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Ocular Manifestations in Reactions in Leprosy Patients

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Abstract: ***Purpose**: To evaluate the spectrum and prevalence of ocular manifestations in patients with reactional states of Hansen's disease (leprosy) and to assess associated visual outcomes. **Methods**: A cross - sectional observational study was conducted on 45 patients with reactional leprosy at LLRM Medical College, Meerut. Ocular examinations included visual acuity, slit - lamp biomicroscopy, corneal sensation testing, ocular surface staining, and fundus evaluation. **Results**: Ocular manifestations were present in 66.7% of patients. The most affected structures included the cornea (80%), lens (50%), and adnexa (madarosis 56.6%). Patients who discontinued treatment showed the highest rates of blindness (11%) and severe visual impairment (18%). Complete adherence to multidrug therapy (MDT) correlated with preserved vision in all cases. **Conclusion**: Ocular involvement in leprosy is frequent and significantly impacts visual morbidity, particularly during reactional episodes. Early identification, interdisciplinary care, and sustained therapy are pivotal to preserving visual outcomes.*

Keywords: Leprosy, Ocular Manifestations, Reactional States, Visual Impairment, Multidrug Therapy

1. Introduction

Leprosy (Hansen's disease), caused by *Mycobacterium leprae*, remains a significant public health concern in endemic regions, including parts of India [1]. Beyond its dermatological and neurological manifestations, leprosy is known for its ocular complications [2], especially during reactional episodes—Type 1 (reversal reactions) and Type 2 (erythema nodosum leprosum, ENL). These ocular lesions can result from direct bacillary invasion, immune - mediated inflammation, or nerve damage, leading to a range of conditions from mild dry eye to severe iridocyclitis and cataract formation. This study aims to explore these manifestations, emphasizing treatment status, anatomical involvement, and visual outcomes.

Aims & Objectives

1) To assess the prevalence of ocular involvement in reactional leprosy.
2) To analyze the spectrum of ocular manifestations in these patients.
3) To evaluate visual outcomes based on treatment adherence.

2. Materials and Methods

Study Design: Cross - sectional observational study

Setting: Ophthalmology & Dermatology Department, L. L. R. M. Medical College, Meerut

Duration: 1 year

Sample Size: 45 patients diagnosed with leprosy - related reactions

Patient Selection

Inclusion Criteria

- Diagnosed cases of reactional leprosy (Type 1 or Type 2)
- All age groups and genders
- Provided informed consent

Exclusion Criteria

- Coexisting ocular/ Systemic diseases (e.g. HIV)
- Incomplete data or lack of consent

Ocular Examination:

- Visual acuity assessment using Snellen chart
- Slit - lamp biomicroscopy
- Corneal sensitivity testing (cotton wisp test)
- Ocular surface staining (fluorescein, rose bengal)
- Fundus examination (direct/indirect ophthalmoscopy)
- Optical coherence tomography (OCT) and fundus photography were performed in selected cases

3. Results

Demographics:

- **Mean age:** 42.16 ± 20.97 years
- **Gender distribution:** 55.56% males, 44.44% females

Prevalence of Ocular Manifestations:

- Ocular involvement observed in 66.7% (n=30) of patients

Anatomical Involvement:

- **Cornea:** 80%
- **Eyebrows (madarosis):** 56.6%
- **Lens (cataract):** 50%
- **Eyelids:** 50%
- **Conjunctiva:** 43.3%
- **Iris (atrophy/synechiae):** 30%
- **Retina (papilledema, retinal detachment):** 23.3%

Specific Findings:

- **Corneal sensation loss:** 26.67%
- **Lagophthalmos:** 23.3%
- **Superficial keratitis:** 20%
- **Cataract (steroid - induced/age - related):** 50%
- **Iris atrophy:** 30%
- **Posterior segment involvement (papilledema, retinal detachment, pale disc):** 6.7–10%

Treatment Status and Visual Outcome:

- **Completed MDT: 11.11% (n=5) –** 100% retained normal vision
- **Defaulters: 33.3% (n=15) –** accounted for all cases of blindness (11%) and majority of visual impairment
- **Currently on treatment: 28.89% (n=13) –** 69.2% had normal vision
- **Treatment status unknown: 26.67% (n=12)**

Table 1: Demographic Characteristics of Participants

Characteristic	Category	Number of Patients (n=45)	Percentage (%)
Age Groups (Years)	< 20	7	15.56%
	20 - 40	14	31.11%
	40 - 60	12	26.67%
	> 60	12	26.66%
Sex Distribution	Male (M)	25	55.56%
	Female (F)	20	44.44%

Table 2: Prevalence of Ocular Manifestations

Ocular Manifestation	Number of Cases (n=45)	Percentage (%)
Present	30	66.7
Absent	15	33.3

Table 3: Ocular Manifestations by Reactional Status

Ocular Manifestations	Total (30)	Percentage
EYEBROWS	17	56.66%
EYELIDS	15	50%
CONJUCTIVA	13	43.30%
CORNEA	24	80%
IRIS	9	30%
LENS	15	50%
RETINA	7	23.30%

Table 4: Analysis of Visual Outcomes and Complications in Leprosy Patients Under Treatment

Visual Acuity Category (WHO)	(n, %)		
Normal Vision (6/6 - 6/18)	20 (44%)	Completed Treatment (Total cases 5)	5
		Currently on Treatment (Total cases 13)	9
		Defaulter (Left treatment before cocomplete Total cases 15)	4
		Treatment status not specified 12	2
Mild to moderate Visual Impairment (6/18 - 6/60)	12 (27%)	Currently on Treatment	4
		Defaulter (Left treatment before completion)	6
		Treatment status not specified	2
Severe Visual Impairment (6/60 – 3/60)	8 (18%)	Defaulter (Left treatment before completion)	2
		Treatment status not specified	6
blind (<3/60)	5 (11%)	Defaulter (Left treatment before completion)	3
		Treatment status not specified	2

4. Discussion

Ocular involvement in reactional leprosy is multifactorial, resulting from nerve involvement (e. g., lagophthalmos, corneal anesthesia), inflammation (e. g., uveitis, scleritis), and immunological injury. The study's findings align with previous research, indicating that corneal disease and cataract are the most prevalent and vision - threatening features. [8] Lagophthalmos contributes to exposure keratitis and ulceration, especially in treatment defaulters. Posterior segment signs, such as relative afferent pupillary defect (RAPD) and papilledema, suggest optic nerve or intracranial complications, underscoring the need for comprehensive ocular examinations in symptomatic patients. These findings highlight the urgent need for integrated ocular health management in leprosy care programs, ([9] which is currently an under - emphasized component in public health strategies. Treatment compliance emerged as the most significant predictor of visual preservation.

5. Conclusion

This study underscores the high prevalence of ocular involvement in leprosy, particularly during reactional states. The cornea, eyelids, and lens are notably vulnerable. Patients who default on treatment are at the highest risk for visual impairment and blindness. Comprehensive ocular evaluations and strict adherence to treatment protocols are crucial for preserving vision in leprosy patients.

6. Recommendations

The high rates of defaulters and unknown status suggest a need for:

a) Better patient education
b) Enhanced treatment follow - up similar to the Directly Observed Treatment, Short - course (DOTS) strategy used in tuberculosis management
c) Integration of dermatology - ophthalmology review during therapy

- These findings reinforce the World Health Organization's recommendation for holistic leprosy management that extends beyond skin and nerve assessment to include comprehensive eye care.
- Corneal complications represent the most direct threat to vision in ocular leprosy. Interventions such as lubricating drops, protective eyewear, nighttime eye taping, and surgical procedures like tarsorrhaphy should be considered based on patient needs.
- Lens examination should be routine in ocular leprosy assessment, especially in elderly or corticosteroid - treated patients.
- RAPD testing is a simple yet crucial screening for posterior segment or optic nerve pathology, particularly in patients with unexplained vision loss

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Conflicts of Interest: None declared

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