Diagnosis and management of posterior uveitis

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Standardization of Uveitis Nomenclature (SUN) Classification has defined posterior uveitis as uveitic entity where the primary site of inflammation is choroid and/or retina. Based on the pattern of involvement, posterior uveitis was further subdivided in to (Table-1):

Table 1: Posterior Uveitis

Focal, multifocal, diffuse	Choroiditis, Chorioretinitis, Retinochoroiditis, Retinitis, Neuroretinitis

Thus posterior uveitis may be focal, multifocal, or diffuse with involvement of posterior segment structures such as choroid, retina, retinal blood vessels and optic nerve head. It is important to differentiate posterior uveitis from panuveitic entities, where there is no predominant site of inflammation, but inflammation is observed in anterior chamber, vitreous and retina/choroid. There is considerable overlap in clinical presentation of clinical entities like ocular tuberculosis, ocular sarcoidosis, syphilis etc. which can involve any part of the uveal tract and can have plethora of presentations. Similarly cases of intermediate uveitis or pars planitis with structural complications such as macular edema should not be confused with posterior uveitis.Some clinical entities, under rare circumstances, can be potentially confused as posterior uveitis and include multiple leak central serous chorioretinopathy (CSR), age related macular degeneration (ARMD), posterior scleritis and masquerade syndrome such as intraocular lymphoma etc.

Clinical approach to a case of Posterior Uveitis:

Once the diagnosis of posterior uveitis is confirmed, next important step is to determine the extent of involvement of the inflammation. The salient features to differentiate a case of choroiditis from a case of retinitis are enlisted in Table 2.

Once you have differentiated between choroiditis and retinitis, it is important to look at the pattern of involvement and distribution of lesions– whether it is focal or multifocal? For example focal retinitis lesions are usually seen in protozoal and viral infections (Table 3).

Involvement of optic nerve head is seen in a number of ocular inflammatory diseases like Sarcoidosis, Vogt–Koyanagi–Harada syndrome (VKH), Posterior scleritis etc (Table 4).Optic nerve head involvement is also common in various intraocular parasitic infections. Neuroretinitis is a particular form of optic neuropathy characterized by acute unilateral visual loss in the setting of optic disc swelling and hard exudate arranged in a star figure around the fovea[1].Neuroretinitis is primarily thought to be an infectious or immune mediated process and requires detailed workup to clinch the diagnosis.

Table 2: Differentiating features of choroiditis and retinitis

Retinitis	Choroiditis
• Appears as a whitish patch	• Appears as yellowish patches
• Ill-defined margins.	• Relatively well defined margins
• Superficial	• Deeper(deep to the retinal blood vessels)
• Usually a leading edge of the lesion is seen	• Diffuse circumscribed lesion
• Usually associated with severe overlying vitritis	• Mild to moderate vitritis

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Table 3: Posterior uveitis with Retinitis

Posterior uveitis with *Focal*Retinitis	Posterior uveitis with *Multifocal*retinitis
• Toxoplasmosis • Onchocerciasis • Cysticercosis • Masquerade syndrome • Toxocariasis	• Syphilis • Herpes Simplex Virus (HSV) • Varicella Zoster Virus (VZV) • Cytomegalo Virus(CMV) • Diffuse Unilateral Subacute Neuroretinitis (DUSN) • Candida • Sarcoidosis • Masquerade syndrome

Table 4: Posterior Uveitis presenting with optic disc involvement

Posterior uveitis with optic disc edema	Posterior uveitis with Neuroretinitis
• Sarcoidosis • Toxoplasmosis • VKH • Syphilis • Behçet's disease • Sympathetic Ophthalmia • DUSN	• Toxoplasmosis, Toxocariasis • HSV, VZV • Syphilis • CMV retinitis • Sarcoidosis • Cysticercosis • Candida • Lymes Disease

Exudative retinal detachments can be a presenting feature of many panuveitic and posterior uveitis and should be thoroughly investigated. Most of the cases of posterior uveitis with exudative retinal detachment warrants rapid and effective therapy often in the form of pulse steroid mainly because of their vision robbing nature. However, as discussed earlier it is very important to rule out conditions like multiple leak CSR before initiating any treatment in such cases, as treatment of these conditions are completely paradoxical. Also one should be able to distinguish rhegmatogenous retinal detachment from such cases, which requires a surgical management.

Involvement of retinal vessels is an important feature of posterior uveitis (Table 5). One should examine the pattern and type of vascular involvement, which can often give important clue to clinch the diagnosis. For example, frosted branch angiitis is a severe usually bilateral retinal perivasculitis, in which sheathing of vessels produce the appearance of frosted branch of a tree. Similarly Kyrieleis plaques, also referred as segmental retinal periarteritis, are associated with infectious aetiology. Kyrieleis plaques are most commonly associated with *Toxoplasma gondii* Chorioretinitis but can also be seen in infections with *Rickettsia conorii, Mycobacterium tuberculosis, Treponoma pallidum, Varicella zoster* infections etc. Table 5 enlists the pattern of predominant involvement of retinal vessels in posterior uveitis.

Posterior uveitis has a broad differential diagnosis. Etiologically it can be divided into infectious and non-infectious entities (Table 6). Usually posterior uveitis more commonly has an infectious aetiology.

Investigations In The Diagnosis Of Posterior Uveitis

A. *Ancillary investigations:*

Although a provisional clinical diagnosis can be reached in most cases of posterior uveitis with indirect ophthalmoscopy, ancillary investigations helps in not only confirming the clinical diagnosis but also resolving diagnostic dilemma.

Table 5: Vascular involvement in Posterior Uveitis

Predominantly arteritis	Predominantly Phlebitis	Both arteries and veins are involved
• Systemic lupus erythematosus (SLE) • Poly arteritis Nodosa (PAN) • Syphilis • HSV in Acute retinal necrosis (ARN) • VZV (ARN) • Frosted branch angiitis • Chrug-Strauss Syndrome	• Sarcoidosis • Toxoplasma • Human immunodeficiency virus (HIV) infection • Eales Disease	• Multiple sclerosis • Behçet's Disease • Granulomatosis with polyangiitis (GPA), previously known as Wegener granulomatosis

Fundus Photography/ Fundus fluorescein angiography (FFA): Documentation of colour fundus photographs can assist in the follow-up of the disease with treatment. FFA is a valuable tool in diagnosis of posterior uveitis and we routinely do FFA in all cases of posterior uveitis. It is also a great tool in confirming the activity of inflammation in cases like choroiditis, vasculitis etc. It can be used to detect important complications or sequelae of intraocular inflammation such as neovascularization, capillary non-perfusion areas and vascular staining in cases of retinal vasculitis. It is also used to detect macular pathologies like cystoids macular edema and inflammatory choroidal neovascular membrane (CNVM).

Indocyanine Green Angiography (ICG): ICG is more helpful indelineating deeper choroidal lesions and choroidal neovascularization. It is a very promising tool to diagnose and differentiate White Dot Syndromes

Optical Coherence Tomography (OCT): Spectral Domain OCT is a novel imaging tool which helps to diagnose macular pathologies relate to uveitis such as cystoid macular edema, epiretinal membrane (ERM) and inflammatory CNVM. Nowadays Swept Source OCT is been increasingly used to assess choroidal thickness in various inflammatory pathologies.

Ultrasound B scans (USG): It is a very useful tool especially when the media is hazy e. g cataract or severe vitritis or vitreous hemorrhage. It is also indicated in Vogt-Koyanagi Harada's disease to assess choroidal thickness.Posterior scleritis can show thickening of posterior coat of eyeball and T sign on USG B scan.It is also useful to diagnose intra ocular tumours masquerading as uveitis and elevated mass like lesions such as TB sub-retinal abscess.

Table-6: Etiology of Posterior Uveitis

Infective causes	Non infective causes
1. Toxoplasmosis 2. Toxocariasis 3. Tuberculosis (TB) 4. Syphilis 5. Bartonella 6. Viral (Herpes simplex, Varicella zoster, cytomegalovirus)	1. Sarcoidosis 2. Acute posterior multifocal placoid pigment epitheliopathy (APMPPE) 3. Multiple evanescent white dot syndrome (MEWDS) 4. Geographic helicoid peripapillary choroidopathy (GHPC) 5. Multifocal choroiditis (MFC) 6. Punctate inner choroidopathy (PIC)

B. Laboratory investigations:

A tailored lab investigation relevant to the clinical entity in question is the right approach in identifying the etiology of a posterior uveitic entity. Specific tests for each entity have been described later. In cases of diagnostic dilemma, intraocular fluid evaluation for polymerase chain reaction (PCR) and antibody titers helps to clinch the diagnosis.

Infective Posterior Uveitis

A comprehensive overview of the characteristic clinical appearance of common infective posterior uveitic entities and the current management approach is briefly described below (Fig.1).

Syphilis

Syphilis is caused by the spirochete *Treponema pallidum*, an obligate human parasite. It is spread by sexual contact, blood transfusions, and across the placenta to the fetus.It is the most common intraocular bacterial infection and is re-emerging in varied forms, especially with the advent of AIDS. About 1–2% of HIV-positive patients are found to have ocular syphilis[2].Ocular syphilis is great mimicker; may present with features of anterior uveitis or posterior uveitis. In 1990,Gass *et al*[3] coined theterm acute syphilitic posteriorplacoidchorioretinitis which is characterized by large, solitary, grey-white or pale yellowish placoid subretinal lesions with evidence of central fading and a pattern of coarsely stippled hyper pigmentation. Syphilitic uveitis can be the first presentation of the systemic disease in both immunocompetent and immunocompromised individuals[4] .Ocular syphilis is treated with aqueous penicillin G (2-5 million units IV every 4 hours for 10-14 days).Penicillin G procaine 2.4 million units IM daily with 500 mg probenecid orally QID for 10 to 14 days can be used as an alternative.

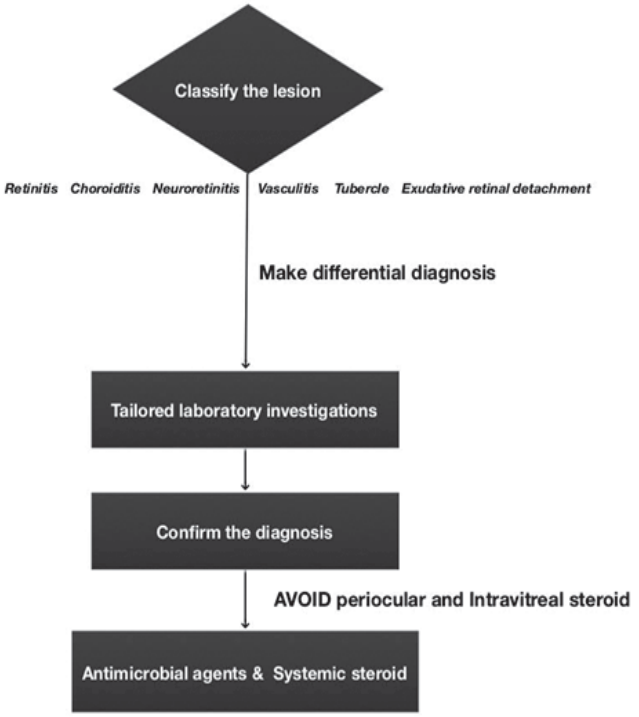

Figure1: Clinical approach to a case of infective posterior uveitis

Viral retinitis

Infection by herpes group of viruses constitute one of the common causes of infectious posterior uveitis. It may affect healthy as well as immunocompromised hosts, although its clinical presentation varies accordingly.

Acute retinal necrosis (ARN) is a devastating viral retinitis and usually presents with a classic clinical triad of moderate to severe vitritis, arteritis and confluent peripheral retinal necrosis. Without treatment, the lesions tend to rapidly progress in a circumferential pattern and involves the other eye also in one third cases (Fig.2).

Progressive outer retinal necrosis (PORN) is another example of viral necrotizing retinitis,occurring exclusively in immunocompromised state, such as in patients with HIV infection[5]. It is characterized by confluent areas of outer retinal whitening with minimal vitritis involving the posterior pole and sparing of retinal vessels at the early stage, the typical “cracked mud appearance is virtually diagnostic[4].

CMV retinitis is usually seen in immunocompromised states such as in AIDS or post organ transplant patients. It

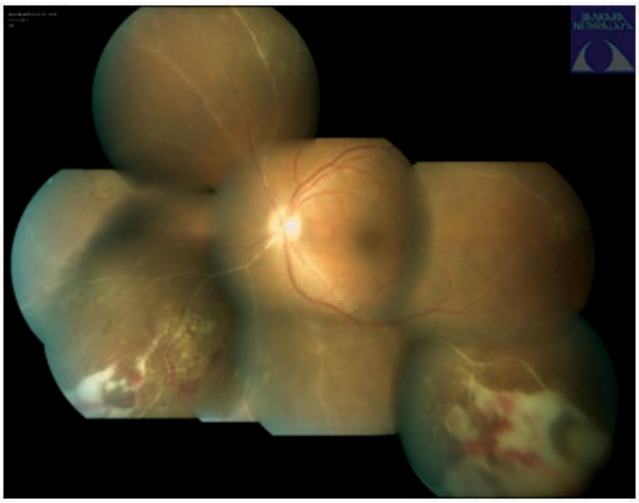

Figure2: Acute retinal Necrosis

can present as fulminant with large areas of hemorrhage and a white, edematous or necrotic retina (also known as "**pizza pie''**) or granular, in which a more indolent progression occurs with lesions that are more peripheral with minimal edema, exudate, or hemorrhage. Polymerase chain reaction (PCR) of vitreous or aqueous sample remains an important tool for isolation of the causative organism in cases of viral uveitis.PCR has been proved more than 90% sensitive for detection of VZV, HSV & CMV[6,7,8].

Ocular toxoplasmosis:

Ocular Toxoplasmosis is caused by *Toxoplasma gondii*, a single-cell, obligate, intracellular protozoan and is likely the most common cause of infectious retinochoroiditis in humans.It is transmitted either by maternal transmission during pregnancy or ingestion of raw or undercooked meat with tissue cysts or from contaminated fruit, vegetables, or water.It has a unilateral presentation in 72–83% of the cases[9].Patients with ocular toxoplasmosis with macular involvement usually present with diminished vision and/or floaters.Toxoplasma lesion is characterized by a focal necrotizing retinochoroiditis, mainly involving posterior pole [10] with overlying vitritis giving it a "Headlight in the fog" appearance" (Fig.3). Presence of an asymptomatic punched-out macular cicatricial lesion with a central necrotic zone involving the retina, choroid, and vitreous is diagnostic of congenital toxoplasmosis.Other manifestations which can be seen in ocular toxoplasmosis include serous macular detachment[11]retinal vasculitis, neuroretinitis[12] with papillitis, disc hemorrhages with venous engorgement, and macular star.In immunocompromised patients toxoplasma lesions can be multifocal and may involve large areas of full-thickness retinal necrosis and mimick viral retinitis. Diagnosis of ocular toxoplasmosis is almost always clinical and serum antitoxoplasma antibody titers can be a supporting aid to the clinical diagnosis. Anti-Toxoplasma immunoglobulin G (IgG) titers present a 4-fold increase that peak 6-8 weeks following infection, then decline over the next 2 years, but remain detectable for life. Anti-Toxoplasma IgM appears in the first week of the infection and then declines in the next few months. In case of diagnostic dilemma, aqueous or vitreous samples may be evaluated for the presence of toxoplasma genomic sequences, using PCR technique. Antibodies titres are measured in aqueous humor and serum and Goldman Witmer (GW) coefficient is calculated. A combination of PCR testing and Goldman Witmer(GW) co-efficient of antibody titres in aqueous or vitreous has high degree of specificity and sensitivity[13, 14, 15] .Most frequently regimen used for the treatment is a synergistic combination of pyrimethamine (25-50 mg/day), sulfadiazine (1gm QID) and folinic acid (15mg twice a week). Clindamycin, a semisynthetic antibiotic with protozoal activity by blocking protein synthesis, has been shown in studies to have high ocular tissue concentration, and activity against the cyst form. Combination of pyrimethamine with azithromycin, a macrolide that inhibits replication of intracellular protein synthesis, has been suggested as an effective and less toxic combination. Atovaquone, a new hydroxy-naphthoqione, is found to be effective against the cysts and tachyzoites of *Toxoplasmagondii*[16]**.**

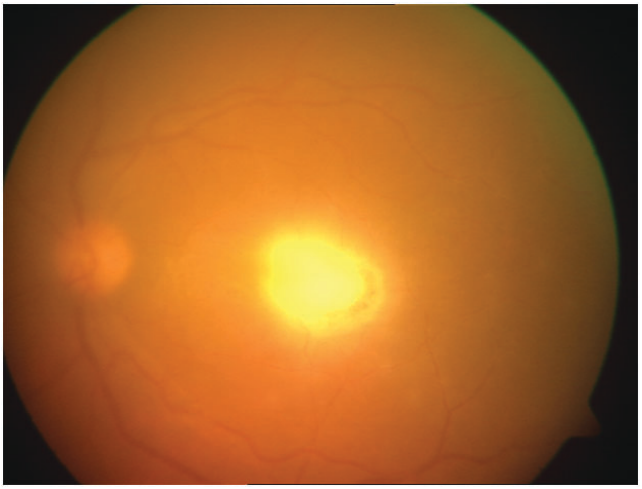

Figure3: "Headlight in fog" appearance in ocular toxoplasmosis

Ocular toxocariasis

Ocular Toxocariasis is caused by the ingestion of larvae of the dog roundworm *Toxocara canis* or the cat roundworm *Toxocara cati.* Risk of human infection is higher in children with pica who may ingest contaminated soil or meat.Ocular toxocariasis is diagnosed based on a positive history of contact with pets and suggestive ocular findings. Infections in humans, an end host, result in a focal granulomatous reaction in many organs, including the eye.Presence of a posterior pole or a peripheral granuloma with tractional retinal detachment or a chronic endophthalmitis-like picture[17]impairing visualization is typical.Whitish/grayish-white granulomas of various sizes may rarely be seen in juxta papillary and subfoveal locations.Toxocara excretory-secretory antigen (TES-Ag) is highly specific for toxocara infection. An increase of anti–

TES-Ag IgE level indicates acute toxocara infection or progressive inflammation. An increase in the IgG level confirms a past or present infection with minimum inflammation. Toxocara GW co-efficient analysis from aqueous and serum can be of value when diagnosing patients with posterior focal lesions or vitritis of unknown etiology[18]. USG/computerized tomography (CT) findings have additional value.Systemic steroids is the mainstay of treatment. Surgical treatment such as pars plana vitrectomy, cryopexy, and laser photocoagulation are usually employed to treat complications.

Ocular tuberculosis

Ocular tuberculosis is an extrapulmonary tuberculous condition and has variable manifestations. It can affect any structure of eye and the clinical course tends to be chronic. In the posterior segment, ocular tuberculosis may manifest as choroidal tubercles or tuberculomas, subretinal abscess, serpiginous choroiditis (SC), or retinal vasculitis.The most common presentation of tuberculous uveitis is of disseminated choroiditis[19]. Choroidal tubercles may be one of the earliest signs of disseminated disease.The lesions range from 0.5 to 3.0 mm in diameter and may vary in size.They appear fairly well circumscribed yellow to gray in colour located deep in the choroid.The next most common presentation is a single tubercle, also termed focal choroiditis,[20] which can occur at the posterior pole. A large tubercle may measure up to 4.0 mm in diameter; however, choroidal masses up to 14 mm in diameter have been reported. The mass is typically elevated and may be accompanied by an overlying serous retinal detachment[21]. Subretinal abscess is formed progressively from a choroidal tubercle, which can be single or multiple (Fig.4). Diagnosis is based on clinical features, suggestive of systemic findings and supportive investigations.Ocular tuberculosis may also present as serpiginous-like choroiditis retinal vasculitis, intermediate uveitis, panuveitis, and neuroretinitis[22]. Fundus fluorescein angiography usually confirms the activity in choroiditis and reveals a classical ring of fire appearance in the subretinal abscess/choroidal granuloma. Occlusive retinal vasculitis can present with neovascularization and capillary non-perfusion areas, which may need prophylactic laser panretinal photocoagulation. Complete hemogram, erythrocyte sedimentation rate (ESR), Mantoux test, interferon gamma release assay and radiological imaging

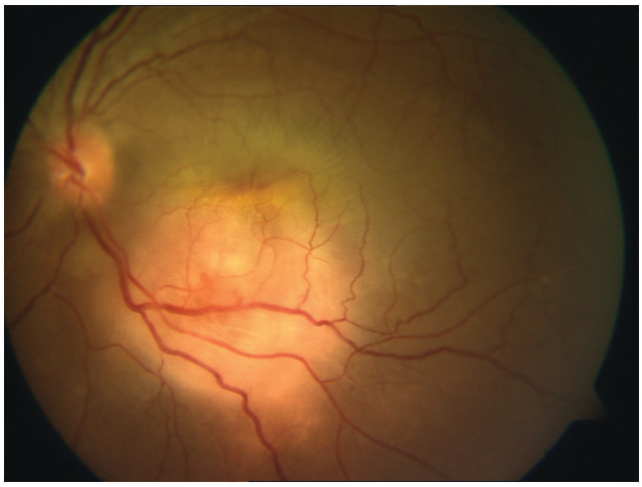

Figure 4: Tubercular subretinal abscess

such as chest X-ray/CT scan should be routinely done in suspected cases of ocular tuberculosis.Histopathological and/or microbiological confirmation of mycobacterium infection, especially by PCR, from intraocular specimens is diagnostic. IS6I I0 primer-based PCR is widely used for detection of the *M. tuberculosis* complex. However, nested PCR technique employing the MPB64 gene is 10,000 times more sensitive and 100% specific and is used in cases of doubt [23, 24, 25].Systemic anti TB treatment is initiated by an infectious disease specialist which include isoniazid, rifampicin, pyrazinamide, and ethambutol. Low dose systemic steroids is used concomitantly.

Role of steroids in infective posterior uveitis

Corticosteroid has been used to treat inflammatory component of infective posterior uveitis because vitritis and vitreous organization progress in spite of effective anti-infective treatment. Corticosteroid helps in reducing intraocular inflammation and clearing the debris, product of inflammation in such cases. Infective conditions need to be treated primarily with the specific anti-infective agents along with anti-inflammatory therapy in the form of low dose steroids.Corticosteroid therapy in such cases should be started only after initiation of proper and effective anti-infective treatment as it can promote replication of the causative organism.Recommended dosage is 1 to 2 mg/kg for 1 week and the drug is tapered over 4 to 6 weeks.

Non Infective Posterior Uveitis:

Current management approach of noninfective posterior uveitis is briefly described below (Fig.5)

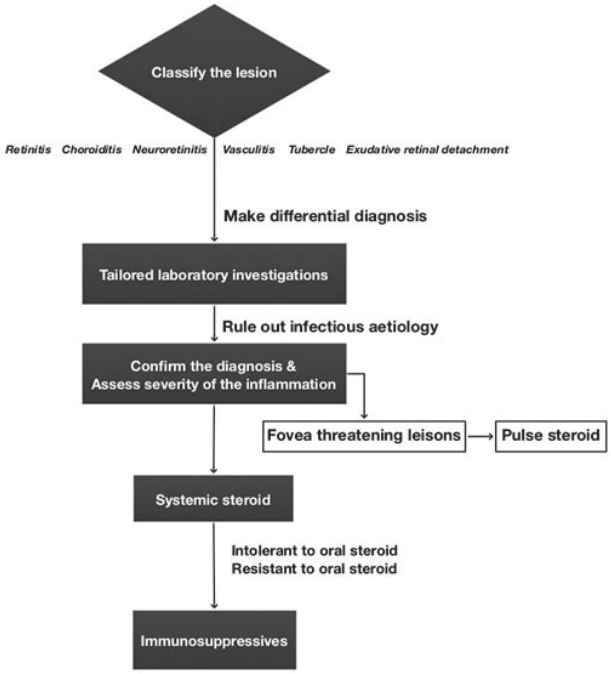

Figure 5: Clinical approach to a case of Noninfective posterior uveitis

Sarcoidosis:

Sarcoidosis is a multisystemic granulomatous disorder which is thought to result from an exaggerated immune response to a variety of antigens. Ocular involvement may be the earliest manifestation of ocular sarcoidosis. Anterior and posterior uveitis is the most frequent ocular manifestation in sarcoidosis.Posterior segment manifestation of sarcoidosis are multifocal choroiditis, retinal vasculitis, choroidal tubercle or mass etc. Choroidal lesions are small usually less than one half disk diameter, creamy or white in colour[26]. They usually involve postequatorial region, more commonly in the inferior half of the fundus. Often a single subretinal mass is seen and can mimic ocular tumors. Retinal vasculitis is a common manifestation of sarcoid uveitis and is typically phlebitis, nonocclusive in nature and usually perivenous creamy white exudation. Posterior uveitis and retinitis was frequently accompanied by central nervous system involvement and may include optic nerve involvement, cranial nerve palsies, encephalopathy, and disorders of the hypothalamus and pituitary gland. Systemic involvement in sarcoidosis include acute Löfgren's syndrome, which is a combination of erythema nodosum, arthritis, and hilar lymphadenopathy (sometimes associated with anterior uveitis) and Heerfordt's syndrome (uveoparotid fever), consisting of fever, parotid swelling, uveitis, and sometimes facial palsy.Serum Angiotensin converting enzyme (ACE) and serum lysozyme are often grouped together as both tests measure the same parameter i.e. macrophage products produced by the sarcoid granulomas. In developing countries where Bacilli-Calmette-Guerin (BCG) vaccination is routinely performed, negative tuberculin test in a BCG-vaccinated patient or in a patient with a previously positive tuberculin skin test is of great value in diagnosis of sarcoidosis. This is the most well-known manifestation of anergy. Radiological evidence of bilateral hilar lymphadenopathy (BHL) is the most common radiological finding in systemic sarcoidosis and regarded as pathognomonic of this clinical entity. Liver is one of the occult sites where sarcoid granuloma can occur and remain undetected. Elevated liver enzymes are of diagnostic value when significantly elevated. As a result of increased calcium absorption after an increased production of 1, 25-dihydroxycholecalciferol by the sarcoid granulomas, hypercalcemia and hypercalciuria occur in some patients with sarcoidosis. Confirmation of the diagnosis of sarcoidosis or diagnosis of definite ocular sarcoidosis can be made by solid-tissue biopsy showing classic noncaseating granulomas, and preferably at more than one site. Skin, conjunctiva, and lacrimal glands are the common sites for nodular lesions in sarcoid[27].

White dot syndromes:

Other non-infective posterior uveitic entities include the white dot syndromes(WDS) which are characterizedby the presence of discrete white lesions located at various levels of the retina, outer retina, RPE and choriocapillaris (Fig.6).

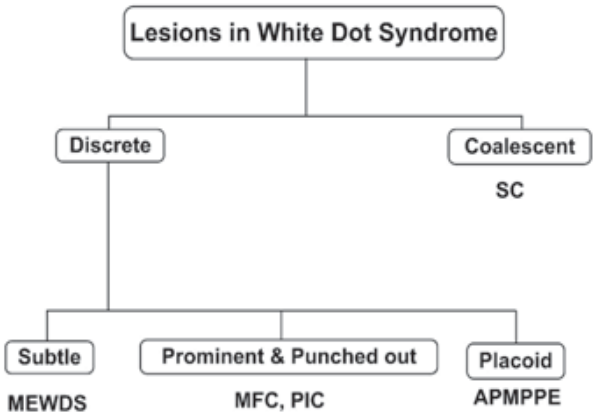

Figure 6: Morphology of lesions in white dot syndrome

FFA and ICG are virtually diagnostic in WDS. While the etiology of white dot syndromes remains unknown, some suggest an autoimmune/inflammatory cause triggered by an exogenous agent. Patients with WDS present with sudden blurring of vision associated with photopsia, floaters, scotomata, and metamorphopsia.In addition, treatment of these diseases is similar.

Treatment options include immunosuppressive therapy, laser photocoagulation, topical or systemic steroid therapy, photodynamic therapy, and, most recently, anti-vascular endothelial growth factor agent.

Acute posterior multifocal placoid pigment epitheliopathy(APMPPE): It is a self-limiting bilateral inflammatory retinal/choroidal disease characterized by appearance of multiple yellow-white, flat inflammatory lesions lying deep within the sensory retina, most notably at the level of the RPE and the choriocapillaries. Diagnosis is based upon a characteristic fluorescein angiogram pattern of early blockage with late staining[28].

Multiple Evanescent White Dot Syndrome (MEWDS): A rare unilateral disease characterized by the presence of white lesions deep in the outer retina or at the level of the RPE. A viral prodrome is known in 50% of the patients.Newly recognized angiographic features termed dots and spots, which varied in size and location in the fundus, have been reported. Small dots were in the inner retina or at the level of the RPE, and larger spots were more external in the subpigment epithelial area.It can be distinguished from other WDSs by its unilaterality, distinct morphology, associated macular granularity, characteristic angiographic pattern, self-limiting course, lack of significant sequelea, absence of associated systemic involvement, rapid recovery, and excellent visual outcome.[33]Usually no treatment is required.The lesions disappear without scarring and photopsias and scotomata gradually resolves[29].

Serpiginous choroiditis (SC): It is a rare, chronic, progressive, and recurrent bilateral inflammatory disease involving the RPE, the choriocapillaries, and the choroid. It is characterized by irregular, gray-white or cream-yellow subretinal infiltrates at the level of the choriocapillaries and the RPE. Lesions can be peripapillary or macular. Mild vitreous and anterior chamber inflammation is observed in one-third of the cases.

Ampigenous choroiditis: It is a bilateral condition which is characterised by lesions mimicking placoid lesions of APMPPE and coalesced lesions of serpiginous choroiditis. Mild vitreous and anterior chamber inflammation can be seen. Optic disc edema, rarely, peripapillary scarring, and prominent linear chorioretinal streaks may also be present[30].

Multifocal choroiditis (MFC): Bilateral condition characterized by anterior segment cell, vitritis, and acute choroidal lesions of the macula. Cystoid macular edema and choroidal neovascularization may result from these lesions, both contributing to vision loss. Retinal pigment epithelium metaplasia and fibrous scarring are additional causes of vision loss. On fluorescein angiography acute lesions show early hypofluorescence and late hyperfluorescence[31].

Punctate Inner choroidopathy (PIC): It is aninflammatory multifocal chorioretinopathy of unknown etiology.The anterior segment is quiet. The lack of vitreous inflammation is a hallmark of PIC and the presence of vitritis should suggest a different diagnosis differentiates this condition from multifocal choroiditis.Usually no treatment is advised for the majority of patients unless complicated with CNVM or subretinal fibrosis[32].

Treatment of Non-infective Posterior Uveitis

Systemic corticosteroids are considered as workhorses of the management of posterior Uveitis. They are the most rapid and most effective ocular immunosuppressant available.Prednisolone is the most commonly used oral corticosteroid. Prednisolone acts in an hour or two and hence is the drug of choice in acute inflammation as the other immunosuppressive agents take a longer time to start their action. Oral prednisolone is used in a dose of 1-1.5 mg /kg body weight as an induction dose and based on the clinical response and the requirement of the patient it can be tapered to lesser dosage. Intravenous corticosteroids are often required in patients who need aggressive management of the inflammation, as in a patient with optic nerve involvement, severe VKH, sympathetic ophthalmia, serpiginous choroiditis or in case of panuveitis. The most commonly used drug is methyl prednisolone. The usual dosage is 500 mg to 1 gm intravenous infusion with 0.9% normal saline or sodium lactate solution over 30 to 60 minutes daily for 3 consecutive days, followed by high dose of oral corticosteroids[33]. Caution should be taken as intravenous methyl prednisolone can cause cardiac arrhythmias and cardiovascular collapse. Intravenous methyl prednisolone should be followed by high dose oral

steroid or immunosuppressive agent. Systemic corticosteroids can cause a number of side effects. The most common side effects are cushingoid face, hypertension, peptic ulceration, hyperglycemia, psychosis, insomnia, osteoporosis, electrolyte imbalance. Though corticosteroid remain mainstay of uveitis, because of their potential systemic side effects often it is difficult to continue these medications in some patients. Also some uveitic entities often don not respond to significant dosage of oral steroid.The need for less-toxic, more effective anti-inflammatory treatment and management of cases refractory to corticosteroids or intolerant to the corticosteroids lead to the use of immunosuppressive agents in noninfective cases of posterior uveitis. Detailed discussion on these immunosuppressives is beyond the scope of this article. Primary use of such immunosuppressives include: as a corticosteroid-sparing therapy because of undesirable side-effects of steroid therapy, posterior uveitis recalcitrant or resistant to oral corticosteroids and management of specific diseases where immunosuppressives are the drug of choice like Behçet's Disease. However care should be taken to rule out infective aetiology prior to initiation of treatment by these group of agents. Recently intravitreal sustained drug delivery devices with various corticosteroid agents have become popular and they have some advantages over intravitreal injections-predictable delivery to the target tissue, constant controlled release of drug for a prolonged period.

Conclusion:

The differential diagnosis of posterior uveitis is extensive. A thorough history, physical examination, careful review of systems and use of ancillary diagnostic tests like FFA, ICG, USG, and OCT aid in establishing a diagnosis of posterior uveitis. It is useful in clinical practice to rule out infectious causes first. Once the infectious causes are ruled out systemic steroids with or without immunosuppressants can be started for non infectious uveitis. Infective posterior uveitis cases are treated with specific anti-infective therapy and steroids.It is essential to follow-up all patients with posterior uveitis even after the resolution of lesions for complications related to the disease, such as CNVM and retinal detachments.

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