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1. Inves Ophtha & visual sci, June 2006 vol.47, no.6:2329-35  *Evidence from LAST study*
Indocyanine Green Angiography in Uveitis

Dr. Vishal R. Raval, Dr. Debmalya Das, Dr. Jyotirmay Biswas

Imaging in patients with uveitis offers excellent information that can provide insight regarding the etiology of the inflammation, extent of the disease, and also serves as a guide for possible treatments.

One of the essential procedures performed in uveitis to complement clinical findings of the patient with intraocular inflammation is Fundus fluorescein angiography (FFA) and recently Indocyanine green angiographic (ICGA). The choroidal vasculature is mainly involved in the inflammatory disease process in many uveitic conditions. The choroid is as such difficult to study as it lies anatomically and optically hidden behind the retinal pigment epithelium (RPE). FFA provides little information about the underlying choroid and hence ICG plays a major role in conditions where choroid is primarily involved. In such cases ICG may be performed to diagnose the underlying disease or it may be just a complimentary tool for diseases already diagnosed by clinical examination or other investigational methods such as FFA and optical coherence tomography (OCT). It may also be used for better understanding the etiopathogenesis of the disease by imaging the choroidal vasculature as well as in follow-up period to monitor the activity of the disease and the response to treatment.

This study was carried out to assess the extent and type of choroidal involvement in a variety of inflammatory eye diseases using ICG angiography.

**MATERIALS AND METHODS**

Case records of 44 patients with different uveitic conditions who were seen between May 2010 and April 2011 in the uveitis services department of the Medical Research Foundation, Sankara Nethralaya, Chennai, India, a tertiary care eye hospital, were analyzed.

Cases included were patients with active choroiditis who had symptoms of visual disturbance with vitreous cells (with or without anterior chamber activity) and lesions evident ophthalmoscopically that appeared to be at the level of the choroid. Patients were excluded if they were pregnant or had a known allergy to iodine.

Complete ophthalmic examination including detailed slit- lamp examination
for any anterior chamber reaction, keratic precipitates, presence of any vitreous
cells and detailed fundus examination with indirect ophthalmoscopy with
scleral indentation was done. It was followed by color fundus photography
and angiography. The majority of patients had FFA performed at the same
time as ICGA, while a few had ICGA alone. FFA and ICGA were performed
with a standard fundus camera (zeiss FF 450 plus IR, version 4.4.3). ICG
angiography was performed with 50 mg of ICG on both eyes of all patients
using the infrared diode laser. Pictures were taken for the first 5 min of the
ICG angiogram, then at 10 min and at 30-40 min.

RESULTS
A total of 44 patients were evaluated: 19 (43%) males and 25 (57%) females with
a mean age of 38 years (range from 14-78 years). Anatomic location of uveitis
included 3 intermediate (7%), 30 posterior (68%) and 11 panuveitis (25%). Table
1 summarizes the various diseases imaged with ICGA.

Table 2 summarizes the angiographic findings in patients with uveitis. ICGA provided more detailed information about the nature of the choroidal
involvement than the accompanying fluorescein angiography. Lesions
that appeared to be actively inflamed on a basis of clinical history and
ophthalmoscopic appearance showed hypofluorescence on ICGA. More
detailed consideration of these hypofluorescent areas suggested two possible
pathologies. In 24 patients (80%), on ICGA hypo fluorescence appeared to be
due to masking of the choroidal fluorescence by inflammatory pathology.
Less commonly in 6 patients (20%) it was due to choroidal hypoperfusion.
ICGA additionally helped to determine the nature of a juxta papillary
inflammatory lesion in patients with serpiginous choroiditis (4 patients) with
a corresponding hyperfluorescent area in the 30 min stage of ICGA. Areas of
chorioretinal scarring and atrophy corresponded to well demarcated areas of
choriocapillaris loss with the underlying large choroidal vessels clearly visible
(10 patients). 3 patients of intermediate uveitis diagnosed clinically and on FFA
showed no visible alterations in choroidal vasculature on ICGA, suggesting
limited role in patients with intermediate uveitis.

<table>
<thead>
<tr>
<th>Anatomical location (No of pts)</th>
<th>Diseases (No of patients)</th>
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</thead>
<tbody>
<tr>
<td>Intermediate (3)</td>
<td>Intermediate uveitis (3)</td>
</tr>
<tr>
<td>Posterior (30)</td>
<td>Serpiginous choroidopathy (12), Multifocal choroiditis (6), Ampiginous uveitis (5).</td>
</tr>
<tr>
<td>Panuveitis (11)</td>
<td>MEWDS (5), Lupus choroidopathy (1), APMPPE (1)</td>
</tr>
<tr>
<td></td>
<td>VKH (5), Sarcoid panuveitis (3), Tuberculous uveitis (2), Sympathetic ophthalmia (1)</td>
</tr>
</tbody>
</table>
### Table 2

<table>
<thead>
<tr>
<th>Choroidal abnormality</th>
<th>ICG angiographic findings</th>
<th>(No. of patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active choroiditis</td>
<td>(a) Masking of choroidal fluorescence by inflammatory infiltrate</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>(b) Dark areas due to mixture of choriocapillaris loss and</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>masking of choroidal fluorescence by inflammatory infiltrate</td>
<td></td>
</tr>
<tr>
<td>Choroidal neovascular membrane</td>
<td>Late hyperfluorescence due to membrane staining</td>
<td>4</td>
</tr>
<tr>
<td>Chorioretinal scarring and atrophy</td>
<td>Well-demarcated dark areas due to choriocapillaris loss</td>
<td>7</td>
</tr>
<tr>
<td>with RPE irregularity</td>
<td>with large underlying choroidal vessels visible</td>
<td></td>
</tr>
</tbody>
</table>

### DISCUSSION

The choroid is the starting point of the inflammation in many diseases including MEWDS, APMPPE, multifocal choroiditis, serpiginous choroiditis, VKH, sympathetic ophthalmia and birdshot chorioretinopathy and participates in the inflammatory process in many other diseases such as sarcoidosis, tuberculosis, syphilis, toxoplasmosis, posterior scleritis and many more which have extensively been analyzed by ICGA.2-12

ICGA is principally useful and has allowed imaging access to the choroidal compartment, which has been poorly utilized to date. It has allowed us to understand etiology of the disease, classify choroiditis according to the structure that is preponderantly or initially involved and not simply according to fundus appearance of lesions.13 ICGA developed as an adjunct to FA to evaluate the choroidal vasculature. As experience has grown with ICGA it has developed distinct applications of its own. ICG is a tricarbocyanine dye, which is highly protein bound and is active in the infrared range. The absorption peak of ICG is situated at 795 nm, and emission of fluorescent light occurs at approximately 830 nm (near-infrared wavelengths), thus allowing visualization of choroidal fluorescence through the RPE. In contrast to fluorescein, ICG is not only highly protein bound (98%), but notably binds as much as 80% to larger proteins, such as globulins and alpha-1-lipoproteins. Accordingly, ICG does not leak from normal or only slightly inflamed retinal vessels, but leaks readily from the fenestrated choriocapillaris, progressively impregnating the choroidal space.

The alteration of the normal choroidal ICG background fluorescence is the main parameter studied in ICGA performed for posterior uveitis. The most crucial information is usually obtained from the later phases of study.14 Choroidal inflammatory lesions appear as areas of decreased or absent fluorescence during the late phases (20 to 30 minutes) of ICGA.15 Recently, two
patterns of inflammatory choroidal vasculopathy have been recognized by ICGA: Type 1 represents more selective inflammatory choriocapillaropathies and appears as hypofluorescence in both the mid and late phases of the ICGA study. Type 2, in contrast, represents stromal inflammatory vasculopathies and is characterized by late leakage of ICG dye from inflamed choroidal vessels. Many of the so-called “white dot syndromes,” which selectively involve the choriocapillaris, tend to exhibit a type 1 pattern, whereas disorders that involve the choroid more diffusely, such as sarcoidosis, tuberculosis, VKH, sympathetic ophthalmia, bird shot chorioretinopathy, Behçet’s disease, and posterior scleritis tend to show a type 2 pattern.

The most common findings on fluorescein angiography that correspond to areas of active choroiditis are of early hypofluorescence with late hyperfluorescence—a combination of angiographic signs considered characteristic of active choroidal inflammation. Active areas of choroidal inflammation were seen on ICGA as areas of hypofluorescence. These could firstly arise from areas of reduced dye influx, i.e. reduced choroidal perfusion. Secondly could arise when dye influx is normal but pathological changes in the choroid and/or RPE result in masking of normal choroidal fluorescence. The hypofluorescent areas on ICGA in this study were most commonly due to masking, with obvious masking of the fluorescence from large underlying choroidal vessels. This could be due to granuloma formation within the choroid as has been shown histopathologically in a number of inflammatory diseases. Choriocapillaris loss in areas of active choroiditis was evident on ICGA in a few patients in this study: within the corresponding hypofluorescent area the large underlying choroidal vessels were seen in increased contrast when compared with those in surrounding normal areas. ICGA has previously demonstrated localized choriocapillaris loss within the placoid lesions of APMPPE while transient, more generalised choroidal hypoperfusion has been demonstrated in both APMPPE and VKH. It has been postulated in both these disorders that the perfusion deficits may be secondary to a choroidal vasculitis.

Unlike for FFA, it is not rare that ICGA gives the essential contribution that leads to the diagnosis. This can be the case for patients with MEWDS (5 patients) and birdshot chorioretinopathy that have near normal fundus or no signs on FFA. Both the diseases shows dark hypofluorescent spots which seems to appear at 10 minutes and persists throughout the study.

As choroidal lesions can only be detected by ICGA, it is obviously the recommended modality to monitor the evolution and to evaluate the impact of treatment on choroidal inflammatory process. In case of VKH disease, clinical disease, meaning inflammation involving extra choroidal structures accessible to fundus observation, to OCT and FFA, can be followed by classical means. However, once clinical disease is under control, it has been shown that
subclinical disease is ongoing, resulting in almost 100% of cases in sunset-glow-fundus (SGF) the witness of ongoing disease destroying choroidal pigment. It was recently shown that ICGA guided treatment of VKH could avoid evolution towards SGF when treating subclinical disease shown by ICGA.\textsuperscript{19}

Areas of gradually increasing hyperfluorescence suggest leakage of dye from the choroidal vasculature, either due to secondary neovascular membrane or due to extensive breakdown of the blood-retinal barrier. Such areas have been demonstrated most convincingly in VKH\textsuperscript{19} and Behçet’s disease\textsuperscript{20} but also in a single report of SLE chorioretinopathy.\textsuperscript{21}

In conclusion ICGA plays an important role in evaluation and management of inflammatory eye disease and is a valuable adjunct to fluorescein angiography.

REFERENCES


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**Role of Real Time PCR in Chikungunya Retinitis**

**Dr. Parthopratim Dutta Majumder, Dr. Biswas Jyotirmay, Dr. Malathi**

Chikungunya is a rare viral disease with ocular lesions. Chikungunya retinitis should always be kept as differential diagnosis for any necrotizing retinitis. Serological diagnosis is difficult. Real time PCR for chikungunya virus in suspected cases of viral retinitis will aid in diagnosis and prompt treatment. We report three rare cases of chikungunya viral retinitis and study the role of real time polymerase chain reaction in the diagnosis of chikungunya viral retinitis.

**MATERIALS AND METHODS**

First case was a 48 year old male presented with gradual, progressive diminution of vision in both eyes since 15 days. He gave history of fever...
prior to the onset of ocular complaints. He had consulted locally and was diagnosed as neuroretinitis for which he had received 3 doses of intravenous methyl prednisolone. On examination, his best corrected visual acuity (BCVA) was 2/60, <N36 in right eye and CF -3 Meters, <N36 in left eye. Slit lamp examination of the anterior segment was within normal limit. Fundus examination revealed subretinal exudates and haemorrhages involving posterior pole in both eyes. Fundus fluorescein angiography showed areas of capillary non perfusion corresponding to the areas of retinitis. He was provisionally diagnosed as a case of atypical viral retinitis and empirical treatment was started with oral antiviral Valacyclovir 1 gm thrice daily and oral Prednisolone 40 mg/day in tapering dose. Anterior chamber tap was done and the aqueous aspirate was sent for PCR for Herpes simplex (HSV), Varicella zoster (VZV), CMV was negative. Patient was examined on his next visit after 2 days, when his vision deteriorated to CF @ 3 Meters, < N 36, CF @ 2 Meters, <N36. The dose of oral steroid was increased from 40 mg/day to 60 mg/day and blood sample was sent for real-time PCR (RT PCR) for Chikungunya Viral RNA. RT PCR for Chikungunya Virus detected 9 copies of viral RNA /ml. The patient was advised to continue the same treatment. He was examined after 2 months when his BCVA was 6/18; N 18 in right eye and 6/24; N 18 in left eye. Fundus examination of both the eye revealed complete resolution of the retinitis and haemorrhages.

Our second case was a 58 years old lady, who presented with a complaint of sudden diminution of vision in left eye for 12 days. She also gave us the history of Chickungunya fever 8 months back. She was a nonhypertensive and nondiabetic who had received intraarticular steroid injection for left shoulder pain. On examination her BCVA was 6/5; N6 in right eye and 2/60; less than N36 in left eye. She was on topical Nepafenac for her current ailment, prescribed elsewhere. Anterior segment examination was within normal limit except for early lens changes in both eyes. Fundus examination of the right eye was normal and left eye showed a hyperaemic disc, obliterated cup, blurred margins with peripapillary nerve fibre layer edema and subretinal exudates in posterior pole. All the laboratory parameters were within normal limit except for a high erythrocyte sedimentation rate (ESR) - 35 mm of Hg. She was advised for RT PCR for chickungunya virus and started on empirical treatment – oral antiviral valacyclovir 1 gram three times a day and oral prednisolone 70mg/day in tapering doses. RT-PCR detected 63 copies of viral RNA/ml of her blood sample. She was advised to continue the same treatment. She was examined after one month when her BCVA improved to 6/9; N6 in left eye.

Third patient of this case series was a 65 years old male who presented with complaints of blurring of vision in both the eyes following fever. The fever was of high grade and associated with body ache and joint pain and was treated
symptomatically. No relevant serological investigations were carried out at that time. He was investigated and treated elsewhere with oral steroid. On examination his BCVA was counting fingers at 1 meter distance; <N36 in right eye and 1/60 ;< N36 in left eye. Anterior segment examination was with in normal limit except for early lens changes. Fundus examination of both the eye showed disc pallor and retinal oedema, cotton wool spots, hard exudates, decreased blood vessels caliber along with scattered haemorrhages in the posterior pole. Fundus fluorescein angiography was suggestive of ischemic vasculopathy. Visual field analysis showed constricted field (more nasally) with central involvement. All the laboratory parameters were normal. A provisional diagnosis of viral retinitis was made and the patient was started on empirical antiviral and oral steroid. He was advised for RT PCR for chickungunya virus and RT-PCR detected 358 copies of viral RNA/ml of his blood sample. He was again examined after one week from the initiation of empirical treatment when patient informed of mild improvement of his vision. His BCVA was 2/60; <N36 in both eyes. Fundus examination of both eye showed resolving subretinal oedema, haemorrhages and cotton wool spots and pale disc .He was advised to continue the same treatment. He was again examined after 1 month. His BCVA was counting fingers at 3 meters distance; N18 in right eyes and 6/60; N10 in left eye. Fundus examination of right showed a pale disc, resolved subretinal edema, cotton wool spots, haemorrhages and few hard exudates scattered over the posterior pole. Fundus examination of left eye revealed mild pallor of the disc and normal posterior pole; spontaneous resolution of the retinal lesions.

In conclusion Real-time PCR bears a very large dynamic range of starting target molecule determination. It is extremely accurate and less labor-intensive. Results are highly reliable compared with conventional PCR, because with real-time PCR, the whole amplification profile is known. Our three cases illustrate the role of real time polymerase chain reaction in the diagnosis of Chikungunya viral retinitis.

Mycophenolate Mofetil Therapy in Uveitis: Analysis of Twenty Cases in a Tertiary Ophthalmic Care Centre in India

Dr. Amit Basia, Dr. Jyotirmay Biswas

Inflammatory eye disease is a crucial cause of blindness in the working age group. The incidence of blindness in uveitis can be as high as 35%, with bilateral loss in 10%. The benefits of the currently available immunosuppressive
drugs, such as cyclosporin A (CyA), azathioprine (Aza), methotrexate (Mtx), tacrolimus, and cyclophosphamide (CyP) are often limited by their side-effects, resistance to therapy and relapses despite treatment. In the absence of selective and individualized immunomodulating agents, MMF (reversible inhibitor of inosine monophosphate dehydrogenase, an enzyme involved in the de novo synthesis of purines), has been suggested as a safe and effective option.

The purpose of this article is to describe our experience in the use of mycophenolate mofetil as either a primary treatment or as a steroid-sparing agent in a series of patients with chronic noninfectious ocular inflammatory diseases.

MATERIALS AND METHODS

Case records of all patients treated with MMF for uveitis at uveitis clinic, between 1999 and 2010 were reviewed. History and follow-up data were obtained through our subsequent longitudinal care. MMF was introduced in patients who had uncontrolled inflammation on prednisolone alone (continuing inflammation despite doses greater than 15 mg per day), uncontrolled inflammation on a combination of prednisolone and other immunosuppressives (cyclosporine, azathioprine or methotrexate), or toxicity of another immunosuppressives. Therapy was started at a dose of 1g twice daily. Prednisolone was given concomitantly in patients at high dose (40–80 mg daily depending on disease severity) when the posterior segment inflammation was active and was then reduced slowly by 10 mg per week to maintenance levels (10 mg daily was aimed for) till the inflammation was brought under control.

The primary measure of success in this study was improvement in the symptoms and signs of ocular inflammation i.e. control of inflammation. Other outcome measures were reduction in prednisolone dose (steroid sparing effect), effect of treatment on visual acuity, and adverse effects of MMF therapy. Change in visual acuity was analyzed by converting the baseline Snellen acuity to LogMAR acuity and was noted at the time of commencement of therapy and thereafter at the final follow-up. A “steroid-sparing” effect was said to have been achieved if there was a 50% reduction in the dose of prednisolone from baseline or if the maintenance dose was 10 mg per day with stable uveitis. All the collected data was statistically analyzed using the computer software SPSS 17 version.

RESULTS

Twenty patients (11 males and 9 females) on MMF, with a mean age of 39.8 years (range, 3-58 years), were reviewed. Mean follow up was 28.95 months (range,
3-72 months). Eleven patients had unilateral involvement and nine patients had bilateral involvement. Mean duration of disease prior to commencing MMF was 23.31 months (range, 0.33-131 months). Mean duration of previous treatment before MMF usage was 18.7 months (range, 1-131 months) All patients had active disease at the time of commencement of MMF. The most common reason for using MMF was uncontrolled inflammation on current therapy.

The steroid sparing effect was achieved in all patients having a mean duration of 1.95 months (range, 0-6 months).

Mean follow up time after MMF usage was 28.95 months (range, 3-72 months). Mean duration for which MMF used was 14 months (range, 2-54 months). The most common reason for using MMF was uncontrolled inflammation on current therapy (n= 16), as a first line therapy in two patients, intolerance to azathioprine in two patients due to lymphopenia. MMF replaced cyclophosphamide in three patients, methotrexate in two patients, azathioprine in nine patients and cyclosporine in five patients. None of the patients had any side effects.

From the first MMF dose to the last, visual acuity (VA) status improved in 18 eyes, remained stable in 9 eyes and deteriorated in only two eyes. The best corrected mean logMAR VA was improved in eighteen patients from 0.96 to 0.51. Log MAR VA was not changed in nine patients (mean 0.57).

The steroid sparing effect was achieved in 80% patients within 3 months of initiation of MMF therapy. Intraocular inflammation was controlled in all patients (n=20) in whom MMF was started. Mean number of relapses before MMF usage was 4.45 times (range, 0-15). Mean number of relapses after MMF usage was 0.45 times (range, 0-15).

At final follow up, seventeen patients were on a combination of MMF and steroids, while three patients were on MMF only. For all patients who were on steroids along with MMF, the steroid dose was reduced to maintenance dose of 10 mg/day. At last follow up after treatment, the efficacy of MMF in keeping disease activity under control was maintained in all of the patients.

DISCUSSION

Ocular inflammatory disease carries great potential for visual loss and morbidity with a high socioeconomic impact. Chanaud et. al. were the first to demonstrate its effectiveness in inhibiting experimental autoimmune uveitis. Our study indicates that MMF was effective in controlling inflammation in most of the patients as also reported by several studies.1,2

In our study, MMF was used in chronic refractory cases with uncontrolled disease, as an adjunct to obtain a steroid sparing effect or in cases intolerant
to other immunosuppressants, with mean disease duration of 23.31 months. Other case series have also used MMF as a second- or third-line agent. A steroid-sparing effect was noted in 80% of our patients which is variable in various studies and reported to range from 55% to 91%.

In our study visual acuity was improved in 18 eyes and remained stable in 9 eyes and deteriorated in only two eyes. The reason for visual decline was epiretinal membrane formation in one patient and optic atrophy in another. In a previously reported series, 42% of patients experienced visual deterioration on triple therapy with corticosteroids, CyA, and Aza. In our study even though adverse effects of MMF were not noted in any of our patients, our study was not powered to offer reliable comments on safety. Most of our patients received MMF in a dose of 1.0 g twice-daily similar to previous reports.3,4 Mean number of relapses before MMF usage was 4.45 times (range, 0-15) which reduced to 0.45 times per patient per year after MMF usage. Previously reported success rates vary between 71% and 91%.3,5 Both our patients with scleritis responded well to the treatment with MMF. There has been conflicting results on the use of MMF in scleritis, with some reporting no benefit6 and others showing encouraging results.1,5 This could be due to the complex, chronic, and refractory nature of this condition.

In conclusion mycophenolate mofetil, with appropriate monitoring techniques and patient screening, is a useful drug for controlling inflammatory diseases of the eye. MMF is well tolerated and an effective alternative having few side effects in comparison to other options. MMF was effective in our patients who had been unresponsive to other immunosuppressants, especially AZA, which suggests that it has potential as a first- or second-line agent.

REFERENCES


Clinical Profile of Endogenous Endophthalmitis in A Tertiary Eye Care Centre in South India

Dr. Sarika Ramachandran, Dr. Padmamalini Mahendradas, Dr. Kavitha Av, Dr. K Bhujang Shetty

Endophthalmitis is an intraocular inflammatory condition caused by the introduction of micro-organisms in the posterior segment of the eye. It is a highly sight threatening condition which may also threaten the very integrity of ocular structure, despite aggressive antimicrobial, anti-inflammatory therapy and even surgical intervention. Endogenous endophthalmitis refers to infection due to seeding of the eye by metastatic blood-borne spread of bacteria or fungi during generalized infection. This entity is extremely rare in healthy population. It is commonly associated with immunocompromised states, debilitating diseases and invasive procedures.1 The aetiological agents range from Gram positive to gram negative bacteria and fungi. Patients usually present with redness, pain and diminished vision. Lid edema and hypopyon may or may not be present on examination. Diagnosis is mostly by high degree of clinical suspicion with laboratory diagnosis confirming the same. Treatment includes systemic and intravitreal antimicrobials along with topical antimicrobials, cycloplegic agents and steroids.

To report aetiology, clinical features, microbiological profile and outcome of Endogenous Endophthalmitis.

MATERIALS AND METHODS

This is a retrospective case series of 19 eyes of 16 patients with Endogenous Endophthalmitis. The study was carried out amongst patients diagnosed with the disease in the period between December 2008 and August 2010. All patients underwent a complete ophthalmic examination, which included measurement of visual acuity, intraocular pressure, slit lamp biomicroscopy and fundus examination through a dilated pupil. A comprehensive systemic evaluation was also performed to localize the source of infection.

B-Scan ultrasonography was carried out for all patients whose fundus view was hazy. General blood and urine investigations were carried out. Aqueous humor/Vitreous sample were collected for microbiological study (Gram’s staining, KOH preparation, Culture and Sensitivity) and Polymerase Chain Reaction was performed in selected cases. The treatment of the patients began with topical (Tobramycin and Moxifloxacin) and systemic antibiotics (Fluoroquinolones); topical Prednisolone Acetate; topical Homatropine; intravitreal Vancomycin and Ceftazidime/Amikacin. Intracameral Moxifloxacin was given in selected cases. Intravitreal Amphotericin B or Voriconazole was given for fungal
aetiology confirmed by laboratory techniques.

Pars plana vitrectomy was performed in cases not responding to standard antimicrobial regimen or those where the posterior segment involvement was advanced and surgery was deemed necessary in order to retain the anatomical and functional integrity of the eye. Patients were followed up periodically till the infection was under control and documentation was carried out at 24 hours interval initially followed by biweekly then weekly and monthly follow up. At least 3 months of follow up data was collected for most patients, except those lost to follow up, after which a last follow up data within the study period was collected.

RESULTS

A total of 16 patients with Endogenous Endophthalmitis were studied. Their age ranged from 15 days to 76 years with a median of 45 years. Three (18.75%) patients had bilateral involvement. Out of the rest, six (37.5%) patients had involvement of right eye while ten (62.5%) patients had involvement of left eye. Nine (56.25%) patients were male while seven patients were female. Ten patients (62.5%) had a known systemic or local source of infection. Six (37.5%) had diabetes mellitus. Eleven (57.89%) eyes had bacterial, Four (21.05%) had fungal while four (21.05%) had mixed endophthalmitis. Eleven (57.89%) eyes had pain on presentation, 16 (84.21%) had diminished vision and 15 (78.95%) had redness, three eyes had watering and one had discharge on presentation. The vision at presentation ranged from light perception with inaccurate projection to 6/12 parts. On presentation, hypopyon was seen in 6 eyes, fibrin in anterior chamber in 4 eyes, complicated cataract in 3 eyes and significant fundus findings in 7 eyes. Overall anatomical success was achieved in 10 eyes (52.63%) and functional success in 8 (42.11%).

<table>
<thead>
<tr>
<th>Aetiological type of Endogenous Endophthalmitis</th>
<th>Number of patients who underwent pars plana vitrectomy and allied procedures</th>
<th>Percentage</th>
</tr>
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<td>Bacterial</td>
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<th>Complications of Endogenous Endophthalmitis</th>
<th>Number of patients</th>
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Retinal Detachment 2 10.53
CRAO 1 5.26
Panophthalmitis 1 5.26
Epi Retinal Membrane 1 5.26
Proliferative Vitreo Retinopathy 1 5.26
Secondary Glaucoma 1 5.26

Table 3: Anatomical and Functional Success in each aetiological type

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<th>Anatomical Success</th>
<th>Functional Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial</td>
<td>4 (36.36%)</td>
<td>4 (36.36%)</td>
</tr>
<tr>
<td>Fungal</td>
<td>3 (75%)</td>
<td>1 (25%)</td>
</tr>
<tr>
<td>Mixed</td>
<td>3 (75%)</td>
<td>3 (75%)</td>
</tr>
</tbody>
</table>

DISCUSSION

Bilateral infection is reported to be seen in 15-25% of endogenous cases. In our group 18.75% of patients with endogenous endophthalmitis had bilateral involvement. Fungal organisms are reported to cause 50% of all endogenous cases, with Candida albicans (75-80% of fungal cases) accounting for a majority of them. In our series, fungal aetiology was found to contribute in 42.10% of cases. Candida was isolated in only one case on culture. Furthermore, 57.89% of cases in our study had bacterial aetiology.

The same group (Jackson et al.) noted that 56% of patients with endogenous bacterial endophthalmitis also had an underlying immunocompromise. In our case series, 60% were either diabetic or were on systemic steroids or immunosuppressants before onset of symptoms. Two such patients had bilateral involvement. Endogenous endophthalmitis is known to have poorer outcome when compared to the other types. Studies report 50-75% patients with final vision less than 20/400. In our study, 36.84% had such poor final visual acuity and 10.53% had 20/20 vision as against 5% reported by Jackson et. al.

In conclusion endogenous Endophthalmitis, though a dreaded complication of systemic infection, can be managed appropriately. Useful vision can be saved by early recognition and aggressive intervention.

REFERENCES


**HLA-B27 Associated Recurrent Post Operative Inflammation – Tip of The Iceberg?**

**Dr. Namita C. Anagol, Dr. Kalpesh H. Jain, Dr. Sri Ganesh**

To evaluate the occurrence of HLA B27 in post operative Uveitis cases following uneventful cataract surgeries.

**MATERIALS AND METHODS**

The study is conducted at NSSEH, Bangalore during the period October 2010 to March 2011. Eighteen eyes of twelve patients who developed Post Operative Uveitis were evaluated. The type of surgery these patients underwent is Topical Clear Corneal Phacoemulcification by a single surgeon. All the eyes are operated one after the other, except for one patient who underwent both eyes on the same day. The surgeries and
post operative period are uneventful. The IOL's used are both silicon and acrylic. None of the patients had any previous history of Uveitis or any symptoms suggestive of auto immune disease. One of the patients on retrospective questioning gave history of recurrent skin lesions and joint pains. This patient was later diagnosed as Psoriatic Arthritis. These patients underwent a series of relevant investigations. All of them required a prolonged course of topical steroids. Two patients are started on AKT 4. Five patients needed immunosuppressive therapy. One patient developed Glaucoma which needed trabeculectomy.

**RESULTS**

The patients underwent a series of investigations to find the cause of persistent inflammation. The results of the tests are depicted below.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Tests</th>
<th>No. of patients tested</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HLA B 27</td>
<td>12</td>
<td>8 are positive</td>
</tr>
<tr>
<td>2</td>
<td>R.A. factor</td>
<td>10</td>
<td>All negative</td>
</tr>
<tr>
<td>3</td>
<td>A.N.A.</td>
<td>8</td>
<td>1 positive</td>
</tr>
<tr>
<td>4</td>
<td>A.C.E.</td>
<td>4</td>
<td>All negative</td>
</tr>
<tr>
<td>5</td>
<td>Chest X - Ray</td>
<td>10</td>
<td>1 positive</td>
</tr>
<tr>
<td>6</td>
<td>S.I. joint X - Ray</td>
<td>8</td>
<td>1 positive</td>
</tr>
<tr>
<td>7</td>
<td>H.R.C.T. Thorax</td>
<td>1</td>
<td>1 positive</td>
</tr>
<tr>
<td>8</td>
<td>Mantoux</td>
<td>11</td>
<td>2 positive</td>
</tr>
<tr>
<td>9</td>
<td>T.B. Gold</td>
<td>2</td>
<td>All positive</td>
</tr>
<tr>
<td>10</td>
<td>Vasculitis Profile</td>
<td>2</td>
<td>All negative</td>
</tr>
<tr>
<td>11</td>
<td>Anti Ds D.N.A.</td>
<td>1</td>
<td>All negative</td>
</tr>
</tbody>
</table>

Eight patients were positive for HLA B27. One of these patients also showed X Ray features suggestive of Sacroilitis. Two of the patients who tested positive for T.B. Gold have been started on AKT 4 by the chest physician. Two cases one with Scleritis and the other with Psoriatic Arthritis needed to be started on systemic steroids. Five of the patients who were HLA B 27 positive have been started on immunosuppressive therapy as per Rheumatologist advise.

The average age of diagnosis of HLA B27 related Uveitis in this study is 62 years. Mean diagnostic time after surgery is 116 days. Male to female ratio is 6:2.

**DISCUSSION**

HLA B 27 related Uveitis is the second most common cause of Uveitis. Twenty percent of HLA B27 positive people have at least one of the associated inflammatory conditions. Uveitis may occur in the presence or absence
of associated systemic disease. Some cases may present first with ocular symptoms. Twenty percent of these cases may require immunosuppressive therapy. Two thirds of the patients may not be aware of their condition. Male predominance is seen and first episode commonly occurs in second to fourth decade.

The prevalence of HLA B 27 haplotype varies markedly in different population. One study has shown a prevalence of 4.1 (Tamil Nadu), 3.8(North India), 1.5(Delhi). One percent of people who are HLA B 27 positive develop acute anterior Uveitis 5, but fifty five percent of acute anterior Uveitis are positive for HLA B27. No particular subtype has been associated with acute anterior Uveitis. The frequency of HLA B 27 is lowest in blacks, intermediate in Asians and highest in Whites. The life time cumulative incidence in normal population is 0.2 percent and one percent in HLA b 27 group.

The latest technological advances in Cataract surgery has made it a day care surgery as simple as purchasing a take away pizza. Due to the media hype and advertisements the patients have very high expectations from the surgery. Therefore it becomes difficult for the surgeon to explain a persistent post operative inflammation to them. These patients are usually asymptomatic prior to surgery and assume the inflammation, is due to some complication in the surgery. A negative feeling is created in the patient and this message is spread by word of mouth to others.

The number of post operative Uveitis in our study is negligible (Eighteen cases out of 2750 surgeries), but it is enough to make a beginning for the foundation for future studies. This study brings out a surprising aspect of the first episode of HLA B 27 Uveitis occurring in the fifth to sixth decade.

To conclude HLA B 27 though a rare cause of first time uveitis in this age group should be a part of our investigations in cases of persistent post operative Uveitis.

**Fundus Autofluorescence Imaging in Eyes with Vogt-Koyanagi-Harada Syndrome in A Tertiary Eye Care Centre in South India**

Dr. Sahana K, Dr. Padmamalini Mahendradas, Dr. Kavitha Av, Dr. K Bhujang Shetty

Vogt-Koyanagi-Harada disease (VKH) is a bilateral granulomatous panuveitis associated with autoimmunity against the melanocytes.1, 2 The acute uveitic stage of VKH is characterized by bilateral anterior and/or
posterior segment involvement with exudative retinal detachment.\textsuperscript{1,3,4} Patients adequately treated with high-dose systemic corticosteroids undergo resolution of this acute stage. However, some may enter a chronic stage, particularly those who receive either delayed or inadequate treatment with systemic immunosuppressive agents.\textsuperscript{3} The retinal changes in the retinal pigment epithelium (RPE) are in the form of granular pigmentary changes, hypopigmentation, or focal loss of the RPE cells.\textsuperscript{1} Proper evaluation of the RPE during acute and chronic VKH may help prevent these retinal complications by guiding the modulation of anti-inflammatory therapy.

Fundus autofluorescence imaging (FAF) has emerged as a valuable tool for noninvasive in vivo imaging of the RPE and outer retina.\textsuperscript{6} The FAF signal is correlated with the presence or accumulation of lipofuscin and other fluorophores in the RPE and outer retina, providing functional assessment of the RPE layer and possibly additional information not obtained with conventional imaging techniques, such as fundus photography, fluorescein angiography (FA) and optical coherence tomography.\textsuperscript{6} Fundus autofluorescence imaging has been shown to allow better delineation of areas of retinal atrophy, as well as improved visualization of subclinical areas of adjacent RPE injury, which could possibly precede the occurrence of visible lesions.\textsuperscript{8}

**MATERIALS AND METHODS**

This is a prospective case series of 37 eyes of 21 patients with Vogt–Koyanagi–Harada syndrome. The study was carried out amongst patients diagnosed with Vogt–Koyanagi–Harada syndrome in the period between June 2009 and June 2011. All patients underwent a complete ophthalmic examination, which included measurement of visual acuity, intraocular pressure, slit lamp biomicroscopy and fundus examination through a dilated pupil.

All patients underwent FAF imaging of the posterior pole on the Spectralis HRA+OCT TM (Heidelberg Engineering, Heidelberg, Germany). All patients were treated with systemic steroids (+ immunosuppression). FAF findings at baseline and after clinical resolution of acute changes (Disc edema/serous detachment- 2 weeks to 6 weeks) were documented.

**RESULTS**

37 eyes of 21 patients presenting with acute VKH were followed prospectively using FAF imaging. Five patients presented with unilateral presentation. There were 6 males and 15 females in our study. Two patterns of FAF were seen at baseline which was Hypoautofluorescence and Mottled (Hyper and hypo autofluorescence).

Twenty eight eyes of 16 patients presented with Hypoautofluorescence at baseline. After treatment with steroids, after clinical resolution of serous
retinal detachment 2-6 weeks after initiation of treatment, 15 eyes returned to isofluorescence and 13 eyes showed mottled (hypo with iso or hyper fluorescence).

Mottled autofluorescence was seen in 9 eyes of 5 patients at baseline. After treatment, after resolution of serous retinal detachment 2-6 weeks of treatment, 5 eyes returned to isofluorescence and 4 eyes retained mottled (hypo with iso or hyper fluorescence).

Twenty eyes (54%) showed isofluorescence following treatment.

**DISCUSSION**

Fundus autofluorescence imaging in our patients revealed various patterns of abnormal autofluorescence signal. Lesions with decreased autofluorescence signal were associated with RPE loss. Loss of the RPE and disruption of the outer retina in the acute form was due to inflammatory insult in the acute stage. Hypoautofluorescence (due to blockage) was noted in all eyes with large serous retinal detachments in the posterior pole at baseline.

Increased hyperautofluorescence signal was observed in the fundi of some patients. Mottled hyper and hypoautofluorescence in the posterior pole was seen in patients with multiple serous detachments (hypo) with the intervening regions showing hyperautofluorescence. Hyperautofluorescence seen at baseline in the areas between serous RD is due to clumped inflamed RPE cells and/or accumulation of lipofuscin following RPE hyperplasia. Both patterns seen at baseline resolved into isofluorescence in only 54% suggesting absence of any changes in the RPE/outer retina. Granular Hypoautofluorescence / mottling seen in the treated eyes was probably due to RPE atrophy or other RPE/outer retinal changes.

There was no correlation of FAF and OCT findings in our study. Correlation of Visual acuity with FAF findings after treatment would help in understanding the implications of FAF findings. These were the limitations of our study.

In conclusion FAF abnormalities were noted in posterior pole in both acute and resolved/ chronic VKH cases. FAF changes progressively in all patients following treatment. Further studies correlating FAF and OCT findings will help understand these changes better.

**REFERENCES**

3. Read RW, Holland GN, Rao NA, et. al. Revised diagnostic criteria for Vogt-


**Patterns of Uveitis in Children Presenting at a Tertiary Eye Care Centre of Northern India**

Dr. Supriyo Ghose, Dr. Brijesh Takkar, Dr. Rajpal, Dr. Garg S.P., Dr. Pradeep Venkatesh

Uveitis has traditionally been labeled as a disease of adulthood. The problem of rarity of Pediatric uveitis is compounded by the delayed presentation, complicated and sometimes unresponsive course of the disease. A myriad of symptoms and signs characterize this entity. Many diseases have been linked with uveitis in Indian children including JRA, Toxoplasmosis and Sarcoidosis to name a few. Current literature on this topic in the Indian and even Asian scenario is lacking. We make an effort to fill this gap by evaluating and classifying pediatric uveitis based on its clinical presentations at the Pediatric and Uvea services of Dr. Rajendra Prasad Centre of Ophthalmic Sciences, a tertiary care eye centre in Northern India.

**MATERIALS AND METHODS**

This was a prospective study and all children clinically diagnosed of having uveitis under the age of 16 years were included. Hence a total of 61 patients presenting at our Centre were enrolled during the period of June 2009 to December 2010.

A detailed clinical history was obtained with particular emphasis on the chief ocular complaints and the presence or absence of specific systemic history. Next the patient was subjected to a meticulous clinical examination (ocular, general and systemic). The ocular examination included the best corrected visual
Acuity, squint workup, slit lamp microscopy, tonometry and ophthalmoscopy. For each patient a hemogram with ESR was done along with urine routine microscopy, Mantoux test and Chest X-ray. Based on all the findings and history, a tailored systemic work up was initiated and investigations like HRCT chest, Serum ACE, Serum Calcium levels, VDRL, ELISA and PCR tests were done. Pediatric and Immunology consultations were taken as and when required. Patients were followed up till a systemic association was either localized or ruled out. The final diagnosis was based on chronological history, clinical manifestations and the results of specific laboratory investigations.

The IUSG system was applied to classify the collected data anatomically, clinically and based on disease course. Four major anatomical groups, anterior, intermediate, posterior and panuveitis were created and a comparison among them was done for various variables inclusive of visual acuity thus identifying the blind children. Blindness was defined based on the NPCB criteria.

**RESULTS**

Pediatric population was found to represent 7.5% of the total cases presenting to the uvea clinic. After analyzing our data we found the mean presenting age to be 11.1y + 3.5y. This was slightly lower for the anterior uveitis group (9.9y). The youngest child was 4 years of age. Nearly two thirds of the patient population comprised of males with the ratio being M:F=64:36, similar in all the groups. Mean duration of the disease at presentation was 16.3 months, though slightly longer in the posterior uveitis group of 20.45 months.

Anterior uveitis predominated with a percentage of 32.8% closely followed by Intermediate uveitis (31.2%). 22.9% of the patients had panuveitis while posterior uveitis group had the least number of patients (13.1%). 41% had unilateral uveitis. However the reverse was true for posterior and panuveitis with nearly 63% unilateral in both. Overall 6.6% had granulomatous pathology and only 9.8% had infectious. In contrast, 75% of the posterior uveitis group had infectious etiology. Chronic course was commoner, seen in nearly 60%, apart from the anterior group (commonly recurrent). Surprisingly, squint was a common presentation in posterior uveitis, being the chief complaint of half of the patients. The disease was blinding in 8.2%, fairly equally distributed amongst all the groups. Nearly 87% of the patients had some complication at presentation - a glaring fact. The predominant complications were cataract (54.4%), BSK (23%) and macular edema (16.4%). Distribution of complications was as per expectation, cataract in anterior (75%) while Macular edema in intermediate uveitis (42.1%). Hypotony (8.2%) was commoner than glaucoma (4.9%).

Although joint pain was deciphered in the history of 40% of the patients, no systemic association was established in 62.3%. Only one child had TB. Idiopathic
Intermediate Uveitis (27.9%) was the most common etiology. JRA (19.7%) and Toxoplasmosis (8.2%) were the other commonly found etiologies. Other causes included Sympathetic ophthalmia, Sarcoidosis, GHPC, and Toxocara.

**DISCUSSION**

As traditionally believed pediatric uveitis is indeed a rare entity described as less than 10% in almost all the studies. While we, like Narayana et al., found both anterior and intermediate uveitis to be commonest—nearly one third each—the other major Indian study by Rathinam and Namperumalsamy concluded anterior trematode induced uveitis to be very common perhaps due to regional and temporal influences. BenEzra et al. describe Intermediate uveitis to be the commonest, 41%, while Smith et al. who have the largest published data of 527 patients describe anterior uveitis as 46.5% and the commonest.

Our mean age of presentation was nearly 11 years while other prominent foreign studies conclude it to be around 8 to 9 years. We found male: female ratio to be nearly 2:1 while most of the western literature describes this to be very slightly in the favor of females. Both these facts perhaps are the result of the different socio-economic conditions in the different parts of the world. We found the disease to be bilateral in 59% of the patients in contrast to 29% as described by Narayana et al. Rathinam and Namperumalsamy like us reported this number to be high—46%. The western literature also gives similar results identifying the number to be 70%. We found the disease to be idiopathic in 62%. Kump et al. found this figure to be 52% while BenEzra et al. found this figure to be 25% perhaps due to the inclusion of infectious endophthalmitis. Rathinam et al. had a figure of 32.5%, having included nematode infestations.

We found Idiopathic Intermediate uveitis to be the commonest etiology occurring in 28% of the patients. Next in line was JRA induced anterior uveitis being 20% followed by Toxoplasmosis at 8%. Like us Narayana et al. found the number of IIU to be 29%. The numbers given by BenEzra et al. are 25.4%, again being the commonest etiology like in our study. However Rathinam et al. found Trematode induced anterior uveitis to be the commonest (29.3%), Perkins in his 1960s study found Toxoplasmosis to be the commoner cause, Smith et al. found JRA in 24% of their patients. Kump et al. also report JRA as the commonest etiology nearly 33%. These differences possibly represent the biological differences between different populations.

Perhaps due to the socio-economic status of our patients, 87% had complications at presentation. While our study reported cataract in more than 50%, Narayana et al. reported cataract as being present in 25%. Similarly Smith et al. report cataract in 20%.7
In conclusion idiopathic Intermediate Uveitis is currently the most common presentation in Indian children although western studies largely find JRA commoner than Pars planitis. Complications are much more frequent in our patients with no systemic associations in two thirds. Hence uveitis may remain an important cause of blindness in Indian children.

REFERENCES

Changing Pattern of Uveitis in India
Dr. Khyati Shah, Dr. Debmalya Das, Dr. Sudharshan S., Dr. Jyotirmay Biswas

The pattern of uveitis is influenced by several demographic and ethnic factors. To identify the pattern of uveitis in a referral uveitis clinic, a retrospective analysis of all patients who presented to the uvea clinic in the year 2010 was done using a standard protocol and the results were compared with the pattern of uveitis in 1995 from the same centre.

Aim: To obtain incidence pattern and etiology of uveitis in the present era as seen in a tertiary care referral center and to understand the etiology of the pathological process causing uveitis.

MATERIALS AND METHODS
A total of 188 new cases seen by a single uvea specialist in the year 2010 were analysed retrospectively regarding clinical presentation, diagnosis and etiology. A standard clinical proforma was filled in all cases for analytical study which included salient points in history, clinical findings, ancillary tests
(e.g., ultrasonography and fundus fluorescein angiography (FFA), tailored laboratory investigations, anatomic type of uveitis and the final etiology. Radiological investigations included skiagram or HRCT of chest (sarcoidosis and tuberculosis); lumbosacral joint (ankylosing spondylitis); and knee joints (juvenile idiopathic arthritis). Tubercular uveitis was diagnosed with the quanti FERON TB gold test. Human leucocyte antigen assay (HLA B27, HLA B5, HLA B7, HLA B51, HLA A25) were done to support the diagnosis. Consultation was done with internist as well as specialist in rheumatology and pulmonary diseases, whenever needed.

RESULTS
A total of 188 patients were included in the study; 105(55.85%) were male and 83(44.15%) were females ranging in age from 6 to 74 years. Uveitis had a unilateral presentation in 88 cases (46.81%) and bilateral presentation in 100 cases (53.19%). The most commonly affected age group was between 21 and 40 years of age. Intermediate uveitis was the most common type seen in 66 patients (35.11%), followed by posterior uveitis 68 patients (34.04%), anterior uveitis 62 patients (26.06%) and panuveitis 9 patients (4.79%) was the least. The diagnosis was idiopathic in 41.5% cases. Infectious cause was proven in 27.13% (TB-16.49%, Toxoplasma-5.85%-major causes) cases. Inflammatory causes were VKH (7.97%), Serpiginous choroiditis (4.79%), HLA B-27 associated uveitis (4.79%).

The most common cause for intermediate uveitis was idiopathic in 44 cases (23.40%). The commonly diagnosed entities were TB in 11 cases (5.85%), sarcoidosis in 7 cases (3.72%). The most common cause for posterior uveitis was diagnosed as TB in 16 cases (8.51%) which was confirmed with quanti FERON TB Gold test. The other common causes were VKH 9 cases (4.79%); Serpiginous choroiditis 9 cases (4.79%) and Toxoplasma in 8 cases (4.26%). The most common cause for anterior uveitis was idiopathic in 23 cases (12.23%). The commonly diagnosed cases were associated with HLA B27 associated uveitis 9 cases (4.79%), 4 cases (2.13%) of TB and 3 cases each of (1.60%) of Sarcoidosis, JIA and Fuch's heterochromic uveitis. The panuveitis group included idiopathic 4 cases (2.13%) and 2 cases (1.06%) were associated with VKH and HIV.

DISCUSSION
In our study only 41.5% were idiopathic and in the study by J Biswas et. al.¹ etiology was unknown in 59%; in S Rathinam study² idiopathic uveitis constituted 44.6% and Gupta et. al.³ 51.18%

In all the studies anterior uveitis was most common in contrast to this study where intermediate uveitis was the most common. A few clinic-based surveys have, however, described diffuse and posterior uveitis as most common, a difference that may be attributed to referral bias, Acute forms of uveitis tend to
predominate in community-based hospitals whereas chronic forms of uveitis tend to be more common in tertiary referral practices.3

Amongst the diagnosed cases of anterior uveitis HLA- B27 and TB were the common causes which corresponded to the study by Gupta et. al.3 and J Biswas et. al.1 Intermediate uveitis was most often idiopathic as in other studies. In this study and other studies, the associated systemic disease ed with intermediate uveitis were tuberculosis and saroidosis.

In our series, the incidence of intraocular tuberculosis was quite high. The reason for the high prevalence in our study could be due to use of PCR for Mycobacterium tuberculosis as a diagnostic criteria in our clinic. Posterior uveitis was most commonly because of TB in contrast to toxoplasmosis in the study by J Biswas et al1 and S Rathinam et. al.2 Serpiginous choroiditis was the most common cause for posterior uveitis which corresponded to other studies. The diagnosed cases of panuveitis were VKH and those associated with HIV in correspondence to the studies by others.

In conclusion pattern of uveitis has significantly changed due to better identification of causative agent with PCR, identification of newer infectious agents, newer imaging modalities and changed referral pattern.

REFERENCES

Safety and Efficacy of Intravitreal Methotrexate (IMTX) for Treatment of Non-infectious Uveitis

Dr. Rohan Chauhan, Dr. Banker Alay S.

Uveitis is treated locally with periocular or intravitreal injections of corticosteroids or systemically with oral corticosteroids or other immunosuppressive drugs. Local treatment is preferred where possible, especially for unilateral disease. Corticosteroids are associated with complications like increase in intraocular pressure (IOP) and cataract. An alternative agent would prove extremely useful in such cases. Intraocular lymphomas associated with primary central nervous system lymphoma have
been successfully treated with intravitreal injections of MTX.\textsuperscript{1,2,3} Hardwig \textit{et al.}\textsuperscript{4} recently reported a retrospective small case series in which patients were treated with 400 µg intraocular MTX for uveitis and advanced proliferative diabetic retinopathy, and they reported retention or improvement of visual acuity (VA) in 75\% of patients.

To evaluate efficacy of intravitreal-methotrexate (IMTX) in uveitis cases resistant / intolerant to conventional treatments.

**MATERIALS AND METHODS**

It is a prospective, interventional, consecutive case series of IMTX (400 microg/0.1 ml) in 18 eyes (16 patients) with intermediate uveitis. Outcome measures included anatomic, visual improvement, reduction in the vitreous inflammation and change in OCT central macular thickness (CMT). Informed consent was obtained from all patients regarding the off label use and unknown side effects. Pregnant or lactating women were excluded and contraceptive advice was given to women and men with partners of childbearing age.

Inclusion criteria included a diagnosis of unilaterally active, noninfectious, intermediate, posterior uveitis, or panuveitis and/or CME such that VA was reduced to the equivalent of 20/40 or worse. All patients also had a history of increased IOP in response to corticosteroid administration.

Intravitreal MTX injections were performed aseptically under topical anaesthesia. Patients were examined at 1 week post injection and monthly thereafter for a period of 6 months. Best-corrected ETDRS vision, slit-lamp examination, and dilated fundus examination were performed. Ocular inflammation was graded according to the Standardization of Uveitis Nomenclature working group recommendations. \textsuperscript{5} Optical coherence tomography (OCT) was performed, where possible, every visit, using a high-resolution Stratus 3000 OCT model (Carl Zeiss Meditec Inc., Dublin, CA) with software version 6.3 to measure macular thickness. Changes from baseline VA, ocular inflammation scores, and OCT volume and thickness were compared at each visit. MTX injections were not repeated within a 3-month window, but if inflammation or CME subsequently recurred, then patients were given a repeat intravitreal injection.

**RESULTS**

Inflammation resolved in all (100\%) eyes for varying periods upto 6 months. Mean age of the patient was 39 years (8-59 years). Mean follow up was 66.75 weeks (4-125 weeks). Mean visual acuity improved from 0.620 to 0.514 LogMAR at 6 months. No eyes developed glaucoma, cataract or any other local or systemic adverse effects. Macular thickness also improved after MTX injection. Optical coherence tomography examinations were attempted in all
patients. In 5 patients, media opacities precluded reliable examination. The mean baseline central macular thickness (CMT) decreased from 363.06 to 298.81 microns at 6 months.

Relapse was defined as a loss of at least 5 letters (i.e., 1 line) from the best VA recorded postintravitreal MTX injection, associated with the recurrence of posterior uveitis and/or CME. Of the 16 patients who responded to MTX injections, 2 relapsed according to this definition that needed repeat injection after 3 months and 3 patients needed additional therapy. The median time to relapse was 3.125 months.

Most patients enrolled in this trial responded to intravitreal MTX injections with an increase in VA associated with decreased intraocular inflammation and macular thickness. This response was rapid, with a significant increase in VA and decrease in ocular inflammation and CME within 1 month.

There were no injection-related adverse events other than mild ocular pain for less than 24 hours’ duration. No patients had increased IOP after MTX injection. No other drug-related adverse events were recorded.

**DISCUSSION**

This prospective study demonstrates the effects of intravitreal MTX in patients with uveitis and uveitic CME. Although it is a noncomparative case series, the results suggest that intravitreal MTX is an effective treatment for uveitis and uveitic CME, expanding on the results of a previous small study. 4 Local treatment of uveitis is preferred where possible, especially for unilateral disease, because it avoids the potential side effects of systemic corticosteroids and immunosuppressive agents. Periocular corticosteroids are useful for mild to moderate inflammation, 5 and IVTA is useful for more severe disease. 6 Indeed, corticosteroids constitute the only intraocular medications that are currently used to treat refractory CME from noninfectious uveitis. 7,8,9,10 However, all forms of corticosteroids can increase IOP, and more than 40% of patients have a significant increase in IOP after IVTA. 8,11 In steroid responders, patients who are already known to develop increased IOP in response to corticosteroid administration, an alternative agent that could be administered locally would therefore be of use.

Methotrexate is a competitive inhibitor of dihydrofolate reductase, and systemic MTX has been used as a steroid sparing agent for the treatment of noninfectious uveitis for many years. 1,12,13 Intravitreal MTX has been widely used to treat ocular lymphoma that is refractory to systemic chemotherapy and radiation, 14 and a dose of 400g is clinically well tolerated. 2,3 Rabbit studies have shown that this dose is nontoxic by electroretinogram study and remains at therapeutic levels for 48 hours. 15 One group performed a rabbit
study that suggested that intravitreal MTX reduces the risk of development of endophthalmitis and that this may render it a safer option for the local treatment of refractory uveitis than intravitreal steroids. MTX has not been reported to induce ocular hypertension, a frequent complication of IVTA.

Several of the patients also had marked macular scarring or had previously had epiretinal membranes or macular holes, all of which can reduce potential VA. We therefore established a best potential VA for each patient to determine how effective MTX was. The results of intravitreal MTX injection were not significantly different in the best potential VA for each patient. The side effect profile of intravitreal MTX treatment also proved acceptable in our study. The response to treatment was rapid, with most of the patients gaining 2 lines within 1 month of intravitreal MTX injection. This may represent the known anti-inflammatory actions of MTX on neuropeptides rather than its immunosuppressive effects. Of the 13 patients in our study who responded to intravitreal MTX, 2 subsequently relapsed. The median time to relapse was 3.125 months in these patients. All elected to undergo a further injection of MTX, to which all patients responded once again.

This cohort is representative of a group of patients who are difficult to treat and present a considerable therapeutic dilemma. The well-established side effects of systemic corticosteroid and immunosuppressive therapy are harder to justify for unilateral ocular disease, and being a steroid responder increases the risk profile of local corticosteroid therapy. These patients are therefore often undertreated for their ocular disease, and as a consequence have less well-controlled ocular inflammation and CME. Chronic CME is known to lead to ultrastructural changes in both the retina and the retinal pigment epithelium, some of which can be observed clinically, and is associated with impaired VA. An alternative agent to IVTA that can be administered as local therapy and that is not associated with an increase in IOP would therefore be of considerable use in these patients.

We conclude from our pilot study that intravitreal MTX injection may provide such an alternative local therapy for uveitis and uveitic CME and merits further study.

REFERENCES


Spectral Domain Optical Coherence Tomography Features in Vogt-Koyanagi-Harada Disease

Dr. Jayant Kadaskar, Dr. Vishal R. Raval, Dr. Rishi Pukhraj, Dr. Jyotirmay Biswas

Vogt-Koyanagi-Harada disease (VKH) is a bilateral granulomatous panuveitis associated with autoimmunity against the melanocytes. The acute uveitic stage of VKH is characterized by bilateral anterior and/or posterior segment involvement with exudative retinal detachment. In chronic stage, progressive choroidal depigmentation ensues, leading to a change classically described as sunset glow fundus. During this stage, vitiligo and poliosis may also occur, and some patients develop vision-threatening retinal complications, including choroidal neovascularization, subretinal fibrosis, severe chorioretinal atrophy, and glaucoma. These retinal complications are preceded by alterations in the retinal pigment epithelium (RPE) in the form of granular pigmentary changes, hypo- or hyperplasia, or focal loss of the RPE cells.

Imaging modalities used in evaluation of VKH disease include B scan Ultrasound, Fundus Fluorescein Angiography (FFA), Indocyanine green angiography (ICGA), Optical Coherence Tomography (OCT). In acute stage of VKH, specific FFA findings include delay in choriocapillary filling, pinpoint leakage, choroidal folds, and pooling of dye in areas of retinal detachment. ICGA provides more information on choriocapillaries circulation and on inflammation of choroidal stromal vessels.

However both FFA and ICG fail to give detailed information on the ultra structural changes in retina and choroid. OCT provides excellent cross sectional images of the retina and retinal pigment epithelium. Parc et. al. studied features of acute and chronic VKH on Time Domain (TD) OCT and
found that it was effective in objectively quantifying the amount of serous retinal detachment present following the sub retinal fluid accumulation. Subretinal pigmented lesion on angiography corresponded with retinal pigment epithelium hypertrophy and fibrosis on OCT.

In this study we analysed Spectral Domain Optical Coherence Tomography (SD OCT) features in patients diagnosed with VKH disease.

MATERIALS AND METHODS

The study included retrospective analysis of 30 eyes of 15 patients in whom VKH disease was diagnosed according to revised diagnostic criteria for Vogt Koyanagi Harada disease at a tertiary care centre in Chennai (India) between January 2010 to December 2010. FFA was performed in all patients with fundus camera Zeiss FF 400 plus IR, version 4.4.3. SD OCT was performed at the initial visit with Cirrus HD OCT 4000 (Zeiss). Scan acquisition protocol were five line raster scan and macular cube 512x128 combination. Features which were studied include serous retinal detachment, cystoid space, cystoid macular edema, internal limiting membrane striae, foveal thickness, retinal pigment alterations and irregularity in IS-OS junction.

RESULTS

Out of 15 patients: 11 (73.34%) were females and 4 (26.66%) males with a mean age of 37.33 (range 11-62 years). Best corrected visual acuity at diagnosis ranged between 20/20 to 20/1000. Out of 15 patients 9(18 eyes) were diagnosed to have acute VKH while 6 (12 eyes) had chronic VKH. Chronic VKH was defined as intraocular inflammation of more than 3 months. Imaging in one eye was not possible due media haze. FFA features in acute VKH were multiple punctate hyperfluorescent lesions in RPE in early to mid phase. Late phase FFA showed multilobular pools of subretinal dye. Table 1 and Table 2 shows SD OCT features of VKH in our study.

<table>
<thead>
<tr>
<th>Table 1: Acute VKH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serous retinal detachment</td>
</tr>
<tr>
<td>Cystoid spaces</td>
</tr>
<tr>
<td>ILM striae</td>
</tr>
<tr>
<td>Hyperreflective line suggestive of fibrin</td>
</tr>
<tr>
<td>Choroidal Neovascular Membrane</td>
</tr>
<tr>
<td>Mean foveal thickness</td>
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</tbody>
</table>

<table>
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<tr>
<th>Table 2. Chronic VKH</th>
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<tbody>
<tr>
<td>IS –OS irregularity</td>
</tr>
<tr>
<td>RPE alterations</td>
</tr>
<tr>
<td>Mean foveal thickness</td>
</tr>
</tbody>
</table>
DISCUSSION

Fluorescein angiography is commonly performed ancillary investigation to diagnose and follow up VKH disease. This investigation is however invasive and carries a risk of adverse reaction, with an overall 1:63 frequency of moderate and death as a rare, serious event. Optical Coherence Tomography is now proven to be effective non invasive investigation in detecting ultra structural changes at retinal level. It can be used at the time of initial diagnosis and can be safely during follow up to monitor response to any intervention. Time Domain OCT has been used to diagnose and follow-up serous retinal detachment in Vogt Koyanagi Harada disease, it has 96% sensitivity and 100% specificity in diagnosing Cystoid Macular edema. New generation SD OCT offers the advantage of high resolution image quality, multiplanar reformat with 3 dimensional reconstruction, 3 dimensional mapping of single retinal layers, transverse C scans and better scanning laser ophthalmoscope fundus photographs. Although the information offered by this current generation of sophisticated OCT is enormous, the interpretation of the results and their clinical application needs to be studied and understood, because some features may be adaptable to clinical settings while others as specialized tools in research. SD OCT was able to detect ILM straie, cystoid spaces and defects of inner segment-outer segment photoreceptor junction in eyes where conventional TD OCT could not.

In our study we found serous retinal detachment in 100% cases with acute VKH. The exact nature of these serous detachment was studied by Maruyama and Kishi in 42 consecutive acute VKH eyes where they postulated two patterns of fluid accumulation: a classic retinal detachment and intraretinal fluid accumulation in outer retina. Areas of true serous detachment were not reflective, but intraretinal fluid spaces were found to be mildly reflective. In our study we found cystoid spaces in 13 eyes (76.6%) in cases of acute VKH. Ishihara et. al. on basis of SD OCT proposed that in acute VKH there may be possibility that the membranous structures characteristically seen in these eyes are composed not only of amorphous inflammatory products, but also of some retinal tissue, probably the outer segment. While some studies had suggested that in acute phase of VKH disease, the OS becomes detached from the photoreceptor layer as intraretinal fluid accumulates, then inflammation causes fibrin to precipitate in fluid space within the outer photoreceptor layer and act as a glue between outer segments forming the membranous structure and cystoid spaces characteristic of acute VKH disease.

In our study we found IS–OS irregularity in 58% (7 eyes) of chronic phase of VKH. Yamaguchi et. al. proposed that the walls of cystoid spaces are made of inflammatory products, such as fibrin, and are located in subretinal space. Using averaged spectral domain OCT Ishihara proposed that these
inflammatory, membranous deposits may additionally contain portions of outer segments, based on their continuity with inner/outer segment (IS/OS) line.\textsuperscript{7} In healed stage of VKH the discontinuity in the IS-OS junction either returns to normal or shows some irregularity as seen in our study (7 eyes). In chronic stage of VKH we had RPE alterations in 100\% (12 eyes) which are consistent with the findings of Santos et. al.\textsuperscript{9}

In conclusion in summary SD OCT can become a valuable ancillary diagnostic and prognostic tool and can provide useful information regarding the morphological features associated with VKH.

REFERENCES


Pattern of Infectious Posterior Uveitis in Eastern India

Dr. Santanu Mandal

Several infectious agents (parasites, bacteria, fungi, and viruses) can invade the eye and lead to ocular inflammation. Infectious causes should always be considered and ruled out in all patients with posterior uveitis. Infectious causes
of posterior uveitis vary geographically. Toxoplasma gondii is by far the most common cause of infectious posterior uveitis in all ages\textsuperscript{1,2} while Toxocara canis infects typically children. Nowadays, bacterial diseases like tuberculosis and syphilis emerged as common cause of posterior uveitis.\textsuperscript{3} Bartonella henselae and Borrelia burgdorferi are other bacteria that can also cause posterior uveitis. Fungal posterior uveitis usually occurs in immunocompromised patients. Viruses (HSV, VZV and CMV) are also associated with infectious retinitis, in immunocompromised as well as immunocompetent patients, with quite destructive clinical course. Recently, more viruses (such as chikungunya\textsuperscript{4}) have been recognized as common etiological factors of infectious posterior uveitis. A rapid and accurate diagnosis is important for the successful visual outcome of infectious uveitis.

**MATERIALS AND METHODS**

This is a retrospective noncomparative interventional case series. We retrospectively reviewed all new posterior uveitis cases between April 2010 and March 2011. Cases presumed to be of infectious in origin were analysed and the causative factors were grouped into different categories. Endophthalmitis of any kind were excluded from this study due to its panuveitis like presentation. Only those cases where involvements were truly posterior in nature like choroiditis, retinitis, chorioretinitis, retinochoroiditis or vasculitis (with or without vitritis) were taken into account. Information regarding history, detailed ophthalmologic examination by slit lamp biomicroscopy, indirect ophthalmoscopy and systemic examinations were noted. Laboratory tests like CBC, peripheral smear, Elisa test for HIV 1 and 2, chest X ray, Mantoux test (5TU), VDRL and blood sugar both fasting and post prandial which was done routinely in all cases were evaluated. Few special tests were done in few special circumstances for diagnosis and for prognostic purposes, like ultrasound B scan (USG), digital fundus fluorescein angiography (DFA), optical coherence tomography (OCT), serum toxoplasma antibody titre both IgG and IgM, QuantiFERON TB GOLD test/Interferon γ releasing assay (IGRA), polymerase chain reaction (PCR) from aqueous fluid, CD4 and CD8 count were also evaluated. In cases of presumed tubercular involvement, IGRA was advised only, when Mantoux test was borderline positive but clinical suspicion was quiet high in favour of tuberculosis. Treatment was advised after consultation with a physician. Follow up was done by physician and by uvea department.

**RESULTS**

Minimum follow up period was one and a half month with a maximum of one year. Cases were broadly divided in 4 main groups according to the cause of origin. Out of 131 new cases of posterior uveitis, 85 cases (64.9\%) were diagnosed to have infectious posterior uveitis. Among which 62 patients
were male. Mean age in male patients was 41.41±12.22 years (range 20-69 years). Mean age for female patients was 34.82±9.62 years (range 21-51 years). Tubercular posterior uveitis leads from the front with 69.4% (59 cases) with male female ratio was 41:18. Toxoplasma came second with 15.3% (13 cases) with male female ratio was 10:3. Viral retinitis came third with 14.1% (12 cases) with a male female ratio was 10:2. Parasite came fourth with a single male case.

Tubercular posterior uveitis was the commonest cause of infectious posterior uveitis in our series. We have had same kind of data in the last academic year i.e. 2009-10 (unpublished). Among these 59 presumed tubercular posterior uveitis cases, 4 cases had active sputum positive pulmonary tuberculosis. One patient with bilateral choroidal tubercle had miliary tuberculosis in chest X-ray and also Mantoux negative. Table 1 shows different types of presumed tubercular posterior uveitis.

<table>
<thead>
<tr>
<th>Type of posterior involvement</th>
<th>No of cases</th>
<th>Unilateral</th>
<th>IGRA required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serpiginous like Choroiditis (SLC)</td>
<td>24(40.67%)</td>
<td>14 eyes (58.33%)</td>
<td>7 cases (29.16%)</td>
</tr>
<tr>
<td>Choroidal tubercle (CT)</td>
<td>14(23.72%)</td>
<td>11 eyes (78.57%)</td>
<td>4 cases (28.57%)</td>
</tr>
<tr>
<td>Multifocal choroiditis (MFC)</td>
<td>11(18.64%)</td>
<td>6 eyes (54.54%)</td>
<td>7 cases (63.63%)</td>
</tr>
<tr>
<td>Subretinal abscess</td>
<td>2(3.38%)</td>
<td>2 eyes (100%)</td>
<td>None (0%)</td>
</tr>
<tr>
<td>Choroiditis with optic nerve involvement (ONH)</td>
<td>1(1.69%)</td>
<td>1 eye (100%)</td>
<td>None (0%)</td>
</tr>
<tr>
<td>Active vasculitis</td>
<td>7(11.86%)</td>
<td>3 eyes (42.85%)</td>
<td>5 cases (71.42%)</td>
</tr>
<tr>
<td>Total</td>
<td>59 (100%)</td>
<td>37 (62.71%)</td>
<td>23 (38.98%)</td>
</tr>
</tbody>
</table>

In our series, second most common cause of infectious posterior uveitis was toxoplasma. Till date it was the leading cause of infectious posterior uveitis in all over the world. But in this study only 15.3% cases were turn out to be toxoplasma positive. To diagnose a case of toxoplasma retinochoroiditis we rely on clinical diagnosis supported by serum toxoplasma antibody titre. Goldmann-Witmer coefficient was not available till date, which is supposed to be the gold standard for diagnosis for toxoplasma retinochoroiditis. Management was started with antibiotics along with oral steroid for six weeks. All cases turned out to be immunocompetent.

<table>
<thead>
<tr>
<th>Types of lesions</th>
<th>Number of cases</th>
<th>Male: female</th>
<th>IgG</th>
<th>IgM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent lesion</td>
<td>6</td>
<td>4:2</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Acquired lesion</td>
<td>4</td>
<td>3:1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>ONH involvement</td>
<td>3</td>
<td>3:0</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>
Viral retinitis constitutes the third most common cause of infectious posterior uveitis in our series that means 12 out of 85 cases (14.1%). We relied mostly on clinical diagnosis and sometimes help was required in the form of PCR from aqueous humour. Amongst them 5 cases were clinically diagnosed as CMV retinitis and out of which 4 were known HIV positive cases. 1 case was diagnosed HIV positive after ophthalmological diagnosis of CMV retinitis. All are unilateral cases and all are male.

Acute retinal necrosis (ARN) is another cause of viral retinitis. 6 cases presented to our hospital with dimness of vision in one eye within a month of chicken pox infection. Out of which 4 were male. All of them were diagnosed to have ARN. As the chickenpox scars were still visible in their face and body, we started their treatment assuming that ARN was caused by varicella zoster virus. No PCR was done in any of those cases. We started oral valacyclovir along with oral steroid followed by barrage laser. All were diagnosed at an early stage except one who had underwent vitrectomy followed by silicone oil insertion and their vision was saved. No bilateral involvement was noticed till date after they had completed full course of therapy.

Atypical retinitis noticed in a single male case, in one eye, where no significant past or systemic history was present. We had done a PCR to diagnose the cause of the lesion. It was positive for herpes simplex virus type 1. Patient was treated with oral valacyclovir along with oral steroid. Barrage laser was done after media clearance. Complete healing noticed after 6 weeks. Table 3 depicts types of viral retinitis in a nut shell.

<table>
<thead>
<tr>
<th>Type of retinitis</th>
<th>No of cases/ no of eyes</th>
<th>Type of virus</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARN</td>
<td>6 cases/6 eyes</td>
<td>Presumed VZV</td>
</tr>
<tr>
<td>CMV</td>
<td>5 cases/5 eyes</td>
<td>CMV</td>
</tr>
<tr>
<td>Atypical retinitis</td>
<td>1 case/1 eye</td>
<td>HSV</td>
</tr>
</tbody>
</table>

Single male case of subretinal Cysticercosis was noticed in one eye. He had painless dimness of vision in his right eye. Few retinitis patches with retinal haemorrhages along with disc edema and exudative retinal detachment was noticed. Clinically cysticercus larva was noticed in subretinal space. USG B scan was done to confirm the diagnosis. Patient was operated for removal of subretinal cysticercus larva under cover of oral steroid.

**DISCUSSION**

Changing patterns are seen in the studies from the same country done at different periods of time. Infectious uveitis occurs in a greater frequency in the developing world, attributing from 11.9% to 50% of cases to infections.6
Tuberculosis is the commonest infectious cause of uveitis in northern India.\textsuperscript{3} But percentage is quiet low in south India.\textsuperscript{6} Till date toxoplasma gondii was the known commonest cause for infectious posterior uveitis in all over the world. Till date there was no report from eastern India about epidemiology of uveitis. In our study we saw that the trend is changing in infectious posterior uveitis compare to other parts of India. Only a report from north India by R. Singh \textit{et al.}, matches with ours.\textsuperscript{3} As India is an endemic zone for tuberculosis, rate of incidence for tubercular posterior uveitis is quiet high. No confirmatory gold standard test was there to diagnose tubercular posterior uveitis. We have to rely on clinical diagnosis, Mantoux test, Quanti FERON TB GOLD test and PCR from aqueous or vitreous fluid. But still this is a presumed case of tubercular posterior uveitis, because of the paucity of biopsy material; it cannot follow Koch’s postulates. But, as the results of post treatment tubercular uveitis is quiet encouraging, we should think twice before discarding a highly positive Mantoux test, where the other evidence of tuberculosis is missing.

REFERENCES


