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Original Research Article

A STUDY ON THE CLINICAL PROFILE OF OCULAR TOXOPLASMOSIS AND ITS MANAGEMENT OUTCOME

Nithya Lokanathan[1], Bharathi Rajan Singaraj[2], Saravanan Muthusamy[1]

[1]Assistant Professor, Department of Ophthalmology, Government Medical College, Ariyalur, Tamilnadu, India.
[2]Assistant Professor, Department of Ophthalmology, Government Medical College, Virudhunagar, Tamilnadu, India.

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Corresponding Author:
Dr. Saravanan Muthusamy,
Email: drsaravananmuthusamy@gmail.com

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Abstract

Background: Toxoplasmosis, caused by Toxoplasma gondii, is a universally distributed, high-prevalence disease affecting animals and humans, with feline species being the definitive host. The study aimed to evaluate the clinical profile of ocular toxoplasmosis and to analyse the visual outcome following medical treatment. **Material & Methods:** This prospective study was conducted at the Uvea and Retina department, RIO-GOH, Egmore, Chennai, for one year on 30 patients. A detailed patient history, including the patient's name, age, sex and affected eye, was noted. The presenting symptoms of the patients, like floaters, blurring of vision and loss of vision, were considered. After two weeks of initiation of therapy, the patients were reassessed to evaluate symptoms, understanding of vision and clinical findings to taper the steroids. Follow-ups were done on 4th week, 3rd month, 6th month and at the end of one year. **Results:** Among 30 patients, 53.3% were male and 46.7% were female. Males are affected slightly more than females, and the most common age group affected is 20-30. 50% experienced 1-3 weeks of symptoms, with 24% having pet history. Grade 3+ vitreous cells were common, with macula involvement being the most common. Intraocular tension varied, with 75% of macula lesion patients experiencing vision impairment. 50% of patients had vision ranging from 6/24 to 6/36, with 50% experiencing improved vision post-treatment, 30% experiencing better vision, and 10% still having low vision. **Conclusion:** Ocular toxoplasmosis presents unilaterally, causing floaters and vision issues. Early treatment improves symptoms, reduces lesion size, and reduces complications.

INTRODUCTION

The obligate intracellular protozoan toxoplasma gondii causes toxoplasmosis. It is distributed universally and has a high serological prevalence in all countries. Although it affects animals and humans, the feline species is the only definitive host.[1,2] The most common cause of posterior uveitis is toxoplasmosis. Recurrence of the congenitally acquired toxoplasmosis was thought for almost all cases. But it is clear now that acquired ocular toxoplasmosis is more common than previously suspected.[3,4] Active toxoplasma retinochoroiditis is usually self-limiting in immunocompetent patients. It can involve the macula and optic nerve, which may lead to irreversible visual loss. Toxoplasma infection in immunocompromised hosts has diagnostic and therapeutic challenges.[5]

There are two diseases involving the eye: congenital and acquired toxoplasmosis. Maternal infection during pregnancy causes congenital toxoplasmosis. Ingestion of raw meat or contaminated food with cat urine or faeces causes acquired toxoplasmosis.6 The clinical features of congenital and acquired toxoplasmosis are quite different. The congenital toxoplasmosis causes typical bilateral macular lesions.[4] However, acquired toxoplasmosis causes typical focal retinitis adjacent to a chorioretinal scar or sometimes occurs even without a chorioretinal scar.[4,7] Hence, the study aimed to evaluate the clinical profile of ocular toxoplasmosis and to analyse the visual outcome following medical treatment.

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MATERIALS AND METHODS

This prospective study was conducted at the Uvea and Retina department, RIO-GOH, Egmore, Chennai, for one year on 30 patients. Ethical approval and informed consent were obtained before the study started.

Inclusion Criteria

Fundus pictures with characteristic toxoplasmosis lesions, anti-toxoplasma IgM and IgG positive cases, and age 14 – 40 were included.

Exclusion Criteria

Patients with signs of active tuberculous choroiditis, other granulomatous uveitis, peripheral tubercles and lesions suggestive of toxocariasis and aged less than 14 years were excluded.

A detailed patient history, including the patient's name, age, sex and affected eye, was noted. The presenting symptoms of the patients, like floaters, blurring of vision and loss of vision, were considered. While taking the history, the duration of the symptoms and the history of contact with pet animals were duly noted. After taking a detailed history, a clinical examination was done to assess the patient's visual acuity both in the affected eye and in the normal eye by using Snellen's acuity chart. While examining the anterior segment, the following four findings were noted in both eyes: normal, keratic precipitates, inflammatory cells, and flares.

Vitreous cells were graded by slit lamp examination, and an examination of the vitreous was done to assess the number of vitreous cells and graded. Fundus examination was done by dilating the pupil with tropicamide and 10% phenylephrine. Detailed fundus examination, including direct ophthalmoscopy, indirect ophthalmoscopy and the site typical active lesion (chorioretinitis), was noted, and these were categorised into five groups as follows: supra temporal quadrant, infratemporal quadrant, supra nasal quadrant, infra nasal quadrant, and macula. While examining the fundus, the other associated findings, like macular oedema and an old scar near the active lesion, were noted, and intra-ocular tension was measured in both eyes.

After completing the proposed period of medical treatment, the following parameters were reassessed and compared with pre-treatment values such as best corrected visual acuity (BCVA), floaters, vitreous cells, and fundus. Detailed investigations were done for all patients, including complete blood count, anti-toxoplasma IgM and IgG antibodies, chest x-ray, Mantoux test, VDRL, VCTC, serum ACE, TORCH screening and B scan.

All the patients were treated with tablet trimethoprim 160 mg/sulfamethoxazole 800 mg (Bactrim DS) for 4-6 weeks. All the patients were started on tablet prednisolone 48 hours after initiating antimicrobials. The dose of oral prednisolone given was 1 mg/kg body weight. The oral prednisolone therapy was tapered two weeks before the completion of the anti-toxoplasma therapy. Patients with anterior segment involvement were treated with topical steroids and tapered depending upon the response. All the patients with anterior segment involvement were atropinized to prevent the complications of anterior uveitis.

After two weeks of initiation of therapy, the patients were reassessed to evaluate symptoms, understanding of vision and clinical findings to taper the steroids. Further follow-ups were done on 4th week, 3rd month, 6th month and at the end of one year. All the data were expressed as frequency and percentage.

RESULTS

Among 30 patients, 53.3% were male and 46.7% were female. The sex distribution revealed that males are affected slightly more than females. The age distribution indicates that the most common age group affected is 20-30. Patients in the fourth decade are the second most commonly affected. Patients in the second decade are the least commonly affected.

19 patients out of 30 cases were diseased in the right eye. The laterality of the affected eye shows that the right eye is more commonly involved than the left eye. All the patients complained of floater symptoms, and all had defective vision. Only two patients presented with symptoms of pain, redness, and defective vision.

Thirty patients had floaters and defective vision, and two had pain and redness. Out of thirty patients, 9 had the symptoms for 1-2 weeks. Nearly 50-60% of patients were presented with 1-3 weeks of duration of symptoms.

History of contact with pets was present in 24% of patients. Only two patients had anterior segment involvement. Both patients had anterior segment involvement in the form of keratic precipitates, cells and flare [Table 1].

The best corrected visual acuity of the affected eye was varied based on the anterior segment involvement, grades of vitreous cells and the involvement of the macula. Patients with anterior segment involvement, grade 3+ of vitreous cells and macular involvement had a decrease in visual acuity.

All the patients had vitreous cells in various grades. Most of the patients had grade 3+, which includes almost 73% of patients. The second most common grade was 2+, which includes 20% of patients. We found two patients with grade 4+ of vitreous cells. We have not noticed any patients with grade 1+ vitreous cells.

The site of classical toxoplasma lesion (chorioretinitis) was noted in all patients on fundus examination. The macula was the commonest site of involvement, which was involved in about 47% of patients. Four out of thirty patients had findings besides classical lesions on fundus examination. About two patients were presented with vasculitis. The other finding noted on the fundus examination was macular oedema. Macular oedema was found in about 7% of patients.

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Most patients had intraocular tension of 14- 16 mm of Hg. About 60% of patients had intraocular tension of 14-16 mm of Hg. About 35-40% of patients had intraocular tension of 17-18 mm of Hg. 75% of patients with the site of lesion in the macula had vision impairment. At the same time, patients with supra-temporal and infra-nasal lesions had no vision loss. About 12.5% of patients with supra-nasal and infratemporal quadrant lesions had vision impairment [Table 2].

Twenty-two patients were found to have 3+ vitreous cells. Most of these patients had visual acuity of 6/24 – 6/36. Some of these patients had visual acuity of 6/60 or below. The second most common grade of vitreous cells found was 2+. About six patients had grade 2+ vitreous cells, and three had visual acuity of 6/6-6/9. Another three patients with grade 2+ vitreous cells had vision of 6/12-6/18. We have observed grade 4+ vitreous cells in about two patients affected by the eye. These patients had visual acuity of 6/60 or below [Table 3].

Almost 50% of patients had the vision of 6/24 to 6/36 in the affected eye. After the treatment, 50% of patients had a vision of 6/12 – 6/18. About 30% of patients had a vision of 6/6 – 6/9 at the end of treatment. About 10% of patients had vision of 6/24-6/36, and another 10% had visual acuity of 6/60 and below even after the treatment [Table 4].

Table 1: Demographic Data

		No of patients	Percentage
Sex	Male	16	53.3
	Female	14	46.7
Age in years	Up to 20	6	20
	21-30	16	53.3
	31-40	8	26.7
Valid	LE	11	36.7
	RE	19	63.3
Floaters	Yes	30	100
	No	0	0
Defective Vision	Yes	30	100
	No	0	0
Symptoms	Floaters	30	100
	Defective vision	30	100
	Pain, Redness	2	6.7
Duration in weeks	<1	7	23.3
	1-2	9	30
	2-3	8	26.7
	>3	6	20
H/O contact with pets	Yes	**7**	24
	No	23	76
Findings	Normal	28	93.3
	Keratic precipitate, cells, flare	2	6.7

Table 2: Other Parameter Findings

		No of patients	Percentage
Vitreous cells grade	1+	0	0
	2+	6	20
	3+	22	73
	4+	2	7
Site of the lesion	Macula	14	46.7
	ST quadrant	7	23.3
	SN quadrant	3	10
	IT quadrant	4	13.3
	IN quadrant	2	6.7
Fundus picture- associated findings	Nil	26	86.6
	Vasculitis	2	6.7
	Macular edema	2	6.7
Tension (mm of Hg)	14-16	20	66.7
	17-18	7	23.3
	19-20	3	10

Table 3: Vision at Presentation

Vitreous cells	**Vision at presentation**				
	6/6-6/9	**6/12-6/18**	**6/24-6/36**	**6/60 & >**	**Total**
1+	0	0	0	0	0
2+	3	3	0	0	6
3+	0	0	14	8	22
4+	0	0	0	2	2

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Table 4: Pre-treatment vision vs. post-treatment vision

Visual acuity	(Pre-treatment)		(Post-treatment)	
	No of patients	Percentage	No of patients	Percentage
6/6 – 6/9	3	10	9	30
6/12 – 6/18	2	6.7	15	50
6/24 – 6/36	15	50	3	10
6/60 & >	10	33.3	3	10
Total	30	100	30	100

DISCUSSION

Our study age distribution indicates that the most affected age group was 20-30. Patients in the fourth decade are the second most commonly affected, and patients in the second decade are the least. The Bosch-Driessen study noted that the peak age of incidence is 29 years.8 Our study also observed that the third decade is the most commonly affected age group. There is no sex predilection for acquired ocular toxoplasmosis reported by Abu EK et al.[9] Our study revealed a slightly higher incidence in male patients. Some other studies also showed a slight male predilection for ocular toxoplasmosis based on frequent contact with the pet animal.[10] Wilking H et al.'s study shows that male gender, cat pets, and BMI >30 are independent risk factors for ocular toxoplasmosis. They also noticed that high socioeconomic status is associated with a lower incidence of ocular toxoplasmosis.10 Bóia MN et al. studied the prevalence in ethnic Indians in the Amazon and Brazil, where they observed equal prevalence of ocular toxoplasmosis in males and females.[11]

Regarding laterality, our study observed a slightly higher incidence in the right eye. However, most studies mentioned above observed no difference in the laterality of involvement. They observed an equal incidence of involvement in the right and left eyes. Ocular toxoplasmosis most commonly affects unilaterally. Bilateral involvement is rare, though some studies have revealed bilateral occurrences.12 Our study observed that almost all the cases were affected unilaterally. Thirty patients with floaters and defective vision, with two experiencing pain and redness. Severe visual impairment was most common in patients with macular fovea lesions, while peripheral retina lesions had minimal vision impairment.

Symptoms of the condition were highly variable, with nine patients experiencing symptoms for 1-2 weeks and 50%-60% experiencing 1-3 weeks. Unlike previous studies, there was no correlation between symptom duration and visual acuity. Contact with pet animals is associated with higher occurrences of ocular toxoplasmosis, with seven patients having a history of contact and 23 patients having no history. Although many patients were unaware of their contact history, it suggests potential exposure to pet animals. The best corrected visual acuity for affected eyes varied based on anterior segment involvement, vitreous cell grades, and macula involvement. Patients with anterior segment involvement, grade 3+ vitreous cell involvement, and macular involvement experienced decreased visual acuity. Only 6-7% of patients had anterior segment involvement in our study. Alireza Ramezani's study reported that mild to moderate anterior segment involvement may or may not occur.[13]

As Soheilian M et al. study reported, vitreous cells were present in all the cases of ocular toxoplasmosis. Most other studies have also reported the presence of vitreous cells in all cases of ocular toxoplasmosis.[10,14] Our study has also observed the vitreous cells in all 30 cases of the study group. Almost 75% of patients were presented with grade 3+ of vitreous cells. Some of the patients were presented with grade 2+ of vitreous cells. However, rare patients were presented with grade 4+ of vitreous cells. We also observed that patients with grade 4+ vitreous cells have more involvement in vision acuity. Some international studies have concluded that severe and prolonged vitreous involvement is associated with vitreous contraction, posterior vitreous detachment and rarely retinal detachment.[10,15] However, our study has not observed such complications in our patients.

In our study, almost 50% of patients were presented with the vision of 6/24 to 6/36 in the affected eye. Soheilian M et al.'s study observed more visual acuity reduction in patients with macular involvement and those with vitreous inflammation.14 Our study also observed more visual acuity involvement in macular and vitreous inflammation patients. The site of characteristic lesion (Retino choroiditis) in the fundus differed among the study patients reported by Abu EK et al. study.[9] In our study, the macula is the commonest site of involvement, accounting for nearly 47% of the patients. Most studies noted that the macula was the commonest site of involvement; the percentage comes to around 50-70.[16]

The study measured intraocular pressure using a Goldmann application tonometer in all patients, with 20 out of 30 cases having IOP between 14-16 mm. About 67% had IOP in this range, while 10% had IOP between 19-20 mm. No increase in pressure was observed in any patients. Other posterior segment findings associated with the characteristic lesion found on fundus examination are retinal vasculitis and macular oedema. In our study, we observed macular oedema in two patients and retinal vasculitis in another two patients. Reynolds SA et al. study has reported other posterior segment findings like papillitis, kyrieleis arteriolitis, and focal retinal vasculitis on rare occasions.[17]

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In our study, 22 patients had 3+ vitreous cells, with most having visual acuity between 6/24- 6/36. The second most common grade was 2+, with six patients having grade 2+ and three having grade 2+. Two patients had grade 4+ vitreous cells. Our study correlated the relation between the site of the characteristic lesion and visual impairment. About 75% of patients with the site of lesion in the macula had vision impairment. This association between the central lesion location and defective vision coincides with the Bosch-Driessen LE et al. study.[8] About 12.5% of patients with supra nasal and infratemporal quadrant lesions had impaired vision.

After the treatment, the floater symptom persisted in two of our patient's affected eyes. The vitreous cells have resolved in most of the patient's affected eye. After treatment, we also observed healed scars with reduced size in the fundus of all patient's affected eyes. About 50% of patients had vision of 6/12 – 6/18 after the treatment. About 30 % of patients had vision of 6/6 – 6/9 at the end of treatment. About 10% of patients had vision of 6/24-6/36, and another 10% had visual acuity of 6/60 and below even after the treatment.

CONCLUSION

The study concludes that ocular toxoplasmosis typically presents unilaterally, with common symptoms including floaters and defective vision. The illness lasts 3 to 30 days, with a common presentation lasting two weeks. There is no significant increase in intraocular pressure (IOP) in patients. About 7% of patients have anterior segment involvement. Most patients have grade 3+ vitreous, with visual impairment most common in macular involvement patients. Early treatment significantly improves symptoms like floaters and defective vision, reduces the size of the characteristic lesion, and reduces the occurrence of complications.

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