Algorithmic approach in the diagnosis of uveitis

S R Rathinam, Manohar Babu

Uveitis is caused by disorders of diverse etiologies including wide spectrum of infectious and non-infectious causes. Often clinical signs are less specific and shared by different diseases. On several occasions, uveitis represents diseases that are developing elsewhere in the body and ocular signs may be the first evidence of such systemic diseases. Uveitis specialists need to have a thorough knowledge of all entities and their work up has to be systematic and complete including systemic and ocular examinations. Creating an algorithmic approach on critical steps to be taken would help the ophthalmologist in arriving at the etiological diagnosis.

Key words: Algorithmic approach, differential diagnosis, naming and meshing, uveitis

Uveitis work up starts with an elaborate history-taking. Subsequently meticulous systemic and ocular examination will offer a clinical conclusion. It is estimated that over 70% of diagnosis can be made on the basis of detailed medical history and thorough clinical work up alone. Systemic history offer possible systemic disease association with ocular involvement. It is often the clinical acumen of the ophthalmologist that points out the diagnosis, that is further confirmed or ruled out by a tailored laboratory approach.

History Taking

Etiological diagnosis of uveitis starts with the first step of elaborate history followed by systemic examination and ocular examination to reach a clinical conclusion. Subsequently list of differential diagnosis is created in order to decide on laboratory investigations to rule out or rule in the possible etiology. Sometimes other sub specialty consultation may be required such as rheumatologist, infectious disease specialist, pulmonologist or dermatologist.

Age

Several conditions have a predilection for certain age groups. Juvenile arthropaties and parasitic uveitis are the most common entities in patients younger than 16 years of age. In general uveitis secondary to infections is common in extremes of age and immunological diseases are common in middle age. Some of the examples are:

- Children: Juvenile Rheumatoid Arthritis, Toxocariasis.
- Young adults: Behcet’s, Human Leukocyte Associated antigen B27– associated uveitis, Fuch’s uveitis.
- Old age: Vogt Koyanagi Harada’s (VKH) syndrome, Herpes Zoster Ophthalmicus, Tuberculosis and Leprosy.

Gender

Several conditions have a predilection for specific gender as given below:

- Males-Ankylosing spondylitis, Reiters, Behcet’s, Sympathetic ophthalmia.
factors include HIV related ocular disorders, leptospirosis and trematode granuloma in children.\[9-12\]

**Systemic conditions**

Collagen vascular disorders are best examples for non-infectious systemic disease which can cause severe ocular morbidity. Other examples include sarcoidosis, Behcet’s syndrome, Reiter’s syndrome and VKH syndrome. Tuberculosis, leprosy, syphilis are common systemic infections that can cause uveitis.\[10\] Other recently reported systemic infections such as Chikungunya and West Nile Virus diseases can also cause ocular inflammation.\[13,14\] Endogenous endophthalmitis is more common in diabetics, renal failure and immuno suppressed patients. In addition patients who received intravenous fluid prior to onset of uveitis may also suffer from endogenous endophthalmitis.

**Ocular symptoms**

Pain, redness and photophobia are the important symptoms for anterior uveitis, while floaters with or without decrease in vision is important for intermediate and posterior uveitis. Pain on ocular movement is seen in posterior scleritis or in orbital inflammatory diseases. Sudden bilateral loss of vision would indicate either VKH’s syndrome or Sympathetic ophthalmia.\[2-5\]

**Extraocular Examination**

The physical signs of extra ocular disease can add evidence to support the etiological diagnosis. Frequently, the findings may have escaped recognition by the patient or, if recognized, may have been deemed insignificant. Thus, it is important for the ophthalmologist to routinely evaluate patients for evidence of extra ocular disease. Table 2 gives some examples of systemic clinical signs one may see in specific uveitis cases.

**Ocular Examination**

A comprehensive eye examination is a requirement for all patients with uveitis, beginning with an assessment of the patient’s best-corrected visual acuity. A good day light examination and external examination with torch light is essential in every patient. Often clues on infectious diseases like Hansen’s disease or Herpes can be obtained on adnexal examination. Common ocular signs that help in the diagnosis are given in Table 3.

**Conjunctiva, episclera, sclera and pupillary examination**

Examination of the anterior surface of the eye should first be performed in ambient illumination for subtle color differences. Inflammation of the conjunctiva and episclera appear bright red in daylight and more in the fornix. In cases of uveitis, the congestion of the perilimbal area is more than the palpebral and fornical conjunctiva. Scleritis will present with dilation of deep vascular plexus which is better seen with red free illumination with tenderness on palpation. Examination of pupil gives clue regarding some of the etiological conditions and structural alterations as a result of inflammation.\[11\]

On slit lamp examination, uveitis can be classified either as granulomatous or non-granulomatous [causes mentioned in Table 4]. Rarely keratic precipitates (KP) may be uniformly distributed as seen in Fuch’s uveitis, Fossner Schlossman syndrome, sarcoid uveitis and lens induced uveitis.

| Table 1: History in uveitis |
|-----------------------------|
| **Demography**              |
| Age                         |
| Gender                      |
| Race                        |
| Residence                   |
| Occupation                  |
| **Ocular history**          |
| Laterality                  |
| Primary symptom             |
| Duration                    |
| Onset                       |
| Severity                    |
| Course                      |
| Associated findings         |
| **Systemic history**        |
| All systemic problem        |
| Associated other diseases   |
| **Treatment history**       |
| A detail history on dosage of drugs that patient is already taking |
| Response to treatment       |
| Treatment complications     |
| Compliance of the patient   |
| **Miscellaneous**           |
| Injury                      |
| Surgery                     |
| Migration                   |

Exposure to risk factors specific to the diagnosis, e.g.: Syphilis, HIV, leptospirosis, trematode eye disease

- Females-Rheumatoid arthritis, Juvenile Rheumatoid Arthritis.

**Race**

Demographic characteristics, such as race and ancestry, can be predispositions to the development of specific conditions, for example:

- Ankylosing spondylitis, Reiters – Caucasians.\[1\]
- Sarcoid-Pigmented race.
- VKH syndrome, Behcet’s syndrome – Orientals.

**Socio economic history**

Recreational activities such as swimming in open water reservoirs may expose the individuals to water borne diseases that may eventually result in uveitis. The best example is leptospirosis and trematode granulomas. Patients who own dogs or cats or are handlers of these animals may be exposed to the intestinal parasites. Toxoplasma gondii and Toxocara canii occur after ingestion of contaminated food sources or contact with soil. Plumbers and sewer workers are at an increased risk of leptospirosis, which is transmitted by a spirochete in sewage water and urine of rats, cattle or other animals.\[8\] Some of the examples of zoonotic diseases are:

- Cat-Toxoplasmosis.
- Dog-Toxocariasis,
- Cattle-Leptospirosis, cysticercosis.
- Pigs-Cysticercosis, Leptospirosis.

Best examples to be concerned about exposure to risk factors include HIV related ocular disorders, leptospirosis and trematode granuloma in children.\[9-12\]
The SUN* Working Group Grading Scheme[15] for anterior chamber cells and flare:

### Anterior chamber reaction

The presence of cells and flare in the anterior chamber is a marker for inflammation of iris and ciliary body. The field size recommended for examination is a slit beam of 1 mm by 1 mm for the grading of anterior chamber cells and flare.

### Table 2: Systemic signs

| Condition | Condition |
|-----------|-----------|
| Poliosis | Vogt Koyanagi Harada’s syndrome, Sympathetic ophthalmia |
| Loss of hair | Systemic lupus erythematosus, Vogt Koyanagi Harada’s syndrome, and Syphilis |
| Hypo-pigmentation of the skin | Leptospirosis, Sympathetic ophthalmia, and Vogt Koyanagi Harada’s syndrome |
| Rash | Vasculitic disease, systemic lupus erythematosus, Adamantiates Behcet’s disease, Syphilis |
| Erythema nodosum-tender violaceous subcutaneous nodules in lower extremities | Inflammatory bowel disease, Sarcoiopsis, tuberculosis, and Behcet’s disease |
| Scaling of the skin | Systemic lupus erythematosus, psoriatic arthritis, Syphilis, and Reiter’s syndrome |
| Discoid lesions | Systemic lupus erythematosus, Sarcoiopsis, leprosy and tuberculosis |
| Nail abnormalities | Psoriatic arthritis, Reiter’s syndrome, and vasculitis |
| Oral and genital lesions | Behcet’s disease, Reiter’s and syphilis |
| Oral ulcers alone | Systemic lupus erythematosus and inflammatory bowel disease |
| Urethral discharge | Reiter’s syndrome, syphilis, herpes simplex, and gonococcal urethritis |
| Epididymitis | Behcet’s disease, Tuberculosis |
| Prostatitis | Reiter’s syndrome, ankylosing spondylitis, and gonococcal disease |
| Nephritis | Vasculitis (Wegener’s granulomatosis SLE, Behcet) sarcoiopsis, tuberculosis |
| Arthralgias and arthritis | Seronegative spondyloarthropathies, juvenile rheumatoid arthritis, Behcet’s, sarcoiopsis, systemic lupus erythematosus, relapsing polychondritis leprosy reactions |
| Cartilage loss | Relapsing polychondritis, syphilis, and gonococcal disease, leprosy, Wegener’s granulomatosis |
| Nasopharyngeal manifestations including sinusitis | Wegener’s granulomatosis, sarcoiopsis, Whipple’s disease, and mucormycosis |
| Bladder (cystitis) | Whipple’s disease and Reiter’s disease |
| Lymph nodes | Tuberculosis, sarcoiopsis, lymphoma |
| Neuropathy | Leprosy, Herpes zoster, sarcoiiosis, multiple sclerosis, syphilis, and sarcoiiosis |
| Hearing loss | Vogt Koyanagi Harada’s syndrome sarcoiiosis |
| Respiratory symptoms | Tuberculosis, sarcoiiosis, Wegener’s granulomatosis (sinusitis) |
| Bowel disease | Whipple’s disease, Crohn’s disease, ulcerative colitis |
| Fever | Collagen vascular disease, tuberculosis leprosiopsis |

SLE: Systemic Lupus Erythematosus

**Table 3: Ocular signs**

### Table 3: Ocular signs

| Anatomical location | Condition |
|---------------------|-----------|
| Forehead and adnexa | Herpes zoster ophthalmicus |
| Vesicles | VKH |
| Poliosis | Sarcoiiosis |
| Nodules | Leprosy |
| Madarosis | Syphilis |
| Conjunctiva | Forien body granulomas |
| Granulomas | Sarcoiiosis |
| Cornea | Viral uveitis |
| Dendritic keratitis, superficial punctate keratitis | Syphilis, tuberculosis, Hansen’s and viral |
| Sclero kerato uveitis | Leptospirosis |
| Exposure and neurotropic keratitis | Leprosy |
| Band keratopathy | Juvenile rheumatoid arthritis, sarcoiiosis |
| Iris/pupil | Miotic and irregular pupils |
| Relative affrent pupillary defect | Posterior synchiae (but the response of the pupil to light and near is symmetric) |
| Sectoral iris atrophy | Asymmetric disc involvement as a result of disc edema due to uveitis or optic atrophy as a result of chronic uveitis |
| AR pupil | Herpetic uveitis (irregular constriction of pupil) |
| Neurosphylis | Neurosyphilis |
| Gonioscopic evaluation | Sarcoiiosis, Tuberculosis |
| Peripheral Anterior Synechie | Sarcoiiosis, Tuberculosis |
| Iris nodules | Sarcoiiosis, Tuberculosis |
| Hyphema | Herpetic |
| Foreign body | Traumatic uveitis |

VKH: Vogt Koyanagi Harada’s, AR: Argyll Robertson Pupil

The SUN* Working Group Grading Scheme[15] for anterior chamber cells and flare:

### Anterior chamber cells

| Grade | Cells in Field |
|-------|---------------|
| 0     | <1            |
| 0.5+  | 1-5           |
| 1+    | 6-15          |
| 2+    | 16-25         |
| 3+    | 26-50         |
| 4+    | >50           |

Flare gives evidence of only previous inflammation or breakdown of blood aqueous barrier.

### Flare

| Flare | Description |
|-------|-------------|
| 0     | Complete absence |
| 1+    | Faint flare (barely detectable) |
| 2+    | Moderate flare (iris and lens details clear) |
| 3+    | Marked flare (iris and lens details hazy) |
| 4+    | Intense flare (fixed coagulated aqueous humor with considerable fibrin) |

*Standardization of uveitis nomenclature (SUN)

**Iris**

Examination of iris may include the presence of posterior
Table 4: Causes of non-granulomatous and granulomatous uveitis

| Non-granulomatous unilateral uveitis | Granulomatous uveitis |
|--------------------------------------|----------------------|
| Sero-negative arthropathy and uveitis | Tuberculosis |
| Traumatic |
| Behcet’s syndrome |
| Leptospirosis |
| EarlySarcoidosis |
| Early tuberculosis |
| Early Syphilis |
| Non-granulomatous bilateral uveitis |
| HLA B27 uveitis |
| Traumatic uveitis |
| Behcet’s, syndrome |
| Fuch heterochromic uveitis |
| Leptospirosis |
| Drug induced uveitis |
| Unilateral granulomatous uveitis |
| Viral anterior uveitis |
| Lens induced uveitis |
| Sarcoid |
| Syphilis |
| Tuberculosis |
| Parasitic |
| Bilateral granulomatous uveitis |
| Bilateral granulomatous uveitis |

VKH: Vogt Koyanagi Harada’s, TINU: Tubulo Interstitial Nephritis Uveitis syndrome, HLA: Human Leukocyte Antigen

Anterior chamber angle
Gonioscopic evaluation may reveal peripheral anterior synechiae sufficient to account for elevated intraocular pressure (IOP). Additionally, one may find angle KP, a small hypopyon which was invisible on slit lamp examination, and inflammatory debris, suggesting an additional mechanism of IOP elevation from occlusion of filtering trabecular meshwork. Abnormal iris vessels, neovascularization or fine branching vessels as seen in Fuch’s heterochromic iridocyclitis, are easily identified by gonioscopy, and their presence can direct appropriate therapy. In cases in which traumatic uveitis is suspected, angle recession and presence of foreign body may be seen.

Lens
Important lenticular findings include cataract. The most common type of cataract in uveitis patients is the posterior subcapsular opacity. Anterior lens changes may also occur, often in association with lens capsule thickening at a site of iris adhesion. Anterior lens opacities following extreme elevations in IOP (glaukome flecken) provide insight into a history of acute uveitis glaucoma.

Intraocular pressure
The IOP in patients with uveitis is most commonly decreased owing to impaired production of aqueous by the non-pigmented ciliary body epithelium.

The factors that can affect IOP include the accumulation of inflammatory material and debris in the trabecular meshwork, inflammation of the trabecular meshwork (trabeculitis), obstruction of venous return, and steroid therapy.

The causes of elevated IOP include:
- Posner-Schlossman’s syndrome.
- Herpetic uveitis.
- Toxoplasmosis.
- Fuchs’ heterochromic iridocyclitis.
- Sarcoidosis.
- Iridocyclitis with secondary angle closure glaucoma.

In patients with uveitis, anterior chamber reaction should be assessed before the instillation of fluorescein to prevent obscuration of anterior chamber details due to a greenish hue caused by the dye after penetrating the anterior chamber.

Indirect ophthalmoscopy
When initiating indirect ophthalmoscopy it is important to direct the illumination beam into the patient’s eye without the concomitant use of the condensing lens. The red reflex is then evaluated in the primary position. This technique gradually allows the patient’s retina to become light-adapted, before exposure to the strong concentrated light delivered by the condensing lens, thereby increasing patient’s comfort and cooperation with the examination. More important is the valuable information that the examiner obtains if the quality and nature of the red reflex changes. For example, if there is an area of active chorioretinitis in one quadrant the red reflex is replaced by a yellowish reflex. If a choroidal hemorrhage or tumor is present in a given area the red reflex is dark only in that area. In addition this review of the red reflex may disclose highly elevated masses as well as intravitreal changes such as foreign bodies, membranes, and parasites.

synechiae which when extensive may produce secluded pupillae, sometimes leading to formation of iris bombe and angle-closure glaucoma. Iris atrophy is a diagnostic feature of herpetic uveitis. Varicella zoster virus generally produces sector iris atrophy due to a vascular occlusive vasculitis, whereas herpes simplex virus usually produces patchy iris atrophy. Other causes of atrophy include anterior segment ischemia, Hansen’s disease, trauma and previous attacks of angle-closure glaucoma. Granulomas may be prominent in the iris stroma or the choroid. Iris nodules are most commonly seen at the pupillary margin are described as Koeppe’s nodules whereas those on the surface of iris are called as Busacca’s nodules. Sarcoidosis, tuberculosis, VKH syndrome, sympathetic ophthalmia and syphilis can show iris nodules. Normal radial iris vessels can be seen dilated in acute inflammation producing iris hyperemia as in rubeosis irides; however, they disappear when inflammation is controlled. Heterochromia of iris can be either hypochromic (abnormal eye is lighter than fellow eye) as seen in Fuch’s heterochromic iridocyclitis or hyperchromic (abnormal eye is darker than fellow eye) as seen in melanosis of iris.
Vitreous
In active vitritis, cells appear white and are evenly distributed between the liquid and formed vitreous. Old cells are small and pigmented, whereas debris tends to be pigmented but larger in size. Active cells can be found in locations that can be helpful diagnostically. A localized pocket of vitritis may suggest underlying focal retinal or retinochoroidal disease. Focal accumulation of inflammatory cells around vessels is seen in active retinal vasculitis. Inflammatory cells that accumulate in clumps (snow balls) may precipitate on to the inferior peripheral retina as seen in intermediate uveitis, associated with sarcoidosis. Cells may accumulate in the retrovitreous space following contraction of vitreous fibrils and posterior vitreous detachment.

Pars plana
Examination of the peripheral retina and pars plana for snowbanking usually requires scleral depression or use of a three-mirror Goldmann contact lens. Exudation, fibroglial band formation and revascularization are pathologic processes that occur at the pars plana.

Retina and choroid
Retinitis presents with a yellow-white appearance and poorly defined edges, often associated with hemorrhage and exudation. Involvement may be focal or multifocal. Retinal vasculitis is usually seen in retinitis and may be seen in Wegener’s granulomatosis, Systemic Lupus Erythmatosus, viral retinitis including herpetic group of infections or newly recognized viruses including Chikungunya or West Nile virus infections [14,15]. Phlebitis may be seen in Leptospirosis or Sarcoidosis.

Choroidal inflammation can also be focal or multifocal. It is not frequently associated with vitritis due to intact retinal pigment epithelial cells that prevents inflammatory cell migration. The inflamed choroid may appear thickened and prominent infiltrates and granulomas may be present. Decomposition of the retinal pigment epithelium can alter the permeability of the blood-ocular barrier, resulting in retinal detachment. It should be highlighted that tuberculosis and sarcoidosis can cause both focal and multifocal choroiditis.

Optic disc
Optic disc inflammation can occur with or without other signs of uveitis. Optic disc involvement takes the form of papillitis or disc edema, neovascularization, infiltration, and cupping. Neovascularisation occurs in ischemic states and is characterized by fragile vessels that are easily ruptured. Sarcoidosis and leukemia can infiltrate the disc tissue, producing an appearance similar to papillitis. Optic neuritis can occur in multiple sclerosis.

Macula
Chronic inflammation can lead to the following pathologies at macula
- Cystoid Macular Edema.
- Macular lamellar holes.
- Retina Pigment Epithelial clumping.
- Choroidal Neo-Vascular Membrane
- Exudative macular detachment.

Systematic Work Up
Once history is taken and complete systemic examination is done, a specific name can be assigned to the clinical entity by using a set of descriptive terminologies in uveitis [1] [Table 5]. Descriptive name can now be compared to the known uveitis patterns. The above two steps are known as “Naming and Meshing Step.”

Probable list of etiologies or causes [Table 6a-e] are constructed and this is known as differential diagnosis (DD). After arriving at a DD we look for investigations to confirm or rule out the specific diagnoses. Table 7 is an algorithm showing systematic workup in uveitis. A comprehensive

Table 5: Descriptive terminologies in uveitis
| Age            | Severity   |
|----------------|------------|
| Paediatric     | Mild       |
| Young adults   | Moderate   |
| Geriatric      | Severe     |
| Chronology     | Pathology  |
| Acute          | Non-granulomatous |
| Acute recurrent| Granulomatous |
| Chroni         |            |
| Anatomical     | Pattern    |
| Anterior       | Focal      |
| Intermediate   | Multifocal |
| Posterior      |            |
| Retinitis      | Disseminated|
| Chorioiditis   | Diffuse    |
| Pan uveitis    |            |
| Laterality     | Etiological|
| Unilateral     | Infectious |
| Unilateral alternating | Immunologic |
| Bilateral      | Traumatic  |
| Symmetrically bilateral | Masquerade |
| Asymmetrically bilateral | Idiopathic |

Table 6a: Causes of Anterior uveitis
| Causes of Anterior uveitis: Ocular diseases | Causes of Anterior uveitis: Systemic diseases |
|--------------------------------------------|---------------------------------------------|
| Non-infectious uveitis | Infectious uveitis | Non-infectious | Infectious |
| Traumatic | Herpetic | Seronegative arthropathy* |
| Lens induced | Tubercular | Sarcoidosis |
| Fuch’s heterochromic uveitis | Parasitic | Masquerade syndrome |
| Post-operative | Fungal infection | Collagen vascular disease |
| Post-traumatic | | Leptospirosis |

*HLA B 27 related uveitis, Ankylosing spondylitis, Reiters syndrome, Psoriatic arthropathy, Inflammatory bowel syndrome
Table 6b: Causes of posterior uveitis and pan uveitis

| Bacterial       | Fungal          | Viral           | Parasitic       | Non-infections |
|-----------------|-----------------|-----------------|-----------------|----------------|
| Tuberculosis    | Nocardia        | CMV retinitis   | Toxoplasmosis   | Sarcoidias     |
| Syphilis        | Asteroides      | Herpes simplex  | Toxocara canis  | VKH            |
| Lymes disease   | Candidiasis     | Herpes zoster   | Cysticercosis   | Sympathetic ophthalma |
| Leptospirosis   | Histoplasmosis  | Chikungunya     | Onchocerca volvulus | Behcets        |
| Brucellosis     | Cryptococcus neoformans | West nile virus |                 |                |
| Septic retinitis| Aspergillosis   |                 |                 |                |

CMV: Cyto Megalo Virus, VKH: Vogt Koyanagi Harada's

Table 6c: Causes of retinal vasculitis

| Bacterial       | Viral           | Vasculitis in Immunologic disorders | Vasculitis-Idiopathic uveitis |
|-----------------|-----------------|------------------------------------|-------------------------------|
| Leptospirosis   | Measles (SSPE)  | Systemic lupus erythematosus       | Birdshot Retinochoroidopathy  |
| Lymes disease   | CMV             | Polyarteritis Nodosa               | GHPC                          |
| Bacterial Endophthalmitis | Herpes Simplex | Wegener's Granulomatosis           | Multifocal choroiditis,       |
| Tuberculosis    | Herpes zoster   | Sjogren's syndrome                 | pan uveitis syndrome          |
| Syphilis        | Miscellaneous   | Giant cell arteritis               | Fungal                        |
| Rickettsia      | Chikungunya[13] | Takayasu's Disease                 | Candidiasis                   |
|                 | West nile virus[14] | Dermatomyocitsy                 | Parasitic                     |

SSPE: Subacute sclerosing panencephalitis, HLA: Human Leukocyte Antigen, DUSN: Diffuse Unilateral Subacute Neoretiinitis, GHPC: Geographic Helicoid Peripapillary Choroidopathy, CMV: Cytomegalovirus

Table 6d: Causes of retinal vasculitis according to size of vessels

| Veins            | Arteries           | Capillaries         |
|------------------|--------------------|---------------------|
| Sarcoidosis      | Polyarteritis nodosa | Whipple's disease   |
| Behcets syndrome | Wegener granulomatosis | Crohns disease     |
| Eales’ disease   | Systemic Lupus Erythematosus | Polychondritis    |
| Multiple sclerosis| Syphilis           | Behcets syndrome    |
| Toxoplasmosis    | West nile virus infection | Syphilis           |
| Tuberculosis     |                    | Leptospirosis       |
| Leptospirosis    |                    |                     |

Table 6e: Causes of joint pain in ocular inflammation

| Non-infectious | Infectious |
|----------------|------------|
| Seronegative arthropathies | Leptospirosis |
| Juvenile rheumatoid arthritis | Syphilis |
| Collagen vascular diseases | Lymes disease |
| Wegener's granulomatosis | Tuberculosis |
| Behcets syndrome | Erethema Nodosum Leprosum of Lepromatous leprosy |
|                   | Chikungunya |
|                   | West nile virus infection |

Table 7: Systematic work up

| Descriptive naming | Example unilateral/bilateral: Granulomatous/non-granulomatous: Acute/chronic, Anterior/ Pan uveitis: mild or severe |
|--------------------|------------------------------------------------------------------------------------------------------------|
| Meshing            | Comparison with the existing diagnosis                                                                   |
| General and specific lab testing | To evaluate the patient for treatment; to rule in/rule out diagnosis                                   |
| Specialist consultation | To confirm the systemic disease and start the treatment                                                |
| Therapy            | General and specific treatment                                                                          |
| Follow-up          | Evaluation for the course and effectiveness of treatment                                               |
Table 8: Differential diagnosis of various clinical signs in uveitis

| Hypopyon                  | HLA B27 uveitis                                      |
|--------------------------|------------------------------------------------------|
|                          | Behcet’s, syndrome                                   |
|                          | Leptospirosis                                        |
|                          | Phacolysis                                           |
|                          | Endophthalmitis                                      |
|                          | Post-operative uveitis                               |
|                          | Leukemia                                             |
| Hyphema                  |                                                      |
|                          | Fuch’s heterochromic uveitis                         |
|                          | Viral uveitis                                        |
|                          | Syphilis                                             |
|                          | Gonococcal uveitis                                   |
|                          | Leukemia                                             |
| Irregular Anterior chamber depth |                                  |
|                          | Iris cyst                                            |
|                          | Sub luxated lens                                     |
|                          | Peripheral anterior synechiae                        |
|                          | Ruptured lens capsule with released cortex in one side|
|                          | Ciliary body tumour                                  |
| Iris atrophy             |                                                      |
|                          | Viral uveitis (Herpes zoster and simplex)            |
|                          | Traumatic                                            |
|                          | Post-laser atrophy                                   |
|                          | Post-operative uveitis                               |
|                          | Hansens uveitis                                      |
|                          | Fuch’s heterochromic uveitis                         |
|                          | Anterior segment ischemia                            |
|                          | Essential Iris atrophy                               |
|                          | ICE syndrome                                         |
| Vitreous cells and opacities |                                                   |
|                          | Inflammatory cells                                   |
|                          | Red blood cells                                      |
|                          | Degenerated old cells                                |
|                          | Pigments                                             |
|                          | Amyloidosis                                          |
|                          | Asteroid hyalosis                                    |
|                          | Synchysis scintillans                                |
|                          | Malignant cells-Retino blastoma Leukemia lymphoma    |
|                          | Lens cortical material                               |
|                          | Parasitic cyst                                       |
|                          | Foreign body                                         |
| Macular edema            |                                                      |
|                          | Pars planitis                                        |
|                          | HLA B27 related uveitis                              |
|                          | Post-operative uveitis                               |
|                          | Vogt koyanagi Harada’s syndrome                      |
|                          | Sympathetic ophthalmia                              |
|                          | Traumatic uveitis                                    |
|                          | Rarely Behcets syndrome                              |
|                          | Posterior scleritis                                  |

(Table 8 Continued)

- Glaucoma in the absence of synechiae
- Sarcoïdosis
- Toxoplasmosis
- Viral uveitis
- Fuch’s heterochromic uveitis
- Phaco anaphylaxis
- Lens protein uveitis
- Low Tension in uveitis
- Bilateral exudative retinal detachment
- Ciliary detachment
- Retinal detachment induced uveitis
- Ciliary shock in acute uveitis
- Traumatic and perforated globe
- Post-operative
- Optic disc edema in uveitis
- Vogt Koyanagi Harada’s syndrome
- Sympathetic ophthalmia
- Leptospirosis
- Pars planitis
- Juxta papillary choroiditis
- Multiple sclerosis
- Neuro retinitis

HLA: Human Leukocyte Antigen, ICE: Iridocorneal Endothelial Syndrome

work up takes the clinician to the list of differential diagnosis [Table 8] and then to a laboratory work up before the treatment is finalised.

Acknowledgements

We greatly acknowledge Dr. Rathika, Aravind eye hospital, and Dr. Tulika Kar, Dehra Dun for their patient assistance in preparation of the manuscript.

References

1. Smith RE, Nozik RA Uveitis: Goals of Uveitis Management; A clinical approach to diagnosis and management Ed. 2, Baltimore: Williams and Wilkins, 1986. Chapter 5, p. 23-24.
2. Rathinam SR, Namperumalsamy P. Global variation and pattern changes in epidemiology of uveitis. Indian J Ophthalmol 2007;55:173-83.
3. Cunningham ET, Nozik RA. Uveitis: Diagnostic approach and ancillary analysis. In: Duane’s Clinical Ophthalmology. Vol. 37. Philadelphia: Lippincott-Raven; 1997. p. 1-25.
4. Nussenblatt RB, Whitcup SM, Palestine AG. Examination of the patient with uveitis. In: Uveitis: Fundamentals and Clinical Practice. 2nd ed. St. Louis: Mosby; 1996. p. 58-68.
5. Rao NA, Forster DJ, Aigsburger JJ. General approach to the uveitis patient. In: The Uvea: Uveitis and Intraocular Neoplasms. Vol. 2. New York: Gower Medical Publishing; 1992. p. 2.1-2.18.
6. Harper SL, Chorich LJ, Foster CS. Diagnosis of uveitis. In: Foster CS, Vitale AT, editors. Diagnosis and Treatment of Uveitis. Philadelphia: W B Saunders; 2002. p. 79-103.
7. Cunningham ET Jr. Uveitis in children. Ocul Immunol Inflamm 2000;8:251-61.
8. Rathinam SR. Ocular leptospirosis. Curr Opin Ophthalmol 2002;13:381-6.
9. Inungu J, Lewis A, Mustafa Y, Wood J, O’Brien S, Verdun D. HIV Testing among Adolescents and Youth in the United States: Update from the 2009 Behavioral Risk Factor Surveillance System. Open AIDS J 2011;5:80-5.

10. Rajapure V, Tirwa R, Poudyal H, Thakur N Prevalence and risk factors associated with sexually transmitted diseases (STDs) in Sikkim. J Community Health. 2013;38:156-62.

11. Shukla D, Rathinam SR, Cunningham ET Jr. Leptospiral uveitis in the developing world. Int Ophthalmol Clin 2010;50:113-24.

12. Rathinam SR, Usha KR, Rao NA. Presumed trematode-induced granulomatous anterior uveitis: A newly recognized cause of intraocular inflammation in children from south India. Am J Ophthalmol 2002;133:773-9.

13. Lalitha P, Rathinam S, Banushree K, Maheshkumar S, Vijayakumar R, Sathe P. Ocular involvement associated with an epidemic outbreak of chikungunya virus infection. Am J Ophthalmol 2007;144:552-6.

14. Shukla J, Saxena D, Rathinam S, Lalitha P, Joseph CR, Sharma S, et al. Molecular detection and characterization of West Nile virus associated with multifocal retinitis in patients from southern India. Int J Infect Dis 2012;16:e53-9.

15. Jabs DA, Nussenblatt RB, Rosenbaum JT, Standardization of Uveitis Nomenclature (SUN) Working Group. Standardization of uveitis nomenclature for reporting clinical data. Results of the First International Workshop. Am J Ophthalmol 2005;140:509-16.

Cite this article as: Rathinam SR, Babu M. Algorithmic approach in the diagnosis of uveitis. Indian J Ophthalmol 2013;61:255-62.

Source of Support: Nil. Conflict of Interest: None declared.