

Ocular manifestations of leprosy

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Abstract

Introduction: Leprosy or Hansen's disease is a chronic infectious disease caused by an intracellular rod-shaped acid-fast bacilli *Mycobacterium leprae* which affects the skin, nasal mucosa, peripheral nerves and the anterior segment of the eye. *Mycobacterium leprae* was discovered by a Norwegian physician G. Armauer Hansen in the year 1874. **Materials and Methods:** The present study was carried out in the outpatient Department of Ophthalmology and inpatient department of Dermatology at Mamatha Medical College and Hospital, Khammam from March 2015-March 2016. In this study a total of 78 patients were taken, 61 males and 17 females of the age group 20 years and above. All diagnosed cases of leprosy. Old and new cases, both genders and age group of 20 years and above. Noncompliant patients, Patients with preexisting ocular disorders due to other causes than leprosy. **Results:** In the group 'A' there are 21 patients of whom 7 patients (33.3%) showed evidence of ocular involvement. In group 'B' 8 out of 12 patients had eye lesions, thus a greater percentage (66.6%) showed ocular involvement. 39 out of 45 (86.6%) patients of group 'C' showed ocular involvement. Thus, it is found that the greater the duration of the disease, the more are the chance for ocular involvement. Most of the patients had eye lesions when the disease is more than 10 years in duration. **Conclusion:** Visual impairment is preventable in Leprosy if detected early. The risk of ocular complications increases with the duration of the disease, despite being treated with systemic anti-leprosy drugs.

Keywords: Leprosy, Visual impairment, Hansen's disease.

Introduction

Leprosy or Hansen's disease is a chronic infectious disease caused by an intracellular rod-shaped acid-fast bacilli *Mycobacterium leprae* which affects the skin, nasal mucosa, peripheral nerves and the anterior segment of the eye [1]. *Mycobacterium leprae* was discovered by a Norwegian physician G. Armauer Hansen in the year 1874 [1]. The most ancient writings of "SUSHRUTA SAMHITA" compiled in 600 BC refers to leprosy as Vat Rakta or Vat Shonita and Kushtha. Leprosy occurs in all ages and both sexes. Male: Female ratio is 2:14 [2].

Leprosy bacilli have a Predilection for neural tissue and their target is secondary to the involvement of branches of facial nerve which presents with paralytic lagophthalmos, exposure keratitis and neurotrophic keratitis. Acute iridocyclitis and scleritis are seen in type 2 lepra reaction occurring in lepromatous leprosy [3,4]. Blindness has been reported in 7% of patients secondary to lagophthalmos, uveitis, exposure keratitis and cataract. Proper attention and early detection can prevent potentially sight threatening lesions.

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The main objective of this study is to identify the ocular manifestations in leprosy in a tertiary care hospital.

Materials and Methods

The present study was carried out in the outpatient Department of Ophthalmology and inpatient. Department of Dermatology at Mamatha Medical College and Hospital, Khammam from March 2015-March 2016. In this study a total of 78 patients were taken, 61 males and 17 females of the age group 20 years and above.

Inclusion criteria: All diagnosed cases of leprosy. Old and new cases, both genders and age group of 20 years and above.

Exclusion criteria: Noncompliant patients, Patients with preexisting ocular disorders due to other causes than leprosy.

Type of study: A cross sectional descriptive study for a period of 12 months.

Procedure: Relevant details of both ocular and systemic history, including details of lepra reaction and clinical examination of patients were recorded one proforma.

A detailed slit lamp examination of the anterior segment of eye was done. Visual Acuity recorded with help of Snellen's chart. Corneal sensation was checked with a wisp of cotton. Intraocular pressure recorded with help of Schiotztonometer. Fundus examination with 78 D and Indirect Ophthalmoscopy was done. Lab investigations like haemogram, ESR, Urine routine and RBS done. Slit skin smear and skin biopsy from the ear lobe was performed by the Dermatologist and report obtained as positive for M. leprae (Ziehl Neelsen technique).

Patients were started on systemic anti leprosy drugs (multi drug therapy) and treatment for lepra reactions. Common side effects documented in these patients due to medications were diffuse pigmentation, gastritis and light headedness. Patients with ocular manifestations were treated accordingly to their need of Lubricant eye drops, topical antibiotic with steroid drops, eye ointments, frequent blinking exercises, physiotherapy, and lid taping at night time and spectacle correction.

Results

As leprosy is a chronic disease, an attempt is made to study the significance of duration of disease in relation to the incidence of ocular involvement. For this purpose, the patients are divided into 3 groups, group 'A' where in the duration of disease is less than five years, group 'B' where in the duration of disease is between 5 to 10 years and group 'C' wherein the duration of disease is more than 10 years. All the patients in these 3 groups are subdivided based on the type of the disease.

In the group 'A' there are 21 patients of whom 7 patients (33.3%) showed evidence of ocular involvement. In group 'B' 8 out of 12 patients had eye lesions, thus a greater percentage (66.6%) showed ocular involvement. 39 out of 45 (86.6%) patients of group 'C' showed ocular involvement (Table 1). Thus, it is found that the greater the duration of the disease, the more are the chance for ocular involvement. Most of the patients had eye lesions when the disease is more than 10 years in duration.

Table-1: Ocular lesion distribution in study population.

TYPE	No. of cases	Ocular lesion	%	No. of cases	Ocular lesion	%	No. of cases	Ocular lesion	%
LL	5	3	60%	10	8	80%	32	26	81.2%
BL	7	2	28.5%	-	-	-	10	10	100%
BB	8	2	25%	-	-	-	-	-	-
BT	-	-	-	-	-	-	5	2	40%
TT	1	-	-	2	1	50%	2	1	50%
Total	21	7	33.3%	12	8	66.6%	45	39	86.6%

An attempt is made to study the significance of the duration of the disease in relation to the ocular involvement in various types of leprosy. The incidence of ocular involvement increased with the duration of the disease in all the types of leprosy, the exception being lepromatous leprosy. In tuberculoid type the incidence of ocular involvement is nil in group 'A', 50% in group 'B' and 50% in group 'C'.

In borderline type of leprosy the incidence of ocular involvement increased from 26.6% in group A to 80% in group 'C'. In lepromatous leprosy the incidence of ocular involvement is 60% in group 'A', 80% in group 'B' and 81.2% in group 'C'. The fact that the incidence is almost same in all the groups, indicates that the involvement of the eye in lepromatous leprosy is early. This is probably because lepromatous leprosy type of disease is the most infectious form of all types of leprosy.

Ocular Lesions (Adenexae): The present study shows the evidence of loss of eyebrows piesein in almost all types of leprosy disease. More predominant in lepromatous leprosy is 63.8%, next common in borderline type of leprosy (50% and rarer in tuberculoid type (20%).

Table-2: Ocular lesions.

Ocular Lesion	LL	%	BL	%	BB	%	BT	%	TT	%
Loss of eyebrows	30	63.8%	10	71.4%	2	22.2%	2	50%	1	20%
Poliosis	4	8.5%	-	-	-	-	-	-	-	-
Madarosis	30	63.8%	10	71.4%	-	-	-	-	1	25%
Trichiasis	8	17%	2	14.2%	-	-	-	-	1	25%
Lagophthalmos	1	2.12%	-	-	-	-	-	-	3	75%

Poliosis is found to be comparatively rare. It is found in only 4 cases, all being patients of lepromatous leprosy, it is not found in other types of leprosy. Madarosis is common. It is seen in 63.8% of lepromatous leprosy and 35.9% of border line type. Trichiasis is not very common, it is seen in 17% of lepromatous leprosy and 7.1% of border line type. Lagophthalmos is surprisingly found to be rare in lepromatous leprosy type (2.12%). It is found to be more common in tuberculoid leprosy. In tuberculoid leprosy 3 patients (75%) had lagophthalmos, where as madarosis and trichiasis are seen in only one patient.

Cornea: Corneal involvement is Frequent and it is an important cause of visual impairment in leprosy disease. The corneal involvement can be primary, or secondary to the lid involvement the most important being lagophthalmos.

The corneal lesions are seen in all types of leprosy disease. The common forms of involvement are superficial punctate keratitis, sub epithelial keratitis, interstitial keratitis, Pannus, thickening of corneal nerves and reduced corneal sensation, keratic precipitates and corneal opacities.

Exposure keratitis leading to perforation of corneal ulcer and iris prolapse is also noticed. Of the all the corneal lesions punctate keratitis is the commonest corneal involvement. It requires examination with slit lamp using blue filter after fluorescein staining to establish the presence or otherwise of punctate keratitis is found in a total of 33 patients of all types of patients accounting for 42.3% of all patients, among them bilateral involvement is observed in 24 patients accounting for 72.7%.

Patients with punctate keratitis and 30.8% of all types of leprosy disease. Of all the types of hansen's disease punctate keratitis is found to be more common in lepromatous leprosy (66.6%) and Borderline lepromatous (BL) type is 24.2%.

Interstitial keratitis, Pannus and healed interstitial keratitis leaving corneal opacities are the most important primary corneal lesions which lead to visual impairment. A total of 6 cases of corneal opacities situated in the corneal stromal level with the evidence of ghost vessels were found in lepromatous leprosy and all the eyes were involved unilaterally. 2 cases of active interstitial keratitis involving both eyes were found in borderline lepromatous (BL) type.

Pannus was seen in 12 cases of all types of leprosy, majority (8) being seen in lepromatous leprosy. exposure keratitis is as a result of lagophthalmos. Thus the incidence or exposure keratitis is not very high, as only 3 patients (3.8%) had evidence of it, it is surprisingly found to be very common in tuberculoid leprosy. 2 patients of tuberculoid leprosy (66.6%) had exposure keratitis, one of them bilaterally.

They both had total corneal ulcer in one eye and perforated corneal ulcer in the other type. These findings point out to the fact that in a case of bilateral lagophthalmos, Hansen's disease particularly tuberculoid leprosy should be thought of. Another important factor is that the patient should be educated to watch for appearance of inadequate closer of eyelids and to report to the Ophthalmologists the moment they found it, so that the blinding complication of exposure keratitis can be prevented. Other common findings are reduced corneal sensation and thickening of corneal nerves which can be made out by direct illumination with slit lamp.

Chronic anterior uveitis is found in 25 patients of all types of leprosy (32%) and is seen bilaterally in 10 cases (13%). Lepromatous leprosy accounts for most of the cases a total of 19 patients (40.5%) and all the cases of bilateral involvement is seen in this form of leprosy only. The diagnosis of anterior uveitis is made by the presence of keratic precipitates, altered iris pattern, synechiae, exudates, irregular constricted pupil and pigment dispersion over the anterior capsule of the lens. No case of acute iridocyclitis is found.

Complicated cataract ranging from opacities of small size without causing much visual disability to total lenticular capacities leading to virtual blindness are found. A total of 16 (20.5%) patients had cataract. 8 of them had bilateral cataract. Again most of the patients 12 (25.5%) belongs to lepromatous leprosy. This is expected because the incidence of iridocyclitis and corneal complications are more in lepromatous leprosy.

Only 2 cases of scleritis are seen in the study. They are all seen in lepromatous leprosy and all involved in one eye only. 2 patients had chronic dacryocystitis and they all belong to lepromatous leprosy.

Lacrimal Secretion: A study of amount of lacrimal secretion is carried out by schirmer's test. Reading less than 10 mm is considered as hyposecretion or dry eye.

Table-3: Distribution of cases with reduction in secretion.

TYPE	No. of Cases	Reduction Secretion	Percent
LL	47	16	34%
BL	14	2	14.2%
BB	9	2	22.2%
BT	4	-	-
TT	4	-	-
Total	78	20	25.6%

It is found that a total of 20 patients (25.6%) had reduced secretions of tears. The incidence of 'dry eye' are maximum in lepromatous leprosy (34%); and least in tuberculoid leprosy. Though the exact cause of it is not definite, it may be due to the infiltration of conjunctival nerves or alteration in blinking of eyes. Though the reduced lacrimal secretion is often associated with corneal involvement, it is not the rule. In some cases the corneal involvement is seen in the presence of normal secretion and in 2 cases, reduces lacrimal secretion are seen with healthy cornea.

Discussion

In our study, Most of the Patients examined were adults. Only three patients are below the age of 20 years. There is no significant difference in the age distribution of patients of Hansen's disease as compared to that of patients with ocular involvement. None out of 3 patients below the age of 20 years had ocular manifestations. Similarly, there is no significant variation in the distribution in different types of leprosy disease. Majority of the patient with ocular involvement were seen in the age group of 21-40 years [5].

In the study conducted by A Samuel Gnanoss and N Rajendran, out of these 250 cases, 148 (59.2%) showed ocular lesions. An incidence congruous with 47% of Weekeroon but is lower than that of Harley (90%); Lamba & Santosh Kumar. (87.3%) Hornblasse (76%), Malla et al (74.2%) Ticho & Sira give a very low figure of 6.3%. This variation can be racial too, Asiatics being more susceptible [6]. In a study by Dr. Jyothirmay Datta, Dr.Swapan, The major sight threatening lesions include Cataract (65%), Lagophthalmos (12%), Corneal Opacity (13%) & Uveitis (9%). Other condition including Dry eye syndrome was noted (9%) [7].

In a study conducted in UK on ocular complications in leprosy by ANJ Malik, RW Morris, TJ Fytche, this is the first review of ocular findings seen in leprosy patients presenting in the United Kingdom and shows a significant rate of ocular complications and blindness. Half of all leprosy patients examined had an ocular complication and, although many of these were mild, in more than one in five patients, they were potentially sight threatening.

The prevalence of blindness was 2.4% (both eyes), and the main causes were corneal opacity, cataract or a combination of both. The most recent study based in a non-endemic country was carried out in 1994 and was based in the United States. It was also conducted in an outpatient setting and it found that 74% of the patients had some type of ocular

complication, with 48% having a potentially sight-threatening complication [8,9,10,11].

Conclusion

Ocular involvement in Hansen's disease is very common. 76.9% of all types of leprosy disease showed evidence of involvement of the eye. The duration of disease has an important bearing on the incidence of ocular involvement. It is found that the longer is the duration of the disease, the higher is the incidence of ocular involvement. It increased from 33.3% in patients with less than 5 years duration of disease to 86.6% in patients with duration of disease more than 10 years.

What the study adds to the existing knowledge?

In lepromatous leprosy the ocular involvement is early, because its incidence is 80% in patients with less than 5 years of duration and 81.2% in patients with duration of disease more than 10 years.

This early involvement in lepromatous leprosy is probably because it is the most infectious form of all types of leprosy disease. Loss of eyebrows and madarosis are the common changes seen in the ocular adnexae.

A fair number of (25.6%) had reduced lacrimal secretions. The dry eye is more common in lacrimal secretions. The dry eye is more common in lepromatous leprosy. Its significance as to the etiology of punctate keratitis is of doubtful value because of hyposecretions of tears is observed in presence of healthy cornea.

Corneal involvement is common and it is seen in all the forms of leprosy either as a primary keratitis or secondary to lagophthalmos. The commonest corneal lesion is superficial punctate keratitis.

It is more common in lepromatous leprosy and border line lepromatous leprosy (BL).

Author's contribution

- **Dr. G. Narender Reddy:** Concept, study design
- **Dr. G. Adarsh Reddy:** Statistical analysis, manuscript writing

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