The Inflamed Eye

18

Abstract

This chapter deals with inflammatory conditions that affect the different parts of the eye, from different aetiologies, including trauma, allergy, infections and non-infectious ('autoimmune') conditions. It highlights uveitis, but in addition, the sclera and the episclera ie the more superficial coats of the eye may also be affected by similar inflammatory changes. Causes, clinical features of the different types of inflammation, their investigation and treatment are described.

In an earlier chapter we have already seen that 'the red eye' is an important sign in ophthalmology, and there are a number of reasons why the eye may become inflamed. When the exposed parts of the eye such as the conjunctiva and the cornea are the primary sites of inflammation, the cause is usually infection, allergy or trauma. Common examples are chronic conjunctivitis or a corneal foreign body. Here we are going to consider a type of inflammation, which arises, deeper in the eye and primarily from the uvea. The uvea has a tendency to become inflamed for no apparent external reason and in this respect can be compared to a joint; indeed, there is a recognised association between uveitis and arthritis. In spite of the fact that the eye is open to microscopic examination, the exact cause of uveitis is usually obscure, although there is evidence to indicate a relationship with other kinds of autoimmune disease. Uveitis can be divided into anterior, intermediate or posterior uveitis depending on which part of the uvea is predominantly involved. Anterior uveitis is the same entity as iritis or iridocyclitis and is when the inflammation predominantly affects the anterior chamber and iris; intermediate uveitis, the same as pars planitis is where the vitreous and ciliary body are predominantly affected; posterior uveitis is the same as choroiditis, and refers to inflammation predominantly involving the choroid (and retina).

Apart from the uvea, the sclera and the episclera (that is, the connective tissue deep to the conjunctiva and overlying the sclera) ie the more superficial coats of the eye may also be affected by similar inflammatory changes.

The Role of Autoimmunity in Uveitis

Although it has been long recognised that bacterial and viral infection may account for some cases of uveitis, it is also recognised that the majority of

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cases fail to show any evidence of this. Furthermore, in many instances the eye disease may be associated with known autoimmune disease elsewhere in the body. There are several different ways in which the uvea might be expected to become the focus of an antigen-antibody reaction. A foreign agent such as a virus might reside in the uvea and cause an antibody response, which coincidentally involves uveal tissue, or, on the other hand, a foreign agent might react with specific marker on the cell membrane to produce a new active antigen. It is now recognised that patients who inherit certain of the human leucocyte antigens (HLA) are more susceptible to particular types of uveitis, for example the uveitis seen in ankylosing spondylitis and Reiter's disease (HLA B27), and birdshot choriodopathy (HLA A29). It has been suggested that HLA may act as the specific marker in these cases. A further way in which the uvea might become the centre of an immune response concerns the question of self-recognition. It now appears that there is a mechanism in the body, which normally prevents antibodies in the serum from acting against our own tissues. This active suppression is maintained by a population of thymus-derived lymphocytes (T lymphocytes) known as T-suppressor cells. There is evidence to suggest that sympathetic ophthalmitis might arise from inhibition of the T- suppressor cells after uveal antigens have been introduced into the bloodstream. Patients with juvenile rheumatoid arthritis occasionally develop uveitis, whereas rheumatoid disease in adults is more commonly associated with the dry eye syndrome and episcleritis. The causes of uveitis can be infectious or non-infectious (Table 18.1). A significant proportion (up to 70–80 % of anterior uveitis, and 60 % of posterior uveitis) of non-infectious uveitis is idiopathic. However, this conclusion should be arrived at only after excluding all potential associations.

Table 18.1 Common causes of anterior and posterior uveitis

Non-infectious uveitis	Infectious uveitis
Idiopathic	Parasitic
Sarcoidosis	Toxoplasmosis
Bechets' disease	Toxocariasis
HLA B27 associated disease (Reiter's, ankylosing spondylitis, psoriasis)	Onchocerchiasis
	Fungal
Juvenile idiopathic arthritis	Candida
Birdshot Choroidoretinopathy (HLA A29 associated)	Cryptococcus
	Histoplasmosis
Bowel diseases (ulcerative colitis, Crohn's and Whipple's diseases)	Bacterial
	Syphilis
	Tuberculosis
Sympathetic ophthalmitis	Lyme disease
Specific entities (MEWDS, PIC, MF)	Cat-scratch
	Leprosy
Others	Viral
	HSV
	HZV
	CMV
	Others

Anterior Uveitis

Symptoms

The patient suffering from acute anterior uveitis is usually aware that there is something seriously amiss with the eye. The vision is blurred and the eye aches and often, may be extremely painful. Photophobia is usual and often the pain may worsen on focusing on near objects. The age incidence is wide but anterior uveitis is commonly seen in the third and fourth decades of life, and every eye casualty officer becomes very familiar with this particular form. When the disease presents for the first time in the elderly, the underlying cause is likely to be different and age provides an important diagnostic feature. In children, anterior uveitis may occur as a complication of juvenile rheumatoid arthritis, especially the pauci-articular type. Occasionally, it can complicate an acute viral illness or sarcoidosis in children. Acute anterior uveitis usually appears quite suddenly over a period of about 24 h and then resolves on treatment in 2 or 3 weeks; however, it may last as long as 6 weeks in some cases. A further exacerbation may occur during this period and there is a strong tendency towards recurrence after a few months or several years in the same or the other eye.

Signs

The eye is red, but of especial importance is the presence of a pink flush around the cornea

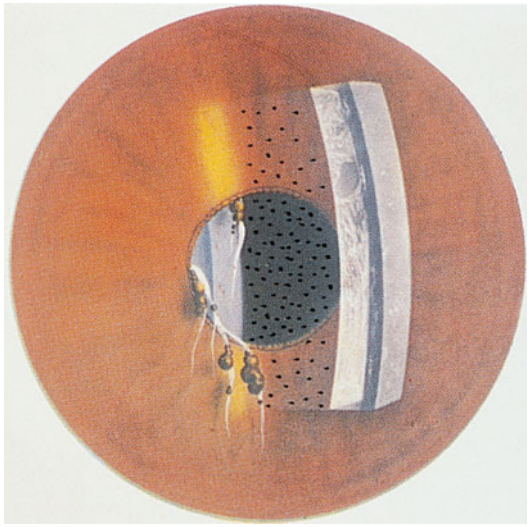

Fig. 18.1 Flare

(the ciliary flush) which indicates an inflammatory process either in the cornea or within the anterior chamber of the eye itself. The pupil is small because the iris sphincter goes into spasm. Thus the pupil of iritis is small and treatment is aimed at making it larger, whereas the pupil of acute glaucoma is large and treatment is aimed at making it smaller. Unless there is secondary glaucoma, the cornea remains bright and clear, but with a pen torch it may be possible to see that the aqueous looks turbid. That is to say, a beam of light shone through the aqueous resembles a beam of sunlight shining through a dusty room (Fig. 18.1). Normally, of course, the aqueous is crystal clear even when examined with the slit lamp biomicroscope or pen torch.

The presence of an occasional cell in the aqueous may be normal, especially if the pupil has been dilated with mydriatic eye drops, but suspicion should be raised if more than three or four cells are seen. In fact the early diagnosis of anterior uveitis can entail very careful slit-lamp examination. It is usual to discriminate between the presence of cells in the aqueous and the presence of flare. The latter reflects a high protein content and is a feature of more long-standing disease. Because there are convection currents in the aqueous, inflammatory cells are swept down the centre of the posterior surface of the cornea

Fig. 18.2 Keratic precipitates

and become adherent to it, often forming a triangular-shaped spread of deposits known as keratic precipitates, or 'KP's (Fig. 18.2). The microscopic appearance of the KP is determined by the type of cells. If a granulomatous type of inflammatory reaction is taking place involving epithelioid cells and macrophages, then the KP may be large, resembling oil droplets ('mutton fat KP'). This form of KP is seen in uveitis associated with sarcoidosis and also tuberculosis and leprosy. When the inflammation is non-granulomatous, a fine dusting of the posterior surface of the cornea may be evident. KPs tend to become absorbed over time but they may remain more permanently as pigmented spots on the endothelium.

Anterior uveitis is often associated with the formation of adhesions between the posterior surface of the iris and the lens. These are called posterior synechiae and become evident when attempts are made to dilate the pupil since parts of the iris remain stuck to the pupil giving it an irregular appearance. In severe cases of anterior uveitis, pus may collect in the anterior chamber to the extent that a fluid level may be seen where the layer of pus has formed inferiorly. This is known as hypopyon – literally, 'pus below' (Fig. 18.3). A hypopyon is an indication of severe disease in the eye and the patient should be, preferably, treated in hospital as an in-patient. Hypopyon tends to occur in certain specific types of anterior uveitis. It is occasionally seen in elderly diabetics with inadequately treated corneal ulcers, particularly those with vascular

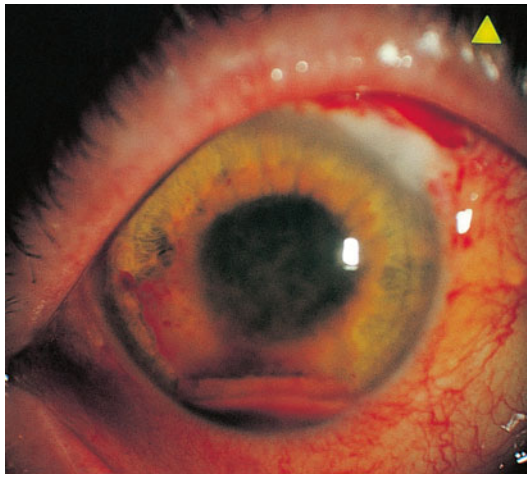

Fig. 18.3 Hypopyon. In addition, there are red blood cells and fibrinous exudate in the anterior chamber (with acknowledgement to Professor HS Dua)

occlusive disease. It is also seen in Behcet's disease, which is a rare disorder characterized by hypopyon uveitis, and ulceration of the mouth and genitalia. A hypopyon is occasionally seen following cataract surgery and in such cases may often be infective in origin, although it could be non-infective. It is fortunately a rare complication of modern cataract surgery, with the use of intraocular lenses, and strict asepsis.

Complications

The visual prognosis of acute anterior uveitis as commonly seen in young people is usually good unless recurrences are frequent. Chronic uveitis is more prone to complications. Secondary glaucoma may cause serious problems and a careful check on the intraocular pressure must be maintained. The rise in intraocular pressure may be due to direct obstruction of the aqueous outflow by inflammatory cells or by the presence of adhesions between the peripheral part of the iris and the posterior surface of the cornea (peripheral anterior synechiae). Sometimes, especially when treatment has been inadequate, the posterior synechiae sticking the pupil margin to the anterior surface of the lens become extensive enough to obstruct the passage of aqueous through the pupil. The iris bulges forwards giving the appearance known as iris bombe. Secondary glaucoma may also result from the use of topical steroids in predisposed individuals. Cataract is a further serious complication, which may appear after repeated attacks of anterior uveitis. It nearly always first affects the posterior subcapsular zone of the lens and unfortunately interferes with the vision at an early stage. Cataracts may also result from long term use of topical or systemic steroids.

Causes

For the majority of patients who present to eye out-patient departments with this condition, no specific cause is found. However, there are many known causative agents. The ophthalmologist is obliged to exclude at least some of these although he/she knows that more often than not a negative result will be obtained. It is necessary to explain this to patients otherwise considerable anxiety may be created by the fact that 'no cause can be found' for their complaint. When we say no cause can be found we really mean that there is no evidence of any associated systemic disease and this should be of some reassurance to the patient.

As has already been mentioned, it is helpful to consider the age of the patient when trying to eliminate the possibility of underlying systemic disease. Uveitis is very rare in young children, but when seen, the possibility of juvenile rheumatoid arthritis or an antecedent must be borne in mind. In young adults sarcoidosis, gonorrhoea, Reiter's disease and ankylosing spondylitis are all recognised associations. In former years tuberculosis was very high on the list of suspected causes but this would appear to be a less common cause nowadays. Herpes Simplex and Zoster may also cause anterior uveitis. Septic foci in adjacent structures, such as dental sepsis or sinusitis, have also been under suspicion but these are now thought to be relatively unimportant. In the case of the elderly, the onset of anterior uveitis may prove to be a recurrence of previous attacks and the same underlying causes must be suspected, but here there is also the possibility of

lens-induced uveitis associated with by hypermature cataract.

Management

Once the diagnosis has been made, it is usual to embark on a number of investigations, guided in part by the history and taking into account especially any previous chest or joint disease (Table 18.2) An x-ray of chest, and a blood count including measurement of the ESR are routine in most clinics, but the expense of further investigations is now often spared if the patient appears completely fit and well in other respects. The history and background of the patient may lead one to suspect the possibility of venereal disease. In the case of some infective types of anterior uveitis, the diagnosis is usually made before the uveitis appears because the condition occurs as a secondary event. This is the case following herpes simplex keratitis and also in patients with herpes zoster affecting the upper division of the fifth cranial nerve. By contrast, anterior uveitis may be an important clue to the diagnosis of a venereal disease.

The treatment involves the administration of local steroids and mydriatic drops. When the condition is severe, a subconjunctival injection of steroid should be given and relief of symptoms may be further achieved by local heat in the form of a warm compress. Atropine is the mydriatic of first choice except in the mildest cases when homatropine or cyclopentolate drops may be used. Steroid drops should be administered every hour during the acute stage and then gradually tailed off over a period of a few weeks. Systemic steroids are not usually indicated and should be reserved for those cases in which the sight becomes seriously jeopardised. If any underlying systemic disease is identified, then of course this should also be treated if effective treatment is available. The proper management of anterior uveitis demands the expertise of a specialist ophthalmologist and, when the condition is affecting both eyes, it may be preferable to admit the patient to hospital (Table 18.3).

A special word of warning is needed for those patients who have undergone previous intraocular surgery. For these patients what is normally a mild infective conjunctivitis may lead to intraocular infection. The development of anterior uveitis, weeks, and occasionally even years, after the operation, can indicate disastrous consequences if urgent and intensive antibiotic treatment is not applied.

Two other specific types of anterior uveitis must be mentioned at this stage.

Heterochromic Iridocyclitis (Fuch's)

This type of anterior uveitis presents in 20–40 year olds and is usually unilateral. The vision becomes blurred and the iris becomes depigmented. Sometimes it may take several years for the diagnosis to be made. The eye usually remains white, the inflammatory reaction is low grade and chronic; posterior synechiae do not develop. As such mydriasis is not required. However, the inflammation may respond to topical treatment with steroids as the spillover of cells into the anterior chamber is curtailed. Intravitreal steroid therapy may be useful if the inflammation is complicated by cystoid macular oedema. Cataracts and chronic glaucoma occur very commonly. The condition has been mimicked by denervating the sympathetic supply of the eyes in

Table 18.2 Investigations in uveitis

Ocular examination
Fundus examination of both eyes, with pupillary dilatation – mandatory
Laboratory investigations based on clinical findings and presumed clinical diagnosis

Table 18.3 Management of non-infectious uveitis

Treatment choice dependent on
Anatomic location of inflammation: anterior/intermediate/posterior uveitis
Laterality
Age/sex
General health
Patient wishes and compliance
Potential benefit

experimental animals and it seems possible that there may be a neurological cause, unrelated and distinct from other types of uveitis.

Intermediate Uveitis (Pars Planitis)

This refers to an inflammatory response, usually seen in young adults, which may vary from low grade to severe. It affects both eyes in up to 80 % of cases, although the severity may be asymmetrical. There is minimal evidence of anterior uveitis, unless there is significant spillover, and the patient complains of floating spots in front of the vision. Inspection of the fundus reveals vitreous opacities and careful inspection of the peripheral retina shows whitish exudates in the overlying vitreous base (described as snow banking), or in the vitreous (snow balls) especially inferiorly. A mild to moderate peripheral retinal phlebitis may occur. The condition runs a chronic course and occasionally may be complicated by cataract, cystoid macular oedema and tractional retinal detachment. The cause is unknown in the majority of cases although there is a known association with sarcoidosis and multiple sclerosis.

Treatment and Management

The investigations recommended here are similar to those for anterior uveitis.

In the mild forms of intermediate uveitis, management is observation. However, when the condition is complicated by cystoid macular oedema, or optic disc swelling, or the vitreous debris is significantly symptomatic, treatment is recommended with systemic steroids or intravitreal steroids. Steroid sparing immunosuppression may be helpful.

Posterior Uveitis

Symptoms

When the choroid, as opposed to the ciliary body and iris, becomes inflamed, the eye is not usually painful or red and the patient complains of severe blurring or loss of vision. If the focus of choroiditis remains peripheral, then the disease may remain unnoticed, as is witnessed by the relatively frequent observation of isolated healed foci in the fundi of asymptomatic patients. Often the inflammation spreads from choroid to retina and then to the vitreous, with the resulting vitreous floaters from cells and debris. When this happens the vision becomes markedly blurred, even when the original focus is remote from the macula region. Alternatively the inflammation may originate from the retina and spread to involve the choroid and vitreous subsequently. Choroiditis at the macula itself usually leads to permanent loss of central vision.

Signs

In its early stages, choroiditis may be seen as a grey or yellowish raised area which may be discrete or multiple and anywhere in the fundus. In the mild or early stages of the disease the vitreous may be fairly clear to allow a good view of the fundus. As the disease progresses, a cellular reaction may appear in the overlying vitreous, seen as localised misting with the ophthalmoscope, and eventually the whole vitreous may become clouded, obscuring any view of the fundus and the original site of inflammation. The patient usually presents at this stage so that the origin of the problem only becomes apparent after the inflammation has subsided. Retinitis manifests as an indistinct white cloudy area. When a patch of choroiditis heals, the margins become pigmented and a white patch of bare sclera remains (Fig. 18.4a, b). This is the result of atrophy of the pigment epithelium and choroid. Sometimes larger choroidal vessels survive as a clearly seen network overlying the white sclera surrounded by a pigment halo. During the active stage, inspection of the vitreous with the slit lamp reveals the presence of cells and very often the anterior chamber also contains cells. Posterior uveitis comes into the differential diagnosis of a white eye with failing vision. When the vitreous becomes cloudy the condition must be distin-

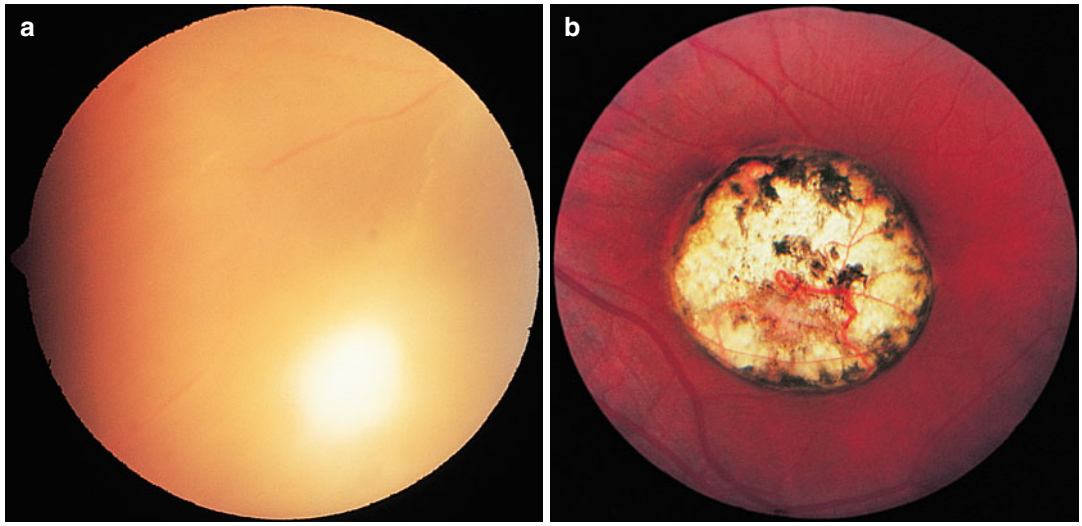

Fig. 18.4 Chorioretinitis. (**a**) active inflammation with hazy vitreous; (**b**) inactive scar

guished from vitreous haemorrhage. The latter nearly always occurs acutely over a period of hours, whereas the cloudiness following uveitis takes a few days to develop. Examination of the vitreous with the slit lamp can reveal whether the vitreous is filled with inflammatory cells or red cells. Retinal vasculitis may occur. A predominantly arteriolar inflammation indicates a viral cause whereas venous involvement is more common with other aetiologies. Optic nerve inflammation or oedema may also occur.

Causes

As in the case of anterior uveitis, it is often impossible to pinpoint any systemic cause and the condition seems to be confined to the eye. However, a number of systemic associations have been recognised and often are related to specific types of posterior uveitis (Table 18.1). The fundus appearance may provide a clue to the cause of the inflammation.

Management

The fundus appearance may provide a clue to the diagnosis, although this is not always possible and laboratory investigations may be necessary to refine the diagnosis, and guide treatment.

Non-infectious posterior uveitis is treated when the condition is complicated by cystoid macular oedema, or optic disc swelling, the vitreous debris is significantly symptomatic enough to aggravate the patient or impair the visual acuity, or if the lesion is close to the fovea. Systemic steroids are the usual first line therapy, and may be supplemented with intravitreal steroids. Large doses of systemic steroids are best administered, sometimes, on admission to hospital. This has the added advantage of allowing a more detailed pre-treatment examination and investigations, and often the opinion of a general physician or immunologist may be valuable at this stage. Secondary glaucoma may also need to be treated as necessary.

Increased interest in immunological diseases in recent years, which has accompanied advances in tissue grafting and cancer research, has led to attempts to treat uveitis with means other than steroids. Immunosuppressive agents eg Cyclosporin A, Tacrolimus, Azathioprine, Cyclophosphamide, Mycophenolate Mofetil and biologics including anti-TNF drugs are now sometimes used to supplement or replace steroids in difficult cases.

The infectious causes of uveitis have specific therapies directed at the pathologic agent, and are described below with each specific entity.

Specific Uveitis Entities

Toxoplasmosis

Toxoplasma gondii is a parasite, a protozoan carried by cats. Man and other intermediate hosts may be infected. In the adult with the acquired infection systemic symptoms are usually mild. Similarly, the ocular symptoms of acquired toxoplasmosis may be mild. However, a severe form of acquired ocular toxoplasmosis has been recognised. In such cases there has been contact with wild cats in stables. In the case of infected pregnant mothers the child in utero may be infected by the more severe congenital form of the disease. The organism enters the brain as well as the eyes and may cause mental deficiency and epilepsy. A characteristic type of calcification is seen on skull x-ray or CT scan. In the eye a focal type of choroiditis often affects both eyes and this is usually at the posterior pole in the (macular region) (Fig 18.4b), but may be anywhere in the fundi, and may be asymmetric. Histologically the Toxoplasma organism is found in the eye lesions. The diagnosis may be confirmed by sending some blood for serological tests. Four such tests are currently in use clinically: the toxoplasma dye test, indirect fluorescent antibody test, haemaglutination test and enzyme-linked immunosorbent assay (ELISA). These tests must be interpreted carefully because a high proportion of the population becomes infected at some point and the positive results increase with age, even in those with no clinical evidence of infection. For this reason the diagnosis may be less easy in acquired toxoplasmosis where evidence of systemic involvement may be slight or absent. It has been shown that there is a higher incidence of positive dye tests in patients with posterior uveitis than in the normal population, but in an individual case it is often necessary to demonstrate a changing titre in order to confirm the diagnosis. The most specific of these tests is the ELISA.

All the currently available anti-toxoplasma treatments have potential serious side effects. Therefore not all active toxoplasma retinochoroiditis lesions require treatment. Such treatment is required only if an active lesion involves or threatens the fovea and/or optic nerve. Treatment is also required when there is severe vitritis.

A combination of pyrimethamine and sulphadiazine has been recommended, but such treatment may cause a serious fall in the white cell count. An alternative anti-microbial treatment is clindamycin. This needs to be given with a sulphonamide in order to reduce the risk of colitis. It is generally accepted that systemic steroids have some beneficial effect and may help to clear the vitreous more rapidly, but this treatment should be given only with antimicrobial cover. Steroids on their own will produce exacerbation or progression of the chorioretinitis. In fact the majority of cases resolve spontaneously, leaving more or less chorioretinal scarring at the macular region. Recurrences are fairly common, with or without treatment, and the fresh choroidal inflammation tends to arise at the edge of a previous scar.

Toxocariasis

Toxocariasis is caused by toxocara cati (from cats) or canis (from dogs). This nematode has been found in the enucleated eyes of young patients with a severe type of chorioretinitis. It is a unilateral disease found in children who are in close contact with puppies or eat dirt (through faecal contamination). The vitreous tends to be filled with a white mass of inflammatory cells so that the presence of a tumour may be suspected (eg retinoblastoma). Endophthalmitis tends to develop in these cases and the sight of one eye may be completely lost. During the acute stage the peripheral blood may show an eosinophilia. Treatment is unsatisfactory and includes a combination of anti-helminthic agent taken by mouth (thiobendazole or diethylcarbamazine) and steroids.

Tuberculosis

In former years this was considered to be a common cause of posterior uveitis, clinicians having been impressed by the number of patients with a previous history of TB. The relationship seems

less likely now that tuberculosis has been almost eliminated from the population. However, this diagnosis must not be forgotten especially in the immunosuppressed patient and patients with recalcitrant or atypical uveitis since there is currently a slight re-emergence of the disease. Choroidal tubercles are a well-described entity: these raised yellowish granulomatous foci were used as a diagnostic feature of miliary tuberculosis and occasionally chronic pulmonary TB. They are usually seen in extremely ill patients and the yellowish tubercles become pigmented as they heal.

Treatment is as for systemic TB.

Presumed Ocular Histoplasmosis

Histoplasmosis is a fungal infection (causative agent – Histoplasma capsulatum). Infection with this organism occurs throughout the world but is more common in the Mississippi Valley and does not occur in the UK. A severe pneumonitis may occur but most cases are asymptomatic.

Presumed ocular histoplasmosis (POHS) is not seen in patients with active histoplasmosis. The evidence for infection in the originally described cases was necessarily circumstantial – hence the expression 'presumed ocular histoplasmosis'. The syndrome consists of a certain type of haemorrhagic macular lesion (choroidal neovascularisation) combined with discrete foci of peripheral choroiditis and peripapillary scars.

Treatment includes systemic steroids.

Syphilis

Syphilis is a chronic infection caused by Treponema pallidum. Iridocyclitis occurs in patients with secondary acquired syphilis. It is a bilateral disease in which the iris vessels are particularly engorged. Chorioretinitis may be either multifocal or diffuse and involves the mid-periphery and peripapillary area. The inflammation in syphilis can take several forms, and may have a different appearance in immunocompromised patients. Systemic associations should be looked for. In the healed phase, perivascular bone spicule pigmentation may be seen similar to that observed in retinitis pigmentosa.

In congenital syphilis other possible features occur such as deafness and corneal scarring from previous interstitial keratitis. The scattered pigmentation in the fundus may suggest an inherited retinal degeneration but a careful family history together with electrodiagnostic testing of the eyes usually enables one to distinguish the two conditions. It is also important to carry out serological testing. The Treponema pallidum immobilisation test (TPI) and the fluorescent treponemal antibody test (FTABS) are the most sensitive and specific.

As it is a venereal disease, the Genito-Urinary Team should be involved, and contact tracing is important. Treatment is specific with intramuscular injections of benzyl penicillin. An alternative treatment is high dose tetracyclines. Systemic steroids may be added on control of the infection.

Sarcoidosis

The eye is very frequently involved in sarcoidosis. Involvement usually takes the form of an anterior or posterior uveitis. The choroiditis is more often peripheral and accompanied by inflammatory changes in the retinal veins. Sheathing of the veins may be seen and the vision may be impaired by macular oedema. The inflammatory changes may be similar to those seen in pars planitis. When the diagnosis is suspected, the conjunctiva and skin should be searched for possible nodules, which may be biopsied, and an x-ray of the chest may reveal enlargement of the hilar lymph nodes. The management of the ophthalmological problem may involve treatment with local and systemic steroids but the opinion of a physician specialising in sarcoidosis is essential and should be sought before embarking on treatment.

Behcet's Disease

Behcet's disease is a multi-system disease associated with HLA-B5. It was originally thought to occur only in the Mediterranean and Japan where

the disease is most common. The disease is characterised by an obliterative vasculitis. The clinical syndrome consists of oral and genital ulceration in combination with recurrent uveitis and skin lesions. The uveitis consists of recurrent bilateral non-granulomatous anterior and/or posterior uveitis. Central nervous system involvement occurs as a very serious form of the disease.

The management involves good collaboration between the ophthalmologist and immunologist. Prolonged treatment with steroids and non-steroidal agents is required.

Sympathetic Ophthalmia

This is a rare but dramatic response of the uvea in both eyes to trauma. The significance of the condition rests in the fact that although the trauma has only affected one eye, the inflammatory reaction occurs in both. It may follow perforating injuries, especially when uveal tissue has become adherent to the wound edges. Occasionally it may occur following intraocular surgery. The injured eye, which is referred to as the 'exciting eye', remains severely inflamed and, after an interval of between 2 weeks and several years, the uninjured eye ('sympathising eye') becomes affected. The inflammation in the sympathising eye usually starts in the region of the ciliary body and spreads anteriorly and posteriorly. It is granulomatous.

Careful wound toilet and repair of the injured eye may probably prevent many cases, as can also removal of blind, painful and inflamed eyes within the critical 2 week period following injury. Treatment with high dose steroids is required in order to control the inflammation and save the eye and vision. The treatment may be prolonged.

Other Causes

A wide variety of infective agents have been shown to cause posterior uveitis on rare occasions. The leprosy bacillus and the coxsackie group of viruses are two examples chosen from many. An especially rare but intriguing form of uveitis is known as the Vogt-Koyanagi-Harada syndrome in which is seen the combination of vitiligo, poliosis, meningoencephalitis, uveitis and exudative retinal detachments.

Endophthalmitis and Panophthalmitis

When inflammatory changes in the posterior uvea extend into the vitreous and there is an extensive involvement of all layers of the globe except the sclera, the patient is said to have endophthalmitis. Further extension of the inflammation into the sclera (ie inflammation of the entire globe, with or without possible extension into the orbit) leads to panophthalmitis. Endopthalmitis is one of the feared results of infection after injury or surgery but it may prove reversible with intensive antibiotic treatment. When endophthalmitis and panophthalmitis are not properly and aggressively treated, the sight is usually lost permanently and after months or years the whole eye begins to shrink.

Episcleritis and Scleritis

Both these conditions form part of the differential diagnosis of the red eye. The episclera is the connective tissue underlying the conjunctiva and it may become selectively inflamed, either diffusely or in localised nodules. In the case of episcleritis, close inspection of the eyes shows that the inflammation is deeper than the conjunctiva and there is a notable absence of any discharge. The eye is red and may be gritty but not painful. Episcleritis is seen from time to time in the casualty department and the patient may be otherwise perfectly fit and well. Such cases tend to recur and some develop signs of dermatological disease. The condition responds to local steroids, but systemic aspirin may also prove effective. Scleritis is less common and more closely linked with rheumatoid arthritis and other collagen diseases. The eye is red (diffuse or localised) and painful. In severe cases the sclera may become eroded with prolapse of uveal tis-

sue. Topical treatment is of no benefit. The condition responds to systemic anti-inflammatory agents, particularly oral flurbiprofen (Froben) which may be supplemented with systemic steroids and/or immunosupressants.

Summary

- The reader should understand the different causes of ocular inflammation, and that,
- Inflammation of the eye can affect any of its layers as well as the ocular adnexae.
- Ocular inflammation may be due to immune abnormalities including allergy, autoimmune diseases, accompany non-infectious or infectious diseases elsewhere in the body.
- Inflammation of the uvea (uveitis) is divided into anterior, intermediate or posterior uveitis depending on which part of the uvea is predominantly involved: anterior uveitis (iritis or iridocyclitis) is inflammation predominantly affecting the anterior chamber and iris; intermediate uveitis (pars planitis) is inflammation predominantly affecting vitreous and ciliary body, and posterior uveitis (choroiditis) refers to predominant involvement of the choroid (and retina).
- Patients presenting with 'red eyes' require examination to exclude cause other than conjunctivitis.
- Good clinical acumen is required to characterize the inflammation.
- Investigations are directed by the clinical findings.
- Infectious causes, and systemic diseases which may present initially as uveitis need particular attention.
- Treatment is guided by the diagnosis, based on clinical features, and confirmed as necessary with appropriate investigations.
- Infectious inflammation requires treatment with particular agents directed at the causative
- Collaboration between the ophthalmologist and other specialists including the chest and genito-urinary physicians is important as necessary.
- Sympathetic ophthalmitis which occurs following trauma is rare but devastating if missed.