

A CLINICAL STUDY OF OCULAR MANIFESTATIONS IN LEPROSY

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BACKGROUND: Leprosy (Hansen disease) is a chronic infectious disease which affects the anterior segment of the eye. There are about 11 million cases of leprosy throughout the world and about 1/3rd have complications related to the eye. **OBJECTIVES:** Objective of this clinical study is to study the distribution of ocular involvement in patients with leprosy under various parameters like age, sex, duration, the different modes of ocular manifestations, and to identify and appropriately manage potentially sight threatening lesions. **METHODS:** In this clinical study, 50 patients with leprosy were examined to study the ocular involvement in leprosy. Detailed history taken and thorough clinical examination done, which was recorded on a predesigned proforma. Potentially sight threatening lesions identified and were appropriately managed conservatively or surgically. **RESULTS:** Ocular involvement was seen in 58 % of the patients with leprosy, among whom 72.4% had potentially sight threatening lesions. Most common ocular manifestation observed was superciliary madarosis (48 %). The other predominant potentially sight threatening lesions were lagophthalmos (35%), corneal hypoesthesia (28%), exposure keratitis (21%), corneal opacity (17%), cataract (17%), anterior uveitis (7%). Visual impairment was seen in 48.28%. No case of blindness was seen. Ocular manifestation was seen in the patients, despite all the patients being treated with systemic anti - leprosy drugs. **CONCLUSIONS:** The eye is involved in various forms in all the types of leprosy. The risk of ocular complication increases with increased duration of disease and with lepra reactions. Since ocular involvement can be seen even after completion of anti-leprosy treatment, the need for screening and periodic eye examination of all the patients with leprosy should be emphasized, for early identification of potentially sight threatening lesions which can be easily treated.

KEY WORDS: Leprosy, potentially sight threatening lesions, Ocular involvement

INTRODUCTION: Leprosy (Hansen disease) is a chronic infectious disease caused by an intracellular acid-fast bacillus *Mycobacterium leprae* which apart from skin, nasal mucosa and peripheral nerves also affects the anterior segment of the eye.¹ *M.leprae* was discovered over a hundred years ago (around 1873) by Armauer Hansen. It is a disease that does not kill the affected individual but cripples. When the threat of blindness is also added to patient's natural dread of the disease, the condition is indeed terrifying. There is direct ocular involvement in lepromatous type, whereas in tuberculoid type ocular involvement is indirect. The eyes can also be involved in lepra reactions.²

Ocular lesions are common in lepromatous type taking the form of lepromatous nodules, conjunctivitis, keratitis, pannus, scleritis and uveitis. In tuberculoid type, ocular lesions are rare. They are secondary to involvement of branches of seventh cranial nerve giving rise to paralytic lagophthalmos and exposure keratitis and involvement of trigeminal nerve leading to neurotrophic keratitis. Acute iridocyclitis and scleritis most commonly occur during type II lepra reactions which occur in lepromatous type of leprosy.

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In leprosy, the hands and feet have received a tremendous amount of attention however by comparison eyes have been neglected. An attempt should be made to educate these patients to undergo regular eye examination. Much of the ocular morbidity and blindness due to leprosy are potentially avoidable by screening, detection and early treatment of the potentially sight threatening lesions.

OBJECTIVES: This clinical study is an attempt to:

- To study the ocular involvement in patients with leprosy under the parameters of age group, sex, type and duration of leprosy.
- To study the different modes of ocular manifestations in patients with leprosy.
- To identify potentially sight threatening lesions and provide appropriate early management.

MATERIAL AND METHODS: The materials for the present study were taken from patients with leprosy, of all ages and both sexes, attending the out- patient department of ophthalmology, as well as in-patients from the department of dermatology at Chigateri general hospital and Bapuji Hospital attached to J.J.M Medical College, Davangere, Karnataka, India affiliated to Rajiv Gandhi university of health sciences Bangalore from Dec 2010 to Aug 2012.

All diagnosed cases of leprosy, old as well as new, out-patients attending the Ophthalmology department, and in-patients referred from the department of Dermatology at Chigateri general hospital and Bapuji Hospital were included in the study.

Patient who are non compliant and patients with keratitis, uveitis, lagophthalmos, other ocular disorders due to causes other than leprosy were excluded.

Method of collection of Data and Methodology

Relevant details of both ocular and systemic history, including details of lepra reaction and clinical examination of patient were recorded on specifically designed proforma. Ocular examination included

Detail examination of adnexa and extra ocular structures including the examination of face, orbit, eyebrows, eyelids, palpebral fissure, extra ocular movements, Bells phenomenon and lacrimal sac was done. Silt lamp bio microscopy was done for detailed examination of anterior segment. Corneal sensation checked using a wisp of cotton. Visual acuity without and with correction were studied using Snellen's acuity chart. All patients with best corrected visual acuity $<6/24$ in one or both eye were considered visually impaired. All patients with visual acuity less than $3/60$ (Snellen) or its equivalent were considered blind (as per WHO definition). Intraocular pressure was measured using applanation tonometer. Fundus evaluation was done using direct ophthalmoscope. Relevant laboratory investigation like complete haemogram, ESR, urine examination was carried out. RBS checked before starting the patients on any systemic steroids. Diagnosis of leprosy was confirmed by clinical examination and on the basis of Smear test report for mycobacterium leprae, previously performed on the patient by the dermatologist attending the case. Opinion of the dermatologist taken when ever required regarding systemic examination and treatment.

Different modalities of treatment used as per patients ocular manifestations. Systemic anti leprosy treatment, and treatment of lepra reaction was continued as per advised by the dermatologist attending the patient. Patients with lagophthalmos, ectropion and exposure keratitis were appropriately managed, conservatively and surgically. Instillation of Lubricating drops four

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times daily, Lubricating Ointment at night time, lid taping night time. Patients were advised to frequently think and blink and physiotherapy advised for facial palsy of recent onset. Spectacle correction was given to correct refractive errors. Antibiotic drops advised as per required in cases presenting with conjunctivitis. In cases with uveitis, combination of antibiotic steroid drops was used along with cycloplegic. Patients were educated regarding continuous treatment, long term follow up and dangers of continuing topical steroids.

RESULTS: In this study 50 patients with leprosy were examined to study the ocular involvement in leprosy.

Age in years	No : of cases	Percentage
10 – 20	8	16%
21 – 40	23	46%
41 – 60	17	34%
>61	2	4%

Table 1- Distribution of patients according to age

Majority of the patients in this study group belonged to the age group of 21– 40 years. Distribution of patients according to sex was male 76% (38), female 24% (12).

Type of leprosy	No: of cases	Percentage
Tuberculoid	15	30%
Lepromatous	11	22%
Borderline	24	48%

Table 2 - Distribution of patients according to type of leprosy

Out of the 50 cases studied,15 cases (30%) were tuberculoid, 11 cases (22%) were lepromatous, 24 cases (48%) were borderline,13 cases (26%) were Borderline tuberculoid (BT), 9 cases (18%) were borderline lepromatous (BL),2 cases (4%) were mid-borderline (BB).

Out of the 50 cases of leprosy studied, ocular involvement was seen in 29 cases (58 %).

Majority of the patients with ocular involvement in leprosy (13 cases) were seen in the age group of 21 – 40 yrs (45 %), followed by 10 cases in age group of 41 – 60 years (34 %).

Among the three major types of leprosy, all were found to have ocular changes. Ocular involvement was predominantly seen in lepromatous type with 10 cases having ocular lesions (35%), followed by 9 cases seen in Borderline lepromatous type (31%), 5 cases each in borderline tuberculoid, and tuberculoid type (17% each respectively). No ocular involvement was seen in the mid borderline type.

Out of the total 50 patients, history of lepra reaction was present in 12 cases (24%), absent in 28 (56%), and not known in 10 cases (20 %).

All the 12 patients with history of lepra reaction had ocular involvement.

Among the 29 patients with ocular involvement, history of lepra reaction was present in 12 patients (41.4 %), absent in 12 patients (41.4%), not known in 5 patients (17.24%).

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The ocular involvement was directly proportional to the duration of leprosy. Ocular involvement was seen in 16 patients (55%) with duration of leprosy being more than 5 years, and in 13 patients (45%) with duration of leprosy being less than 5 years.

Ocular involvement in 8 cases (62 %) with duration being less than 5 year was associated with lepra reaction, 6 cases being currently treated with systemic anti-leprosy drugs and 2 cases formerly treated. Only 4 cases with ocular involvement (25 %) of duration of leprosy being 5 years or more was associated with history of lepra reaction

Ocular manifestation	No: of cases	Percentage
Superciliary madarosis	14	48%
Lagophthalmos	10	35%
Corneal hypoesthesia	8	28%
Exposure keratitis	6	21%
Corneal opacity	5	17%
Cataract (B/L)	5	17%
Anterior uveitis	2	7%
Diffuse lid oedema	2	7%
Lepromatous lid nodules	1	4%
Conjunctivitis	2	7%
Acute B/L conjunctivitis	1	-
Chronic U/L conjunctivitis	1	-
Ectropion	1	4%
Orbicularis oculi weakness B/L	1	4%
Total	29	

Table 3 - Ocular manifestation in leprosy

Out of the 29 patients with ocular manifestations, in many patients more than one lesion were observed. Most common ocular manifestation observed in the study was madarosis. Superciliary madarosis was seen in 14 of the cases (48%). Potentially sight threatening lesions seen were lagophthalmos in 10 cases (35 %), corneal hypoesthesia in 8 cases (28%), exposure keratitis in 6 cases (21%), corneal opacity in 5 cases (17 %), cataract in 5 patients (17%) and anterior uveitis in 2 cases (7%). Cataract was seen in 5 of the patients (17 %). However all these patients were in the age group of 40 – 60 years and above and had bilateral cataract due to senile changes.

2 cases (7 %) of anterior uveitis were seen. Although it is mentioned that iris pearls are pathognomic of leprosy, no such case was seen in the study. The presence of facial maculae with diffuse lid oedema was seen in 2 of the patients (7%) with history of lepra reaction. One of the patient had associated lagophthalmos with exposure keratitis. Nodule involving the lids was seen in 1 of the patient with lepromatous leprosy (4%).

Conjunctivitis was seen in 2 of the patients (7%), 1 patient presented with acute bilateral conjunctivitis, and the other with chronic unilateral conjunctivitis. U/L paralytic ectropion with lagophthalmos was seen in 1 patient (4%). 1 patient (4%) had only decreased tone of orbicularis oculi muscle bilaterally, with no true lagophthalmos. Lagophthalmos was seen in 10 cases (35 %).

of these patients (90%) had lagophthalmos in one eye only and had history of lepra reaction, and 1 patient (10%) had bilateral lagophthalmos, in whom history of lepra reaction was not known.

Good Bells phenomenon was observed in 4 of these patients (40 %) with no secondary exposure keratitis. 6 of the patients with lagophthalmos (60 %) had exposure keratitis and inadequate Bells phenomenon. Lagophthalmos was more common in lepromatous leprosy and borderline lepromatous type (14% each respectively), followed by tuberculoid leprosy and borderline tuberculoid type (4% each respectively). Among the 19 patients with corneal involvement, corneal hypoesthesia was seen in 8 cases (28%), exposure keratitis in 6 cases (21%) and corneal opacity was seen in 5 cases (17 %). Out of the 29 patients with ocular manifestation, 21 patients (72.4%) had potentially sight threatening lesions (which included lagophthalmos with or without exposure keratitis, corneal hypoesthesia, uveitis, corneal opacity, and cataract). 17 of these patients were appropriately treated. 14 were conservatively managed and 3 were surgically managed. Out of the 29 patients with ocular involvement, visual impairment was seen in 14 of the patients (48.28%), out of which U/L visual impairment was seen in 8 cases (27.59%) and B/L visual impairment was seen in 6 cases (20.69%). Visual impairment due to age related B/L senile cataract is also included. None of the patients had visual acuity of less than 3/60. No cases of blindness were seen in this study. All the 29 patients with ocular manifestations were either formerly treated or currently receiving systemic anti leprosy treatment. 17 Patients (58.6%) were formerly treated and 12 patients (41.4%) were currently being treated with anti -leprosy drugs.

DISCUSSION: Eyes are commonly involved in leprosy, the mechanism being infiltration of the tissues and damage to the nerves. The prevalence of ocular lesions varies from series to series depending on race, average duration of the disease in the series. The marked difference in the incidence is possibly not only due to selection variation in study of the patients but also due to geographical pattern of the general incidence of the disease

In this study, out of the 50 patients of leprosy examined, ocular involvement was seen in 58% of the patients.

Majority of the patient with ocular involvement were seen in the age group of 21– 40 years. In this study, Male predominance was seen in both, the number of patients with leprosy attending the hospital (76 %) and those who had ocular involvement (72 %)

Among the three major types of leprosy, all were found to have ocular changes. Ocular involvement was predominantly seen in lepromatous type (35%), followed by Borderline lepromatous type (31%), and borderline tuberculoid, and tuberculoid type (17% each respectively). This was similar to study by Wani M.S. et al, wherein ocular involvement was found to be higher in lepromatous leprosy (75.36 %), followed by borderline (14.49 %) and tuberculoid leprosy (10.14%)⁰⁴. Ocular complications appear to be more common among lepromatous patients than tuberculoid as anterior segment of the eye provides a favourable environment for the M. Leprae which is more numerous in the lepromatous patients.

All the 24 % of patients with history of lepra reaction in the study group, showed ocular manifestations.

The ocular involvement was directly proportional to the duration of leprosy. In this study, Ocular involvement was seen in 55 % patients with duration of leprosy being more than 5 years, and in 45% patients with duration of leprosy being less than 5 years. 62% patients with duration being

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less than 5 year had ocular involvement with history of lepra reaction. This can be explained by the fact that the patients have the greatest risk for developing eye complications, due to lepra reactions during the first 6 – 12 months of systemic treatment.

Most common ocular manifestation observed in the study was madarosis. Superciliary madarosis was seen in 48 % of the cases.

In this study, lagophthalmos was seen in 35 % cases. 90% of these patients had lagophthalmos in one eye only and had history of lepra reaction, and 1 patient (10%) had bilateral lagophthalmos, in whom history of lepra reaction was not known. Decreased tone of orbicularis oculi muscle bilaterally was observed in a patient with no true lagophthalmos. 60% of the patients with lagophthalmos had exposure keratitis and inadequate Bells phenomenon.

Lagophthalmos is commonly associated with lepra reaction in the face, with damage to the facial nerve, but may also develop gradually in lepromatous patients as a late result of infiltration and secondary atrophy of the facial nerve and orbicularis muscle. Lagophthalmos was found to be more common in lepromatous leprosy and borderline lepromatous type (14% each respectively) followed by tuberculoid leprosy and borderline tuberculoid type (4% each respectively). This is consistent with motor nerve lesions in leprosy, mostly occurring in borderline cases or very late in the course of lepromatous leprosy.

Patients most at risk of developing lagophthalmos are those with reactive red and raised patches of the face, near to the eye. In recent lagophthalmos due to leprosy, such patches are usually still visible. In this study, the presence of facial maculae with diffuse lid oedema was seen in 7% of the patients with history of lepra reaction. One of the patient had associated lagophthalmos with exposure keratitis. Reactive facial patches around the eye and recent lagophthalmos of less than 6 months duration should be considered a Type I reaction, and given treatment with systemic steroids, in order to prevent nerve damage or restore facial nerve function.

Nodule involving the lids was seen in 4% of the patient with lepromatous leprosy. In this study corneal involvement was seen in 66 % of the patients, corneal hypoesthesia being the most common seen in 28%, exposure keratitis in 21% and corneal opacity was seen in 17 %. Other forms of keratitis like interstitial keratitis, pannus was not observed in this study.

Cataract was seen in 17 %. However all these patients were in the age group of 40 – 60 years and above and had bilateral cataract due to senile changes. As leprosy populations become older, their age related complications like cataract together with their ocular morbidity may lead to further deterioration of vision, hence these patients require regular follow up, even long after completion of systemic anti leprosy treatment.

Uveal complications are relatively rare in the tuberculoid form and are much more common in the lepromatous form of the disease (21, 24), besides chronic anterior uveitis occurs relatively late in the disease, usually after it has been present for 10 years or more, however in this study group there were only 4 patient with duration of leprosy being more than 10 years. The predominance of the patients with tuberculoid and borderline tuberculoid leprosy in the study group, and the small sample size of the study group, probably explains the lower incidence of uveitis in this study.

Conjunctivitis was seen in 2 of the patients (7%), 1 patient presented with acute bilateral conjunctivitis, and the other with chronic unilateral conjunctivitis. Leprosy rarely affects the fundus and in this study fundus lesion pertaining to Hansen's was not seen in any case. In this study out of

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the 29 patients with ocular manifestation, 72.4% had potentially sight threatening lesions. Visual impairment was seen in 48.28%, out of which U/L visual impairment was seen in 27.59% and B/L visual impairment was seen in 20.69%. Visual impairment due to age related B/L senile cataract was also included. None of the patients had visual acuity of less than 3/60.

However no cases of blindness was seen in this study, probably explained by the variation in the study sample, study centre as compared to other studies as well as the small size of this study group.

In this study, all the patients with ocular manifestations were either formerly treated (58.6%) or presently being treated (41.4%) with systemic anti leprosy drugs.

The anti leprosy treatment does not prevent or retard the development of ocular lesions.⁴ Once the patient has been put on systemic anti-leprosy treatment, the greatest risk for eye complications due to reactions, is during the first 6-12 months of treatment.³ Leprosy related ocular pathology progresses in some patients even after they are cured microbiologically. The progressive leprosy related lesions are the result of chronic nerve damage.

Although prompt institution of treatment and availability of newer and better anti-leprosy drugs has markedly improved the outcome of those affected, the process of ocular involvement continues not withstanding regular medical treatment.⁴

CONCLUSION: Visual impairment in leprosy needs special consideration by leprologists and ophthalmologists, because much of it is preventable if detected early. The risk of ocular complication increases with increased duration of disease, lepra reaction and presence of facial patches in reaction. Screening of all the leprosy patients may help in earlier identification of potentially sight threatening lesions which can be easily treated. Considering the seriousness of eye complications, repeated and careful examination of the eye especially of those with lepromatous leprosy and those with nerve involvement affecting the eye cannot be overemphasized, especially since ocular involvement can be seen even after completion of anti leprosy treatment. The anti leprosy treatment though has markedly improved the outcome of those affected, it does not prevent or retard the development of ocular lesions.

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