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Original Research Article

Role of intravitreal dexamethasone implant in HIV associated macular edema: A retrospective clinical trial

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ABSTRACT

Aim: To investigate the role of intravitreal sustained release dexamethasone implant in AIDS associated macular edema.

Materials and Methods: This hospital based retrospective interventional study (nonrandomized) was conducted in Malda Medical College, West Bengal, India from September 2017 to august 2019 where 18 eyes of 18 patients with HIV were included. After proper history taking and required investigations, intravitreal sustained release dexamethasone implant was injected to each patient in respective eye under topical anaesthesia with strict aseptic measures and utmost care. Institutional clearance and written informed consent from each patient were taken before the procedure. Best corrected visual acuity (BCVA) and intraocular pressure (IOP) measurement and central macular thickness (CMT) evaluation by spectral domain optical coherence tomography (SD-OCT) were performed at baseline and after 1 month, 3 months, 6 months of injection. The data obtained then were put for paired t test using SPSS software.

Results: All patients had shown improvement in terms of BCVA as well as reduction of central macular thickness (CMT). 12 patients had increased IOP at first visit for which topical anti glaucoma drugs were prescribed and on subsequent visits their IOP were under control.

Conclusion: Intravitreal sustained release dexamethasone implant is a good option to tackle macular edema in HIV infected patients.

1. Introduction

Acquired immunodeficiency syndrome (AIDS) is characterized by severe compromise of immune system with a propensity of different opportunistic infections and neoplasms resulting in multisystem disorder.[1] Ocular manifestations occur upto 73% patients with AIDS.[2] Vasculopathy is the commonest presentation of retina causing cotton wool spots, and retinal hemorrhage. Viral retinitis specially cytomegalovirus (CMV) retinitis causes iritis. HAART therapy in AIDS infected patients results in significant improvement in immune system but immune recovery uveitis(IRU)may occur[3] with signs of severe inflammation culminating in macular edema producing moderate to severe visual impairment although its clear pathogenesis is still unknown. IRU with macular edema can be treated with valganciclovir 450 mg twice daily.[4] Periocular steroids can be used with varying success provided CD4+ cell count should be above 60/mm3 because of fear of reactivation of viral retinitis. Steroids reduce inflammation thereby controlling macular edema by means of inhibiting neutrophil transmigration, cytokines as well as vascular endothelial factors release.[5] It can be given topically, systemically, or through intravitreal and periocular route.[6] Systemic side effects along with ocular side effects like cataract formation and rise in intraocular pressure (IOP) are very common.[7] Intravitreal triamcinolone is widely used but it is associated with above mentioned ocular side effects much more. Hence sustained release corticosteroid implants have been developed in recent times and intravitreal dexamethasone implant is one of them which is approved by US FDA, It is a biodegradable

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copolymer of glycolic acid and lactic acid from which 700 micrograms of drug is being released gradually in the eye.[8] Maximum drug release occurs at 2 months followed by steady decline with its effect remains upto 6 months.[9]

Here we have evaluated the role of intravitreal sustained release dexamethasone implant in AIDS associated macular edema.

2. Materials and Methods

This hospital based nonrandomized retrospective interventional clinical trial was conducted in Malda Medical College in West Bengal, India from September 2017 to august 2019 for the period of 2 years. Here we have included 18 patients from both sexes. At first detailed history taking was done including unprotected sexual intercourse, blood transfusion, accidental needle prick, any associated drug use etc. Then each patient was asked about the onset, grade and course of visual impairment and any associated ailments. There after detailed systemic examinations followed by ocular examinations including best corrected visual acuity (BCVA) measurement by Snellen's chart (standard), intraocular pressure (IOP) measurement by Goldmann's applanation tonometer, thorough slit lamp examination and fundal evaluation under mydriasis by 78D, 90D lens as well as by indirect ophthalmoscope were done. Spectral domain optical coherence tomography (SD-OCT) was performed in each patient to evaluate macular status. Then each patient was asked to undergo routine hemogram along with blood sugar level measurement and CD4+ cell count. Now after prior written informed consent from each patient along with needed institutional clearance, sustained release dexamethasone implant was injected intravitreally under topical anaesthesia with strict asepsis and utmost care to the respective eye of the patients. BCVA, IOP measurement and SD-OCT to evaluate central macular thickness (CMT) were done at 1 month, 3 months, 6 months after the injection. In each month routine hemogram and CD4+ cell counting was performed. Other systemic therapy was continued as usual. Those patients with increased IOP at subsequent visits were advised to start topical antiglaucoma drugs.

2.1. Exclusion criteria

1. Severe intraocular infection.
2. Severe vitreous hemorrhage.
3. Retinal detachment.
4. Very low CD4+ cell count (less than 60 /mm3).

2.2. Outcome measures

1. BCVA.
2. IOP.
3. CMT.

The normal CMT in SD-OCT was taken as 250+_ 25 microns. The above data were then put for the paired t test using SPSS software.

3. Results

We had 18 patients out of which 15 were male and rest were female. The mean age of patient was 36 plus minus 12 years. After the required intervention, we have found that all the patients had shown improvement in BCVA as revealed by improvement by 2-3 lines in standard Snellen's chart, reduction in CMT as shown by SD-OCT. However, 12 patients had increased IOP at first visit for which they were prescribed topical anti glaucoma drugs and as a result of that their IOP were under control at subsequent visits. The whole data were then analyzed by paired t test after using SPSS software. The following results were found particularly in relation to CMT.

Paired t test values in relation to CMT——

Table 1: Before intervention

Mean	445.20
Standard deviation	31.419

Table 2: After intervention

	After 1 month	**After 3 months**	**After 6 months**
Mean	396.9	363.5	332.2
Standard deviation	33.688	26.771	21.081
P value	<0.05	<0.0001	<0.0001

It is clearly evident from above tables that reduction in CMT is clinically significant at 3 months and 6 months follow up as p values are <0.0001. But Inspite of improvement in BCVA it is not statistically proven.

Followings are SD-OCT pictures of one patient along with macular thickness map: (Figures 1, 2, 3 and 4)

4. Discussion

AIDS basically is a multi organ disorder. Patients with symptomatic HIV infection are having early onset of ocular manifestations[10] where cotton wool spots and noninfectious retinopathies are commonest[11] although CMV retinitis is not infrequent. The incidence rate of immune recovery uveitis (IRU) in HAART responders with CMV retinitis is reported to be 0.11 to 0.83 per person- year.[12] Large retinal surface area involvement increases the risk of IRU. Previous cidofovir therapy is also a risk factor[13] of this where extensive inflammatory changes like iritis, vitritis, macular edema and formation of epiretinal membrane happen[14] thus resulting in severe visual impairment but concrete pathophysiology of immune recovery uveitis still not fully

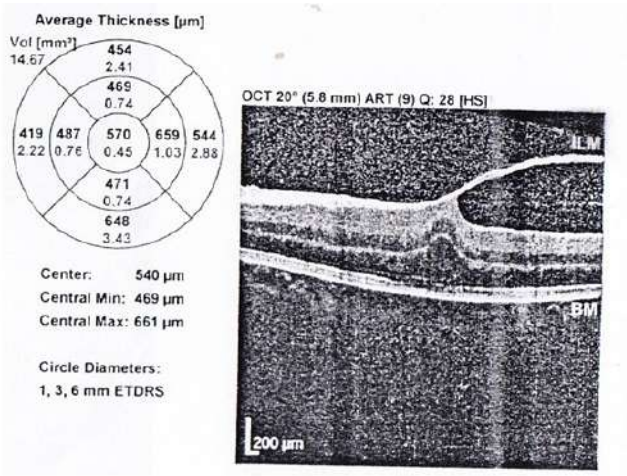

Fig. 1: Before intervention

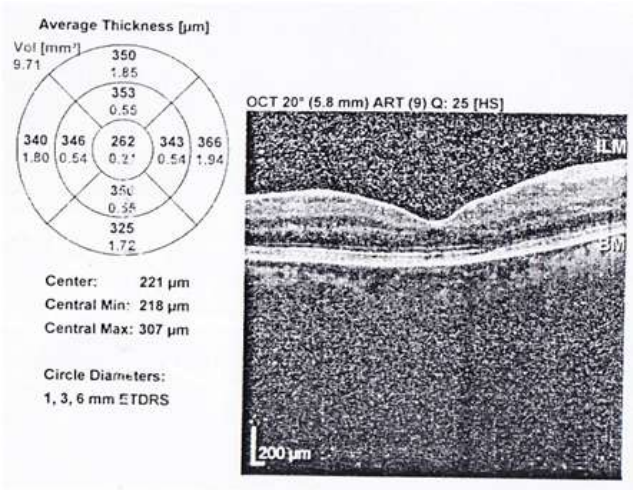

Fig. 4: After 6 months

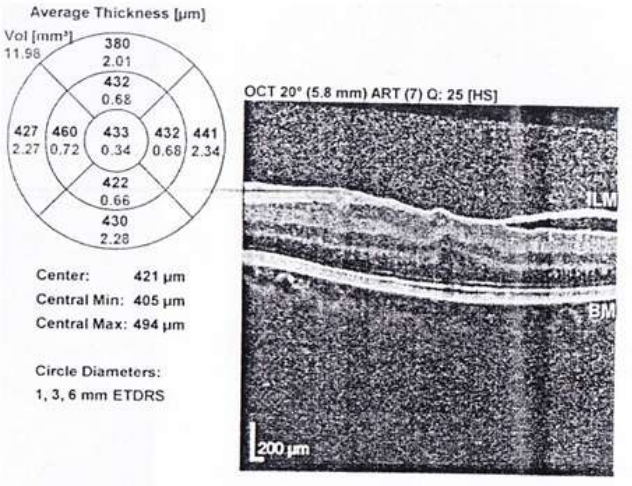

Fig. 2: After 1 month

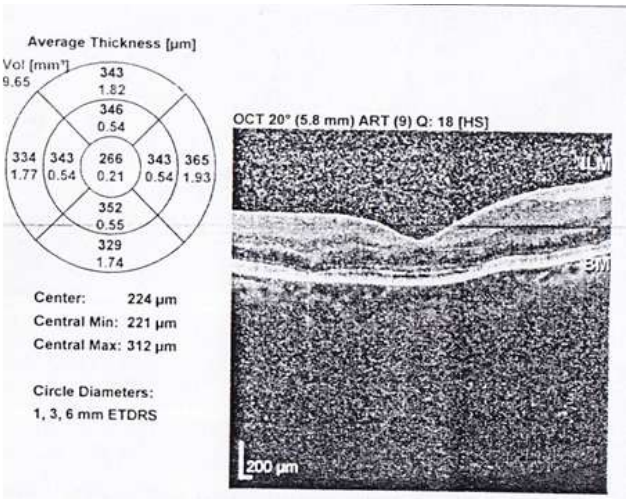

Fig. 3: After 3 months

established although possible hypothesis is that after anti viral therapy once immune system is reconstituted, severe inflammatory reaction is generated against the residual cytomegalovirus antigen residing in retinal glial cells adjacent to retinal scars. Multimer et al proposed a role of CD8+ cells in vitreous in patients with IRU. Siqueria et al did not detect any CMV DNA by PCR in aqueous, vitreous of IRU patients. In spite of recent advances in therapeutic and diagnostic modalities there is no definite treatment regimen in macular edema in HIV patients treated with HAART therapy. Oral steroids and immunosuppressive therapy, periocular steroid therapy, oral acetazolamide, topical nonsteroidal anti-inflammatory drugs have been tried but most cases remain refractory and may need either intravitreal steroid like sustained released examethasone implant or pars plana vitrectomy where bulk of vitreous is removed causing reduction of inflammatory cytokines load. Intravitreal triamcinolone has been also tried but with limited success. The dexamethasone implant opposes inflammatory cascades for prolonged duration because drug is being released from the implant in a gradual manner causing presence of sustained concentration of steroid with in vitreous cavity. Hence IRU is being counteracted for longer time compared to other steroid preparation thus limiting macular edema.

Though we have achieved exciting results about this therapy in HIV associated macular edema, these results should be monitored in our day to day clinical practice because recurrent episodes are frequent. Recurrence is the main concern of the ophthalmologists and it badly affects the final visual outcome.

5. Conclusion

HIV associated macular edema remains a constant threat to current days ophthalmologists as it jeopardizes the vision.

Different treatment modalities are being advocated now including topical non steroidal anti inflammatory drugs, oral, periocular, topical steroids but intravitreal sustained release dexamethasone implant is a credible weapon to deal with this phenomenon. But recurrence in this case remains a headache to ophthalmologist which is very difficult to manage. Multicentered Prospective studies with larger patient number and longer duration are required to draw a firm conclusion.

6. Source of Funding

None.

7. Conflict of Interest

None.

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