/SF6	Laser barrier	Yes
Yes	No	No	Yes	6/5	6/6	16	Cryo/276/ext drain		Yes
No	No	No	No	CF	CF	1	Cryo/276/ext drain	Vity/LIO/C3F8 gas	Yes
Yes	No	No	Yes	6/60	6/36	7	Cryo/276/ext drain/SF6		Yes
No	No	No	No	CF	6/12	1	Cryo/277		Yes
No	No	No	No	6/18	6/18	15	Cryo/sponge	Remove sponge	Yes
N/A as primary repair of open eye required	No	No	Yes	6/60	6/6	28	Vity/cryo/oil/276	Phaco + IOL/remove OIL	Yes
No	No	Yes	Yes	PL	HM	35	Vity/laser/lensectomy	Cryo/276	Yes

indented peripheral retinal examination and gonioscopy; the time between their initial ophthalmic review and presentation with dialysis; and any evidence of fellow eye pathology. Indented peripheral retinal examination was considered to have occurred if either documented as such in the notes, if comment made on the state of ora serata (normal or otherwise), or if comment made indicating presence/absence of dialysis. The absence of documentation regarding peripheral retinal state was considered as evidence that no indented examination had occurred.

**Results**

A total of 580 primary procedures were performed at Sussex Eye Hospital for retinal detachment during the review period, of which 32 eyes of 29 patients underwent surgery for retinal dialysis (6%) (see Table 1 for summary of patient data). There were 21 male and eight female patients with mean age of 33 years (male subjects: 32 years; female subjects: 35 years), and mean follow-up of 13.5 months (range 0–57). A history of trauma was

obtained in 55% (17 eyes, 16 patients), 12/19 left eyes and 5/13 right eyes. Three patients underwent bilateral procedures for retinal dialysis, two of which gave a history of trauma. Of the 16 patients with a history of trauma, 10 had undergone prior ophthalmic review at the time or soon after their trauma. One patient (no. 28) had required primary repair of globe rupture elsewhere, and the issue of prior indented peripheral retinal examination was considered not applicable in this case. All 9 remaining patients had been reviewed in our ophthalmic casualty unit, initially by either senior house officers or staff grade specialists. Each of these patients had been seen on at least one occasion between presenting with their trauma and presenting with retinal detachment due to dialysis; however, only two (22%) had documented evidence of indented peripheral retinal examination. Only one (3%) patient managed for retinal dialysis had documented gonioscopy performed at any time in their management. Elevated IOP requiring medical control was noted in two (6%) patients.

All nasal dialyses were associated with trauma, while trauma was reported in only 50% for dialyses at other sites. Inferiorly and/or temporally was the commonest dialysis site, which is in keeping with the most vulnerable site for orbital trauma. Interestingly the average age of male patients with trauma was 29 years ( $n = 13$ ) and without was 38 years ( $n = 8$ ) while the opposite was shown for female patients with average age for trauma 50 years ( $n = 3$ ) and no trauma 27 years ( $n = 5$ ). There were 10 macula-off and 22 macula-on retinal detachments at presentation, and reattachment procedures comprised: 28 conventional (external) procedures (external drainage in 14 or 50%), one vitrectomy and one combined vitrectomy/conventional procedure, and two cryotherapy only (asymptomatic fellow eyes). Final retinal reattachment was 100%; however, eight eyes (25%) required further procedures (two barrier laser, two vitrectomy, four further conventional procedures). All 'macula-on' patients retained visual acuity better than or equal to presentation, with 19/22 (86%) seeing 6/12 or better. 'Macula-off' patients also did well with all patients ending up better than or equal to presenting acuity and 60% regaining 6/24 or better vision; however, two patients with longstanding detachments remained CF/HM visual acuity despite successful reattachment surgery. With the exception of one patient, follow-up data was complete on all patients.

## Discussion

Nonpenetrating or blunt ocular trauma, orbital trauma and systemic trauma may cause a variety of anterior and posterior segment abnormalities.<sup>3</sup> While trauma is

common, fortunately retinal tear and detachment due to trauma is uncommon.<sup>1</sup> Because of the low prevalence of retinal detachment after trauma, an incomplete/inadequate examination might seem to rarely result in an unfavourable outcome. Such an approach, however, is not good practice, as every patient visit is an opportunity to exclude serious pathology and prevent adverse outcomes for patients. However, this requires that appropriate examinations based on current scientific knowledge be tailored to the clinical situation.<sup>2,5,12,13</sup> Thus, our goal in this review to determine whether established gold standard examinations in trauma patients were being satisfactorily performed in our department.

Retinal dialyses account for approximately 75% of retinal breaks after trauma and are present in up to 85% of traumatic retinal detachments.<sup>5,13</sup> Clinical examination and histopathologic evidence suggests that most retinal dialyses result from blunt ocular trauma,<sup>4,12</sup> although a definite history of trauma is only obtained from about 60% of patients.<sup>14</sup> Our series supports previous findings that a history of trauma is more likely to be obtained in patients presenting with superior and/or nasal dialyses (~90%) than patients with inferior and/or temporal dialyses (~56%).<sup>2,14</sup> This possibly reflects that a greater force is necessary to cause a dialysis superonasally with compression of the globe against the superonasal orbit, and consequently an injury more likely to be remembered. Whereas less force may be necessary to induce the more commonly found dialysis inferotemporally, where the globe occupies a more exposed position within the orbit: such injuries might therefore be easily forgotten or denied. Genetic weakness in the inferotemporal quadrant is not an important factor in the development of most retinal dialyses, which, like our group, frequently have associated ocular trauma.<sup>4,12,14</sup> Whether trauma is the underlying cause or just precipitant in inferotemporal cases is less clear as lattice degeneration or some other nongenetic, developmental anomaly at the ora serrata has been implicated in some idiopathic and bilateral cases.<sup>2,12,15</sup> Bilateral dialyses can occur in about 10% of patients, as with our group, although previous reports suggest that there is less of an association with underlying trauma in this group.<sup>2</sup> Thus, although trauma and nongenetic developmental anomaly are the predominant associations of retinal dialysis, there is a definite subpopulation in which genetic predisposition is present. When a patient with bilateral nontraumatic retinal dialyses is discovered, other family members should be examined.<sup>16,17</sup> Furthermore, the frequency of bilateral disease mandates examination of the fellow eye, as asymptomatic fellow eye disease may exist and may be amenable to simple retinopathy.

It has been suggested that many of those cases of retinal detachment due to dialyses with no reported trauma, reflect forgotten or denied trauma,<sup>14</sup> and that women acknowledge trauma less frequently than men, possibly because of a sociologic tendency for women to deny physical abuse.<sup>2</sup> Our own results also revealed women less frequently reported trauma (38 vs 57%) and interestingly trauma was only reported by older women.

Given the strong association of retinal dialysis with trauma, not only should patients presenting with anterior segment trauma such as hyphaema be examined for posterior segment injury, it is prudent to examine patients presenting with retinal dialysis for other sequelae of trauma. Zion and Burton<sup>2</sup> studied 196 retinal dialysis patients and found 12% had ocular hypertension exceeding 22 mmHg and 16% had angle recession. Angle recession is more easily diagnosed by gonioscopy in the first few weeks after trauma as trabecular lesions tend to scar and can become much more difficult to recognize over the ensuing weeks.<sup>9</sup> Recognition of angle recession and management of ocular hypertension is important as about 5% of patients with angle recession will develop glaucoma.<sup>8</sup> It was an interesting fact to find that only one patient of our 29 (3%) had documented gonioscopy at any time at or after their presentation.

While necrotic retinal breaks after trauma commonly present with immediate retinal detachment, retinal dialyses often have delayed presentation.<sup>5</sup> Thus, even though dialyses are typically present at or soon after trauma, the mean time to presentation is 8 months after trauma.<sup>5</sup> Previous reports suggest visual prognosis is good when retinal break or detachments were diagnosed within 6 weeks of injury. However, those patients who escaped initial retinal examination (either by failed presentation, or inadequate retinal examination) or were lost to follow-up had a less favourable visual outcome.<sup>5</sup> External procedures (scleral buckling techniques) have high success and typically low PVR rates,<sup>6</sup> although some cases may be amenable to simple retinopexy (cryotherapy or laser). Pneumatic retinopexy offers a less-invasive alternative to scleral buckling surgery in certain cases of superior retinal dialyses.<sup>18</sup>

Our retinal reattachment rates and visual outcomes were comparable with previously reported studies.<sup>5,6</sup> Unfortunately, a significant percentage of retinal dialysis patients present with chronic inferior retinal detachments with demarcation lines, retinal cysts, peripheral microcystoid degeneration, and yellow-white vitreous opacities,<sup>15</sup> and remain asymptomatic until their macula detaches. Unfortunately, visual prognosis in the macula-off setting is worse. Therefore, ophthalmologists can help prevent delayed consequences of trauma by including gonioscopy and peripheral retinal examination (indented scleral examination) in all cases of blunt trauma.<sup>10,11</sup>

Our audit provided the catalyst for a review in our education process seeking assimilation of indented peripheral retinal examination and gonioscopy (by suitably experienced ophthalmologists) into routine management practice of patients presenting to our ophthalmic casualty unit with a history of blunt trauma. It also reinforced the need to document accurately examinations performed and clinical findings. In the era of increasing medicolegal claims, the failure to adequately document that such examinations have occurred, implicates an incomplete examination, even when a comprehensive examination might have taken place. It is hoped these process changes will positively impact the results of similar future audits in our department.

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