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A Study on Ocular Manifestations of Leprosy in a Tertiary Care Hospital

Vinayagamurthy K[1], Kaavya Madasamy[2], R. Saravanan[3], Aruna Arumugam[4]

[1]Professor and H.O.D, Department of Ophthalmology, Government Stanley Medical College, Chennai, Tamil Nadu, India.
[2]Senior Resident, Department of Ophthalmology, Government Stanley Medical College, Chennai, Tamil Nadu, India. Mail
[3]Associate Professor, Department of Ophthalmology, Government Stanley Medical College, Chennai, Tamil Nadu, India.
[4]Associate Professor, Department of Ophthalmology, Government Stanley Medical College, Chennai, Tamil Nadu, India.

Abstract

Background: Leprosy is also known as Hansen disease is one of the oldest known diseases to mankind. It is curable but if left untreated can lead to severe deformities. It primarily affects the skin, mucous membranes, peripheral nervous system, eyes and testes. M. leprae is an intracellular, pleomorphic, acid-fast, pathogenic bacteria. It closely resembles Mycobacterium tuberculosis. Objective: To analyse the incidence of ocular manifestations of leprosy in a hospital population and To analyse the association of various ocular manifestation in types of Hansen's disease : a) tuberculous b) lepromatous.**Material and Methods:**Study Design: Hospital based Prospective observational study. Study area: Dept. of. Ophthalmology, in a tertiary care teaching college and hospital. Study Period: 1 year. Study population: Patients with systemic leprosy who presented to the OPD of department of Dermatology were referred to the department of Ophthalmology and screened for ocular manifestations. Sample size: study consisted a total of 96 patients. Study tools and Data collection procedure: The patient's demographic data like age, sex, residential area were documented. A detailed history regarding ocular symptoms of leprosy like diminished vision, redness, pain, loss of lashes, watering, photophobia were documented.**Results:**The age distribution with lepromatous and tuberculoid types. Majority of lepromatous patients were in 40-50 years age group, while majority of tuberculous patients were in above 60 age group.**Conclusion:**Majority of patients treated for ocular inflammation had good visual outcome. Patients with corneal anesthesia and decreased corneal sensation need prophylactic measures, which are vital to avoid certain refractory and sight threatening corneal pathology. Early detection, proper awareness of the ocular morbidities, early intervention, management and rehabilitations of complications arising during treatment and even post-anti leprosy treatment is essential to prevent potentially sight threatening complication.

Keywords: Hansens disease, lepromatous, tuberculoid, M.leprae, lagophthalmos, blindness, corneal anaesthesia.

Corresponding Author: Dr. Aruna Arumugam, Associate Professor, Department of Ophthalmology, Government Stanley Medical College, Chennai, Tamil Nadu, India.
Email: aruna269@gmail.com

Introduction

Leprosy is also known as Hansen disease is one of the oldest known diseases to mankind. It is curable but if left untreated can lead to severe deformities. It primarily affects the skin, mucous membranes, peripheral nervous system, eyes and testes. M. leprae is an intracellular, pleomorphic, acid-fast, pathogenic bacteria. It closely resembles Mycobacterium tuberculosis.

The diagnosis of leprosy is based on the presence of at least one of these three cardinal signs: definitive loss of sensation in a pale or reddish skin patch, a thickened or enlarged peripheral nerve with loss of/diminished sensation and/or weakness of the muscles supplied by that nerve, and the presence of acid- fast bacilli in a the slit-skin smear.[1,2]

Leprosy lesions include macules, papules, and hypopigmented to erythematous plaques, hypo-anesthetic and dry, scaly lesions with scanty to no hair. Early symptoms include nasal stuffiness, discharge, bleeding, and swelling of legs and ankles. The adaptive immune response controls M. leprae infection and influences the manifestations of the disease.[3]

In 90% of the patients, the first sign of the disease is feeling of numbness, which may precede to skin lesions by a number of years. Temperature is the first sensation lost. It can be classified into 2 types, (1) non-lepromatous/neural and (2) lepromatous. Classifying patients with leprosy into multibacillary and paucibacillary determines the duration of its treatment.[4] Anti-leprosy drugs have multiple targets in the lepra bacilli, the WHO-recommended MDT, for clearing the infection and lowering the risk of drug resistance.[5]

Lepra reactions occur in about 30–50% of patients with leprosy. They are induced by medication, stress or surgical procedures. It is an immunological process that is seen before, during or after the completion of multi-drug therapy (MDT). Most blindness and impaired vision resulting from leprosy is preventable. Patients, who are cured, remain at risk of leprosy-related ocular complications before, during, and after MDT. The visual disability and blindness are still associated with stigma, ignorance, lower socio-economic status, and neglect.

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Dermatologists and ophthalmologists have an important role to play in the management of leprosy with the integration of leprosy services into general medical services.[6,7] The study was undertaken to determine the incidence of the various ocular manifestations of leprosy.

Objective: To analyse the incidence of ocular manifestations of leprosy in a hospital population and To analyse the association of various ocular manifestation in types of Hansen's disease : a) tuberculous b) lepromatous.

Materials and Methods
Study Design: Hospital based Prospective observational study.
Study area: Dept. of. Ophthalmology, in a tertiary care teaching college and hospital.
Study Period: 1 year. From January 2019 to January 2020.
Study population: Patients with systemic leprosy who presented to the OPD of department of Dermatology were referred to the department of Ophthalmology and screened for ocular manifestations.

Sample size: study consisted a total of 96 patients.
$N = 4pq/L^2$
$N = 4\ p(1-p)\ /L^2$ p = prevalence, q = 1-p, L = error In this study prevalence is 4%, L =10%
So, N = 96

Sampling method: Simple Random sampling method.
Inclusion Criteria: Patients with Hansen's disease undergoing treatment, attending skin and ophthalmology OPD.
Exclusion Criteria: Patients with co morbidities like diabetes, hypertension, tuberculosis, sarcoidosis, and other skin diseases.
Ethical consideration: Institutional Ethical committee permission was taken prior to the commencement of the study.

Study tools and Data collection procedure:
The patient's demographic data like age, sex, residential area were documented. A detailed history regarding ocular symptoms of leprosy like diminished vision, redness, pain, loss of lashes, watering, photophobia were documented.
An elaborate history regarding
(i) Type of leprosy (tuberculous/lepromatous)
(ii) Family history and contact history
(iii) MDT taken and lepra reaction or any adverse drug reactions were elicited.

The patients were examined for ocular manifestations of leprosy.

OCULAR EXAMINATION INCLUDED:
- Best corrected visual acuity.
- Detailed external ocular examination to look for madarosis, lagophthalmos or any lid abnormalities using torchlight.

(i) Slit lamp examination for keratic precipitates, anterior chamber reaction, iris features, any posterior synechiae, lens changes, episcleritis, exposure keratopathy or scleritis.
(ii) Dilated fundus examination by indirect ophthalmoscopy, +90D slit lamp biomicroscopy.
(iii) Corneal sensation: Tested by asking the patient to straight and applying tail end of wisp of cotton on the cornea 2mm from the limbus laterally and categorizing the sensation as normal if the patient responded by closing the eyelids. It is impaired if the patient does not respond adequately.
(iv) Intra ocular pressure was recorded in all patients by separate applanation tonometer/NCT After establishing the diagnosis, appropriate treatment was started. Patients were followed over subsequent visits. During each visit BCVA, ocular statuses were assessed. At the end of the study period, all the data were analyzed. The pattern of ocular involvement in these patients was established.

Statistical Analysis:
The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in Independent groups the unpaired sample t-test was used. To find the significance in categorical data Chi-Square

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test was used similarly if the expected cell frequency is less than 5 in 2×2 tables then the Fisher's Exact was used. In all these statistical tools the probability value of 0.05 is considered to be the significant level.

Results

Table 1: Age Distribution in the Study Population

Age distribution		
	Frequency	**Percent**
31 - 40 yrs	14	14.6
41 - 50 yrs	30	31.3
51 - 60 yrs	28	29.2
61 - 70 yrs	23	24.0
Above 70 yrs	1	1.0
Total	96	100.0

Patients demographic characteristics are showed most of the patients were in 4th – 6th decade of life.

Table 2: Type of Leprosy

Groups distribution		
	Frequency	**Percent**
Lepromatous	160	83.3
Tuberculoid	32	16.7
Total	192	100.0

Majority of patients (83.3%) had lepromatous leprosy while, 16.7% patients had tuberculoid type.

Table 3: Association of Age with Leprosy Types

			Groups		**Total**	**□ 2 – value**	**p-value**
			Lepra-matous	**Tuber-culoid**			
Age	31 - 40 years	Count	13	1	14	4.355	0.360 #
		%	16.3%	6.3%	14.6%		
	41 - 50 years	Count	22	8	30		
		%	27.5%	50.0%	31.3%		
	51 - 60 years	Count	23	5	28		
		%	28.8%	31.3%	29.2%		
	61 - 70 years	Count	21	2	23		
		%	26.3%	12.5%	24.0%		
	Above 70 years	Count	1	0	1		
		%	1.3%	0.0%	1.0%		
Total		Count	80	16	96		
		%	100.0%	100.0%	100.0%		
# No Statistical Significance at p > 0.05 level							

The [Table 3] denotes the age distribution with lepromatous and tuberculoid types. Majority of lepromatous patients were in 40-50 years age group, while majority of tuberculous patients were in above 60 age group.

Table 4: Sex Distribution in the Study Population

Gender distribution		
	Frequency	**Percent**
Female	32	33.3
Male	64	66.7
Total	96	100.0

Majority of patients (66.7%) were males. 33.3% constituted females.

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Table 5: Clinical factors among Leprosy Types

Data	Lepromatous	Tuberculoid
Diminished corneal sensation	70.6%	71.7%
Madarosis	52.5%	59.4%
Chronic uveitis	35%	37.5%
Dry eye	28.8%	25%
Cataract	13.1%	9.4%
Corneal leucoma	4.4%	6.3%
Scleritis	1.9%	3.1%
Lagophthalmos	3.1%	6.3%
Chronic dacryocystitis	2.5%	6.3%
Episcleritis	3.1%	3.1%
Acute uveitis	2.5%	-
Corneal ulcer	1.9%	3.1%

Table 6: Association of Sex with Leprosy Types

			Groups		Total	□ 2 - value	p-value
			Lepramatous	Tuberculoid			
Gender	Female	Count	23	9	32	4.538	0.033 *
		%	28.8%	56.3%	33.3%		
	Male	Count	57	7	64		
		%	71.3%	43.8%	66.7%		
Total		Count	80	16	96		
		%	100.0%	100.0%	100.0%		
* Statistical Significance at p < 0.05 level							

The [Table 6] denotes the gender distribution among lepromatous and tuberculoid types. 71.3% and 43.8% include males in lepromatous and tuberculoid groups respectively while females include 28.8% and 56.3% respectively.

Table 7: Sclera/Conjunctiva/Cornea/AC with Groups

			Groups			□ 2-value	p-value
			Lepra matous	Tuberculoid			
Sclera/conjunctiva/ cornea/ac	Ac. Uveitis	Count	4	0	4	1.900	0.984 #
		%	2.5%	0.0%	2.1%		
	Adherent leucoma	Count	7	2	9		
		%	4.4%	6.3%	4.7%		
	Ch. Uveitis	Count	56	12	68		
		%	35.0%	37.5%	35.4%		
	Corneal ulcer	Count	3	1	4		
		%	1.9%	3.1%	2.1%		
	Episcleritis	Count	5	1	6		
		%	3.1%	3.1%	3.1%		
	Scleritis	Count	3	1	4		
		%	1.9%	3.1%	2.1%		
	Scleritis, uveitis	Count	1	0	1		
		%	.6%	0.0%	.5%		
	Uveitis	Count	1	0	1		
		%	.6%	0.0%	.5%		
	Nil	Count	80	15	95		
		%	50.0%	46.9%	49.5%		
Total		Count	160	32	192		

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	%	100.0%	100.0%	100.0%		
# No statistical significance at p > 0.05 level						

The [Table 7] denotes acute uveitis in 2.5% of lepromatous type, 4.4% and 6.3% of lepromatous and tuberculoid groups respectively, chronic uveitis in 35% and 37.5% of lepromatous and tuberculoid groups respectively, corneal ulcer in 1.9% and 3.1% of lepromatous and tuberculoid groups respectively, episcleritis in 3.1 each of lepromatous and tuberculoid groups respectively, scleritis in 1.9% and 3.1% of lepromatous and tuberculoid groups respectively.

Table 8: IOP with Leprosy Types

Groups		**N**	**Mean**	**S.D**	**t- value**	**p- value**
IOP	Lepramatous	160	15.70	1.77	0.405	0.686 #
	Tuberculoid	32	15.56	1.66		
# No Statistical Significance at p > 0.05 level						

The [Table 8] denotes IOP of lepromatous and tuberculoid groups respectively, which was found to be within normal limits in both groups.

Discussion

A study by Chandra Sekhar et al,[8] states that of the 89 leprosy patients in this study, 69 (77.5%) were male and 20 were female (22. 5%). Dry eye was noted in 18 eyes (12.9%), most commonly among LL patients. In our study 66.7% were male and 33.3% female; dry eye was seen in 28% predominantly with lepromatous leprosy.

As per Chandra Sekhar et al,[8] 11.2% of tested eyes presented with an acuity of 6/60 or less, leaving only 5.6% of eyes socially blind because of leprosy. In our study 8.3% had less than 6/60 vision and 4.7% had social blindness (<3/60).

According to Pranesh Kulkarni et al,[9] ocular involvement is more common in lepromatous leprosy accounting for 58% of cases, followed by tuberculoid leprosy accounting for 30% of cases. In our study with 83% lepromatous and 16% tuberculoid leprosy. Most of cases of lepromatous leprosy has loss of eyebrows and eyelashes. In our study found to be 52.5% with lepromatous and 59.4% with tuberculoid. In tuberculoid leprosy common lesion noticed is lagophthalmos followed by lagophthalmos with exposure keratitis, corneal leucomas and neurotrophic keratitis etc. In our study lagopthalmos seen in 3% in lepromatous and 6.3% in tuberculoid leprosy.

According to study by Daniel et al,[10] lagophthalmos (4.20%), blocked nasolacrimal ducts (1.68%), pterygium (11.34%), impaired corneal sensation (53%), corneal opacity (10.5%), keratic precipitates (4.62%) and cataract (12.6%) were ocular complications seen. 4.6% had blind eyes. In our study, lagophthalmos (3.6%), blocked nasolacrimal ducts (3%), impaired corneal sensation (29.2%), corneal opacity (4.7%), keratic precipitates (35%) and cataract (12.5%) while 4.7% had socialblindness (<3/60).

In those patients who had poor corneal sensation, out of 70% only 6.7% developed corneal pathology. In patients with lagophthalmos only 2% developed corneal ulcer, and had defective bell's phenomenon. So there is need to properly protect cornea at night time after corneal hypoesthesia or lagopthalmos develops.

Conclusion

Majority of patients treated for ocular inflammation had good visual outcome. Patients with corneal anesthesia and decreased corneal sensation need prophylactic measures, which are vital to avoid certain refractory and sight threatening corneal pathology. Early detection, proper awareness of the ocular morbidities, early intervention, management and rehabilitations of complications arising during treatment and even post-anti leprosy treatment is essential to prevent potentially sight threatening complication.

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