

# Spontaneous cataract absorption in patients with leptospiral uveitis

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## Abstract

**Aims**—To describe the occurrence of spontaneous cataract absorption in patients with leptospiral uveitis.

**Methods**—The records of patients with seropositive leptospiral uveitis seen in the uveitis clinic at Aravind Eye Hospital between January 1994 and December 1997 were reviewed retrospectively.

**Results**—During the 4 years of the study, 394 eyes of 276 patients with seropositive leptospiral uveitis were identified. Of these, 54 eyes (13.7%) of 41 patients (14.9%) had a final visual acuity of 20/40 or worse attributable to cataract formation. Of these 54 eyes, 41 eyes (75.9%) had visually significant cataract on their first visit to the uveitis clinic, and 13 eyes (24.1%) were noted to have cataract 1–6 months after presentation. Spontaneous absorption was observed in 10 eyes (18.5%) of eight patients (19.5%), and occurred from 6 weeks to 18 months, with a median of 5 months, after the onset of cataract. Of 12 035 consecutive, non-leptospiral, non-traumatic, uveitic, control patients seen during the same 4 years of the study, none showed spontaneous cataract absorption.

**Conclusion**—Spontaneous cataract absorption occurs in a significant number of patients with leptospiral uveitis, and appears to be unique to this form of non-traumatic uveitis.

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Leptospirosis results from infection with the waterborne spirochaete *Leptospira*. Human infection with *Leptospira* occurs worldwide, and is particularly prevalent in tropical and subtropical agricultural areas where exposure to infected animals and contaminated water are more common. Clinically, leptospiral infection may be occult, may produce a flu-like illness accompanied by fever, fatigue, arthralgia, and headache, or may result in fulminant, life threatening hepatorenal failure.<sup>1 2</sup>

Leptospiral uveitis is a frequent complication of systemic infection, and may even occur in large outbreaks following heavy rainfalls or flooding.<sup>3</sup> One or both eyes may be involved, typically with either an anterior or diffuse uveitis, and often accompanied by hypopyon formation or retinal vasculitis.<sup>3</sup> Therapy includes a 10 day course of intravenous penicillin or oral doxycycline given in conjunction with topical and/or periocular corticosteroids to treat the intraocular inflammation or its sequelae. Good or complete recovery of vision occurs in most patients following such treatment.<sup>3</sup>

Spontaneous cataract absorption is uncommon but can occur in the setting of traumatic capsular tears,<sup>4</sup> and in congenital cataracts caused by rubella.<sup>5–7</sup> While cataract is a frequent cause of vision loss in patients with uveitis,<sup>8</sup> spontaneous absorption of opacified lens material is rare.<sup>9–13</sup> We describe a group of patients with leptospiral uveitis seen at Aravind Eye Hospital who developed uveitic cataracts, a significant percentage of whom showed spontaneous cataract absorption.

## Patients and methods

The records of all patients seen in the uveitis clinic at the Aravind Eye Hospital between 1994 and 1997 who were diagnosed with leptospiral uveitis were reviewed retrospectively. In each case, a complete ophthalmic examination, including slit lamp biomicroscopy and indirect ophthalmoscopy, was performed by a single ophthalmologist (SRR). All microagglutination tests were performed by the leptospirosis reference laboratory at the Centers of Disease Control and Prevention (CDC), Atlanta, Georgia, according to a standard methodology.<sup>14</sup> Other causes of uveitis were excluded by history, review of systems, physical examination, and directed use of laboratory and ancillary testing.<sup>15 16</sup> All patients with leptospiral uveitis were treated with oral doxycycline, 100 mg twice daily for 10 days. In addition, anterior chamber inflammation was treated with intensive topical corticosteroids, whereas patients with diffuse uveitis were given both intensive topical corticosteroids and either oral, 1.0 mg/kg, or a sub-Tenon depot (40 mg/ml) injection of prednisolone. A cycloplegic/mydriatic agent was also used in most patients. Cataracts were considered visually significant when they limited vision to 20/40 or worse. Patients were considered for cataract extraction and intraocular lens implantation when the cataract was visually significant, and the inflammation was under control for 3 months with or without corticosteroid cover.

Statistical significance and p values were determined by means of a  $\chi^2$  test. When the expected number of individuals in a cell was less than five, a two tailed Fisher exact test was used.

## Results

During the 4 years of the study, 394 eyes of 276 patients with seropositive leptospiral uveitis were identified. Of these 276 patients, 227 (82.2%) were men and 49 (17.8%) were women. Bilateral uveitis was identified in 118 patients (42.8%), whereas 158 patients (57.2%) had unilateral inflammation. Thirty

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Table 1 Clinical findings in patients with leptospiral uveitis and spontaneous cataract absorption

Case No	Age/sex	Presenting vision	Eye findings	Time from presentation to cataract*	Duration between cataract onset and absorption*	Surgery	Final vision
1	29/M	HM RE 20/20 LE	Anterior uveitis RE with: hypopyon; posterior synechiae; partially absorbed cataract	0	0	Refused surgery RE	HM RE 20/20 LE
2	24/M	20/30 RE HM LE	Anterior uveitis LE with cataract	1 month RE 0 LE	4.5 months RE 5 months LE	PC IOL both eyes	20/20 both eyes
3	23/M	20/20 both eyes	Anterior uveitis RE, Diffuse uveitis with Koeppe nodules and snowbanking LE	1 month RE 2 months LE	6 months RE 1 month LE	PC IOL both eyes	20/20 both eyes
4	32/M	BE-6/18	Diffuse uveitis with posterior synechiae and optic disc oedema both eyes	2.5 weeks RE 0 LE	9 months RE	PC IOL both eyes	20/20 both eyes
5	19/M	HM RE 20/20 LE	Anterior uveitis with hypopyon posterior synechiae, and cataract RE	0	10 days	AC IOL (capsular tear)	20/30
6	29/M	20/20 RE 20/30 LE	Diffuse uveitis with hypopyon, posterior synechiae, and cataract LE	2.5 months LE	9 months LE	PC IOL LE	20/20 both eyes
7	27/F	HM RE 20/20 LE	Diffuse uveitis with hypopyon, posterior synechiae, and cataract RE.	0 RE	2 months RE	ECCE/no IOL RE	20/30 RE 20/20 LE
8	23/M	20/20 RE HM OS	Diffuse uveitis with hypopyon, posterior synechiae, and cataract LE.	0 LE	2 months LE	PC IOL LE	20/20 RE 20/30 LE

\*Cataract present on first examination.

eight patients (13.8%) presented with anterior uveitis, and 238 patients (86.2%) showed evidence of diffuse inflammation. Of the 394 eyes with leptospiral uveitis, 54 eyes (12.9%) had visually significant cataract. Cataract was identified in 41 of the affected eyes (75.9%) at first visit to the hospital, whereas it was noted on a subsequent visit 1–6 months after presentation in 13 eyes (24.1%) of nine patients, with a median time of 2 months after onset of uveitis. The duration of eye symptoms before presentation was 3 months or less in 78% of patients. Follow up ranged from 1 month to 3 years, with a median follow up time of 1 year.

Of the 54 eyes of cataract, 10 eyes (18.5%) of eight patients (19.5%) showed spontaneous cataract absorption (Table 1). The time from first observing the cataract to complete absorption ranged from 6 weeks to 18 months, with a median of 5 months. The age range and median, as well as the serovar distribution of patients with leptospiral uveitis with and without cataract, including those in the latter group that showed spontaneous absorption, are shown in Table 2. The most commonly identified serovars were the *L autumnalis*, *L pomona*, and *L bratislava*. The median age and frequency of the various serovars among these three groups of patients showed no statistical differences. Table 3 compares the ocular findings present in the 54 eyes with cataract with those in the 343 eyes without cataract. Findings significantly associated with the formation of cataract in patients with leptospiral uveitis included posterior synechiae formation ( $p = 0.012$ ), hypopyon formation ( $p=0.00012$ ), and retinal vasculitis ( $p=0.00026$ ). Papillitis ( $p=0.35$ ), vitreous cells ( $p=0.47$ ), and vitreous opacities ( $p=0.14$ ), although present in a sizeable proportion of

patients, were not observed more frequently in patients who developed cataract or whose cataract, once developed, showed spontaneous absorption.

Of the 54 eyes with cataract, 30 had cataract extraction with posterior chamber lens implantation. One eye with cataract received an anterior chamber lens implantation following posterior capsular rupture. Of these 31 eyes that underwent cataract extraction and intraocular lens placement, none had a recurrence of their inflammation, and 27 (87.1%) had a final visual acuity of 20/30 or better following surgery. Of the remaining four eyes of the two patients who underwent cataract extraction and whose vision remained below 20/200, two eyes had an epiretinal membrane, and two eyes had prior exudative retinal detachments with atrophy of the underlying retinal pigment epithelium. Of the 19 patients who refused cataract surgery, vision was 20/60 in six patients and they chose to postpone the surgery. Thirteen patients refused cataract surgery in spite of their poor visual acuity, which was below 20/60 in each case. Of the 10 eyes that showed spontaneous cataract absorption, seven received posterior chamber intraocular lenses, and each achieved a final visual acuity of 20/30 or better. The remaining patients (three patients, three eyes) refused surgical treatment.

During the same 4 years of the study, 12 035 consecutive, non-leptospiral, uveitic, non-traumatic, control patients were seen in the uveitis clinic at Aravind Eye Hospital, and none showed spontaneous cataract absorption.

#### CASE 1

A 29 year old male farmer from a small village consulted a local physician complaining of fever and fatigue of 10 days' duration. He was treated empirically with broad spectrum antibiotics.

Table 2 Age and serovar distribution in patients with leptospiral uveitis

	Eyes without cataract (n=235)		Eyes with cataract (n=41)		Spontaneous absorption of cataract (n=8)	
Age (years)						
Range	8–80		12–62		19–32	
Median	31		28		25	
Serovar distribution	No	%	No	%	No	%
<i>L. autumnalis</i>	44	20	16	37	4	40
<i>L. pomona</i>	32	14	5	12	1	10
<i>L. bratislava</i>	26	12	13	30	3	30
<i>L. australis</i>	24	11	2	5		
<i>L. bulgarica</i>	23	10				
<i>L. patoc</i>	19	8				
<i>L. canicola</i>	11	5	2	5		
<i>L. hardjo</i>	9	4	1	2		
<i>L. icterohaemo-</i> <i>rrhagiae</i>	7	3	1	2	1	10
<i>L. jegathlara</i>	6	3				
<i>L. javanica</i>	4	2				
<i>L. wolffi</i>	3	1.3				
<i>L. copenhageni</i>	3	1.3	1	2	1	10
<i>L. djasiman</i>	2	1				
<i>L. panama</i>	2	1				
<i>L. semarenga</i>	2	1	1	2		
<i>L. alexi</i>	2	1				
<i>L. cellodoni</i>	1	0.4				
<i>L. grippotyphosa</i>	1	0.4				
<i>L. medanesis</i>	1	0.4				
<i>L. robinsoni</i>	1	0.4				
<i>L. georgia</i>	1	0.4	1	2		

The total number of seroreactions exceeds the total number of patients because some patients tested positive for two or more serovars.

Table 3 Ocular findings by lens status in patients with leptospiral uveitis

	Cataract		No cataract		p Value
	N = 54 (eyes)	%	N = 343 (eyes)	%	
Posterior synechiae	24	47.1	101	29.4	0.012*
Hypopyon	21	41.2	61	17.8	0.00012*
Vasculitis	9	17.6	153	44.6	0.00026*
Papillitis	12	23.5	62	18.1	0.35
Vitreous cells	39	76.5	277	80.8	0.47
Vitreous opacities	24	47.1	125	36.4	0.14

\*Statistically significant.

Three months later the patient noted pain, redness, and decreased vision in each eye, and was referred to Aravind Eye Hospital. Best corrected vision was right eye hand movement, left eye 20/20. Intraocular pressure by applanation was 17 mm Hg bilaterally. Examination of right eye revealed a severe, non-granulomatous anterior uveitis with hypopyon formation, scattered posterior and anterior synechiae, and a mature and partially absorbed cataract. The right posterior segment was not visible. The left eye showed mild, diffuse uveitis with patchy retinal vasculitis. Laboratory investigations, including a complete blood count, a serum angiotensin converting enzyme (ACE), syphilis serologies, a chest x ray, and skin testing with purified protein derivative (PPD), were all normal. A microagglutination test for *Leptospira* was positive for the *L. pomona* at 1:100 dilution. The patient was treated with oral doxycycline, 100 mg twice daily for 10 days, and oral prednisolone, 40 mg daily for 1 week followed by a slow, 2 month taper. Topical corticosteroids and a cycloplegic/mydriatic agent were also given. The uveitis was controlled but within 3 months the cataract in the right eye showed significant absorption (Fig 1). Extracapsular removal of the residual cortical material followed by placement of a posterior chamber intraocular lens was recommended but

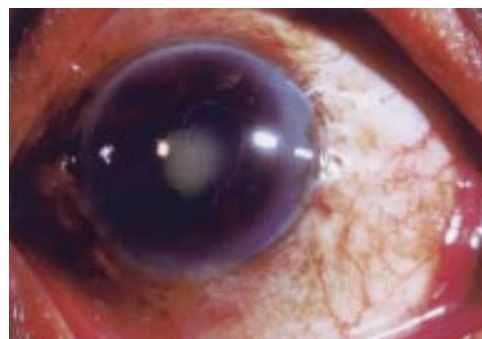


Figure 1 Photograph of the right eye of case 1 three months after presentation showing both anterior and posterior synechiae, and a shadow on the anterior surface of the partially absorbed lens. The patient refused surgery and was subsequently lost to follow up.

the patient refused surgical treatment. The patient was lost to follow up.

#### CASE 2

A 24 year old male farmer developed fever, malaise, arthritis, and headache of 1 week's duration. He was seen by a local physician who obtained a complete blood count, a chest x ray, syphilis serologies, and a Widal test and peripheral smear for malarial parasites, all of which were negative. The patient was treated empirically with broad spectrum antibiotics and slowly improved. Eight months later he developed pain, redness, and decreased vision in each eye, and was referred to Aravind Eye Hospital. Initial examination revealed a best corrected vision of right eye 20/60, left eye hand movement. Intraocular pressure by applanation was 12 mm Hg bilaterally. Slit lamp examination revealed

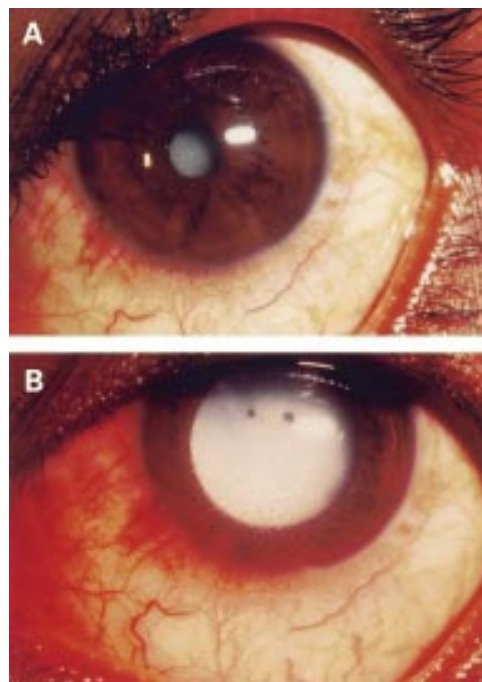


Figure 2 Photograph of the left eye of case 2 at presentation showing numerous granulomatous keratic precipitates. Before dilatation a shadow is visible on the anterior surface of the partially absorbed lens (A). Dilatation reveals that the superior portion of the lens is nearly completely absorbed (B). The right eye also had a cataract which eventually absorbed completely.

moderate, bilateral granulomatous anterior uveitis as well as cataract formation in both eyes. The cataract in the left eye was worse, and showed partial absorption (Fig 2). Posterior segment examination in the right eye was unremarkable. The left fundus was not visible. Microagglutination for *Leptospira* was positive for *L. bratislava* at 1:100 dilution. The patient was treated with oral doxycycline, 100 mg twice daily for 10 days, and oral prednisolone, 40 mg daily for 1 week with a slow, 2 month tapering. Four months after presentation the intraocular inflammation was controlled but the left cataract was nearly completely absorbed. The residual cortical material was removed surgically, and a posterior chamber intraocular lens was implanted. Shortly after surgery the lens in the right eye became white and the vision dropped to 2/60. During the subsequent 8 months cataract absorption began in the right eye, and an extracapsular cataract extraction with posterior chamber lens implantation was performed. Vision stabilised at 20/20 in each eye following surgery.

### CASE 3

A 23 year old man from a region known to be endemic for leptospirosis presented to Aravind Eye Hospital with a 3 day history of right eye pain and redness. Medical history was significant for fever and severe fatigue approximately 1 year before presentation, when he was exposed to flooding after heavy rainfall approximately 2 days before the onset of fever. He had been treated empirically with broad spectrum antibiotics and improved. Initial examination revealed a best corrected vision of 20/20 bilaterally. Intraocular pressure by applanation was 14 mm Hg in each eye. Examination of the right eye was unremark-

able. Slit lamp examination of the left eye showed moderate non-granulomatous anterior chamber inflammation with formation of a small hypopyon. Examination of the left posterior segment showed moderate vitreous inflammation and mild optic disc oedema. Laboratory investigations including syphilis serologies, a chest x ray, skin testing with PPD, and HLA-B27 were negative. The microagglutination test for *Leptospira* was positive for the *L. autumnalis* and *L. bratislava* at 1:3200 dilution. The patient was treated with doxycycline, 100 mg twice daily, a sub-Tenon corticosteroid injection, topical corticosteroids, and a cycloplegic/mydriatic agent. The patient responded quickly but returned 4 months later with bilateral, non-granulomatous anterior uveitis worse on the left. Best corrected vision was right eye 20/20, left eye 20/40. In addition to the anterior chamber inflammation, slit lamp examination showed early cataractous changes in the left lens. The patient responded quickly to a second course of corticosteroids but returned 2 months later with recurrent bilateral diffuse uveitis. Best corrected vision was right eye 6/60; left eye hand movement. Intraocular pressure by applanation was right eye 17 mm Hg; left eye 2 mm Hg. Slit lamp examination showed non-granulomatous inflammation with early cataract on the right, and a hypopyon and a mature cataract on the left. Topical, periocular, and oral corticosteroids were restarted. Within 1 month, however, the cataract on the right progressed to maturation (Fig 3A) and the previously mature cataract on the left was found to be completely absorbed leaving the capsule behind (Fig 3B). After the inflammation was controlled, a posterior chamber intraocular lens was implanted

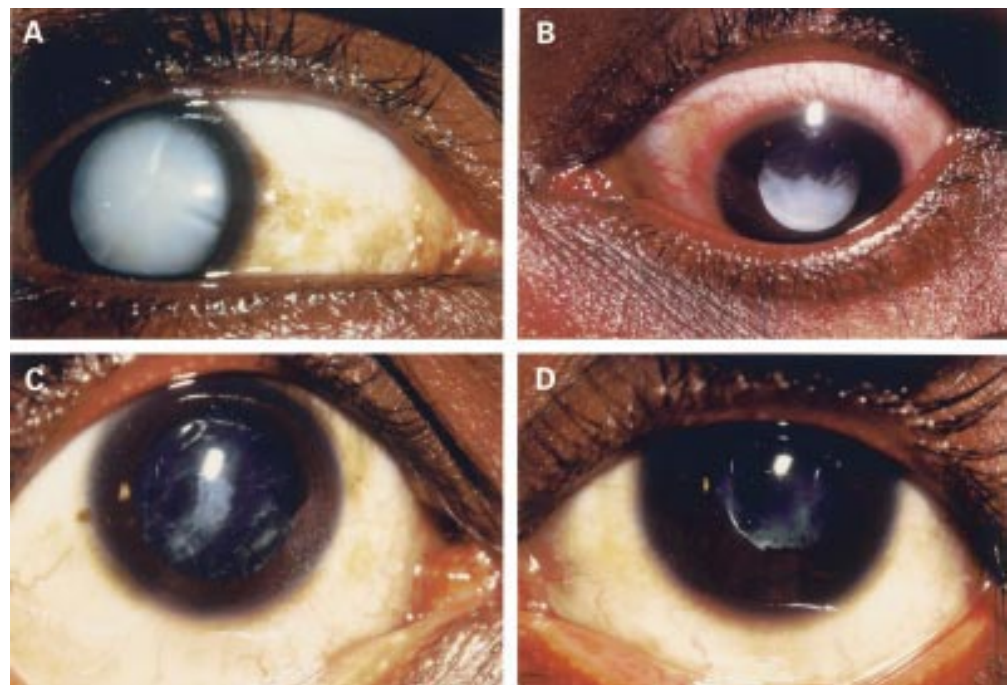
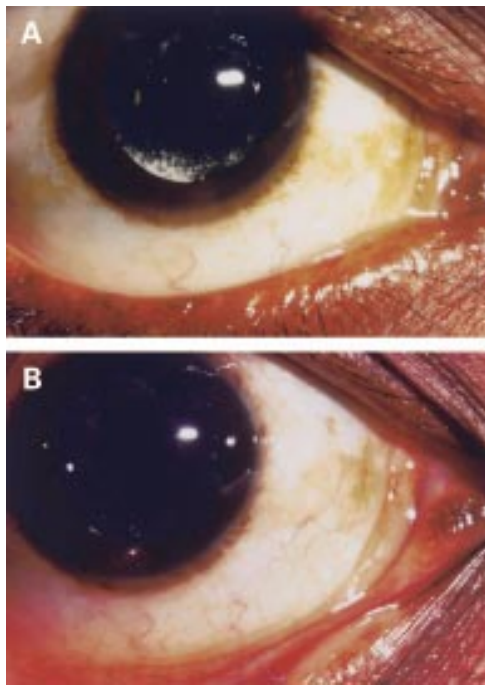


Figure 3 Photographs of the right (A, C) and left (B, D) eyes 2 months after presentation showing a mature cataract on the right (A) and a mature and partially absorbed cataract on the left (B). Four months later the cataract on the right (C) was nearly completely absorbed, leaving residual anterior and posterior capsular opacities, and the cataract on the left (D) had been removed and a posterior chamber intraocular lens placed.



**Figure 4** Photograph of the left eye of case 4 showing total cataract absorption 9 months after presentation (A). Vision was 20/20 with a +10 dioptre lens placed in front of the eye. Best corrected vision remained 20/20 following placement of a posterior chamber intraocular lens (B).

on the left (Fig 3D). During his postoperative follow up for left eye, the cataract in the right eye showed nearly complete absorption (Fig 3C). The patient then underwent cataract extraction and posterior chamber intraocular lens implantation of the right eye. Vision at last follow up was 20/20 in each eye.

#### CASE 4

A 32 year old male farmer presented with a 1 week history of right eye pain, redness, and decreased vision. Medical and ocular history were otherwise unremarkable. Best corrected visual acuity was right eye 20/60; left eye 20/40. Slit lamp examination showed moderate, non-granulomatous anterior chamber inflammation, worse on the right, and mild posterior subcapsular cataract on the left. Posterior segment examination revealed mild vitreous inflammation and optic disc oedema in both eyes. The presentation was believed at first to represent non-specific, endogenous uveitis and the patient was treated with oral prednisolone, and bilateral, topical corticosteroid and cycloplegics. The patient returned 1 month later with minimal residual inflammation but a white mature cataract on the left. Best corrected visual acuity was right eye 20/20; left eye 20/200. The rapid cataract progression suggested that the uveitis might be leptospiral, and a microagglutination test for *Leptospira* was positive for the *L panama* at 1:400 dilution. The patient was treated with oral doxycycline, 100 mg twice daily, as well as bilateral topical and posterior sub-Tenon injection of corticosteroid. An extracapsular cataract extraction and posterior chamber lens placement were performed shortly thereafter with prompt recovery to 20/20 vision in left eye. Over the

following 3 months the right eye showed rapid cataract progression with a decrease in vision to hand movement despite control of the intraocular inflammation. The patient missed all subsequent follow up visits for 6 months, but eventually returned and on examination showed complete, spontaneous absorption of the cataract in the right eye (Fig 4A). The clearing of cortical matter was so complete that the vision with a +10 dioptre lens was 20/40. The patient underwent posterior chamber intraocular lens placement, with improvement of vision in the right to 20/20 (Fig 4B).

#### Discussion

Leptospiral uveitis was identified in 276 patients seen in the uveitis clinic at Aravind Eye Hospital during the 4 years of the study. Of these, 54 eyes of 41 patients developed visually significant cataract. Ten of these 54 eyes in eight patients showed spontaneous cataract absorption. The vast majority of patients with cataracts due to leptospirosis regained 20/30 or better vision following extracapsular cataract extraction and posterior chamber intraocular lens placement.

Systemic leptospiral infection is followed by an asymptomatic, or latent, phase before the onset of the immunological phase. During the immunological phase patients often suffer from chronic headache, arthralgias, and/or uveitis.<sup>17</sup> Uveitis associated with leptospirosis typically manifests as acute, non-granulomatous, diffuse uveitis involving one or both eyes. Occasionally, however, patients may manifest mild to severe anterior uveitis with little or no posterior segment involvement. Hypopyon, vitreous inflammation, optic disc oedema, and retinal vasculitis are reported to affect a sizeable proportion of patients.<sup>3</sup> The intraocular inflammation due to leptospirosis usually responds promptly to treatment, but cataract and glaucoma may remain, and can cause lasting vision loss.<sup>18</sup>

Cataract is a well recognised complication of uveitis, and is particularly common in entities such as Fuchs' uveitis syndrome, juvenile rheumatoid arthritis, and pars planitis.<sup>15, 16</sup> Cataract can develop in patients with uveitis due either to the inflammation or to chronic corticosteroid use. The vast majority of uveitic cataracts remain stable or progress only slightly once the inflammation is controlled.<sup>19</sup>

Spontaneous cataract absorption is uncommon (Table 4). Lens material has been reported to absorb, however, in patients with traumatic cataract,<sup>4</sup> with cataract related to congenital rubella,<sup>5-7</sup> and in age related morgagnian cataract.<sup>4, 9, 19</sup> Spontaneous absorption of cataract in patients with uveitis appears to be rare,<sup>9-13</sup> however, and aside from a single case report of a missing lens in a 31 year old patient who suffered from leptospiral uveitis<sup>20</sup> has not previously been described in patients with leptospirosis.

Although a number of tests are currently available to detect anti-*Leptospira* serum antibodies, the microagglutination test (MAT) is the current standard for serodiagnosis.<sup>14</sup> The MAT relies upon the agglutination of live

Table 4 Previously reported cases of spontaneous cataract absorption

Year	Author(s)	Associated findings	Patient age
1890	Zentmayer <sup>13</sup>	(1) Iritis	62 years
		(2) Idiopathic	5 years
1918	Posey <sup>13</sup>	Idiopathic	14 years
1926	Ballantyne <sup>23</sup>	Morgagnian	65 years
1928	Holloway and Gowen <sup>13</sup>	(1) Vitreous veils	46 years
		(2) Vitreous opacities	
		(3) Retinochoroidal	
1928	Ferrer <sup>12</sup>	Idiopathic	16 years
1945	Gamble <sup>6</sup>	Rubella	6 months
1948	Ehrlich <sup>5</sup>	Rubella	Congenital
1952	Marlow <sup>11</sup>	(1) Vitreous opacities	17 years
		(2) Glaucoma	44 years
		(3) Vitreous opacities	57 years
		(4) Vitreous opacities	57 years
		(5) Vitreous opacities	61 years
1988	Uemura <i>et al</i> <sup>9</sup>	(1) Iritis	56 years
		(2) Iritis	63 years
1990	Smith <i>et al</i> <sup>7</sup>	Rubella	6 weeks
1988	Uemura <i>et al</i> <sup>9</sup>	(1) Iritis	56 years
		(2) Iritis	63 years
1990	Smith <i>et al</i> <sup>7</sup>	(2) Rubella	6 weeks

leptospires by specific antibodies present in an individual patient's serum. A battery of leptospira serovars, representative of each serogroup known to be present in a particular geographic region, is typically used in each MAT. During the acute phase of the illness, seroconversion or a fourfold rise in anti-*Leptospira* serum IgG antibodies strongly suggests the diagnosis. During the chronic or immunological phase of the illness; however, an MAT titre of 1:100 or more is taken as significant.

Systemic antibiotics, such as oral doxycycline or intravenous penicillin, are recognised to benefit patients with early leptospirosis, and may also have a role in the treatment of the more chronic forms of the disease, such as uveitis.<sup>21</sup> The primary therapy for leptospiral uveitis remains, however, corticosteroids.<sup>3</sup> All of our patients with leptospiral uveitis and cataract responded well to oral doxycycline in association with topical, periocular, and/or systemic corticosteroids.

Leptospiral infections vary considerably from patient to patient. Such variations in severity may represent unique interactions between the microbe and the host, or may be due to intrinsic differences between the various leptospiral serotypes.<sup>22</sup> We failed, however, to observe a statistically significant association between any particular leptospiral serovar and cataract formation. In contrast, our results suggested that the formation of cataract was determined most directly by the severity of the anterior chamber inflammation, since cataracts were observed more often in patients with a hypopyon and posterior synechia formation (Table 2).

Spontaneous cataract absorption was first described by Saunders in 1811.<sup>5</sup> Subsequently, several authors reported spontaneous absorption in patients with traumatic cataract,<sup>4</sup> morgagnian cataract,<sup>2,3,9</sup> congenital rubella cataract,<sup>5-7</sup> and a few patients with evidence of uveitis.<sup>9-13</sup> However, the specific causes of uveitis in these patients were not known. The mechanism by which spontaneous absorption of cataract occurs is probably not the same in all cases. Of note, however, histological studies performed on three infants who died of congenital rubella showed massive necrosis in the lenses with vacuolation and absorption of

these vacuoles leading to gradual thinning of the lens. These studies also showed that the virus may persist in viable lens fibres for a considerable time, even in the presence of a neutralising serum antibody response.<sup>19</sup> Since neither live leptospires<sup>24</sup> nor anti-*Leptospira* antibodies<sup>25</sup> have been retrieved from the eye with leptospiral uveitis, it is not clear whether leptospires themselves or antibodies directed against leptospires have any direct role in cataract formation or absorption. Of note, however, horses are well recognised to develop a severe uveitis associated with rapid cataract formation in the setting of systemic leptospirosis, and laboratory studies have demonstrated the presence of anti-*Leptospira* serum antibodies in these horses that react with lens antigens, suggesting the presence of an antigenic relation between the leptospires and lens antigens, at least in the horse.<sup>26</sup> Whether or not a this mechanism plays a part in the spontaneous cataract absorption observed in leptospiral uveitis in humans remains unknown.

In summary, cataract is a common complication of leptospiral uveitis, and appears to be associated with the uncommon phenomenon of spontaneous lens absorption, which may be both rapid and complete, in a sizeable proportion of patients. Cataract removal followed by posterior chamber intraocular lens implantation results in good recovery of vision in most patients.

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