Ocular Manifestations in Lepromatous and Tuberculoid Leprosy

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ABSTRACT

Ocular manifestations of leprosy in 100 patients examined were reported on; - 80% were suffering from the lepromatous type of the disease.

The most frequent change was loss of eyebrows (40%) which was seen mainly in lepromatous patients. The sclera and cornea were rarely affected separately, but sclero-kerato- iridocyclitis was found in 3%. On the other hand, the iris was involved rather more often - 16% (atrophy of the iris - 4, atrophy of the pupillary margin - 3, miosis - 1, posterior synechiae - 6, keratic precipitates - 1, and iris "pearls" - 1). The iritis always had an insidious chronic evolution. The origin of the iritis is probably multifactorial:

a) neuroparalytic - due to involvement of the autonomic nerves supplying the iris muscles, primarily dilator;
b) direct effect of Mycobacterium leprae on the iris tissue; and
c) immune or auto-immune mechanisms.

The posterior uvea was rarely affected (2%). No case of primary glaucoma was detected, but secondary glaucoma due to sclerokerato-iridocyclitis was found in 2 cases. Cataract seems to occur more frequently in leprosy patients (20%) than in the general population.

The anterior segment was mostly affected (21%), and all these cases belonged to the lepromatous (16) or borderline lepromatous (5) type.

INTRODUCTION

Although leprosy has completely disappeared from many countries, the number of patients suffering from this chronic, disfiguring condition, is still rather high world wide. The exact number of leprosy patients is not available from all countries, but it is believed to be between 10 and 12 million. Among these about 750,000 have visual impairment, even blindness. This fact is even more tragic if one keeps in mind that blindness is almost always associated with other disabilities: e.g. loss of sensations, deformities of hands, feet, face, etc.

From all publications it is evident that patients suffering from the lepromatous type of leprosy are more prone to develop ocular complications, involving primarily the eyelids and the anterior segment, while the fundus is rarely affected (2,3,4).

There are regional, climatic, racial and other factors which have an influence on the type of leprosy and on its complications in general. We have therefore undertaken this survey to examine 100 leprosy patients and find out the prevalence of ocular manifestations as well as the relation of these to the type of leprosy - lepromatous or tuberculoid.

METHODS AND MATERIAL

In the period February to August 1987 we have performed the ophthalmological examination of 100 leprosy, who were currently under the care of the Leprosy Eradication Programme.

Ophthalmological examination included the condition of the external part of the eye, examination of the anterior segment with slit lamp, fundoscopy, tonometry, and visual acuity.

1. Sex- Males were represented by 62% and females by 38%.

2. Age Distribution - The majority of the patients - 75% - are older than 50 years due to the facts that:

a) the incidence of new cases has declined drastically in the last two decades, and
b) a considerable number of patients present themselves with the first signs of disease in late adult life.

3. Family History - In 39% it was proved that the patient has or has had another member of the immediate family (i.e. parent, sibling, or offspring) suffering from leprosy.

4. Classification of Patients - The types of disease were represented thus:

Lepromatous	(LL)	57	80%
Borderline lepromatous	(BL)	23	
Borderline	(BB)	5	5%
Borderline tuberculoid	(BT)	11	15%
Tuberculoid	(TT)	4	

It is evident that the lepromatous and borderline lepromatous types constitute the most common form of leprosy encountered in Malta, with a prevalence of 80%.

5. Treatment. All patients examined had been treated with multiple drug therapy, consisting of "Isoprodian - RMP" (a fixed combination of Rifampicin 600mg., Prothionomide 350mg., Isoniazide 350mg., Dapsone 100mg. daily for 6 days a week) for a period of approximately 20 months, following a previous variable period of dapsone monotherapy - in some cases up to 15 years and over. At the time of examination the vast majority had been released from treatment more than 10 years previously and since then had been kept under strict post-treatment control.

Dapsone in a daily dose of 100mg.

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does not usually cause any serious side effects. However, a massive dose of 7.5gm taken in a suicidal attempt has produced bilateral retinal necrosis, haemolytic anemia, methaemoglobinaemia, and acute renal failure (5).

6. Sequelae. A number of patients showed stigmata of the disease. "Leonine facies" was seen in 3 patients while a considerable number had abnormalities relating to their upper and/or lower limbs. These included: anesthesia (14%), muscle atrophy (4%), trophic ulceration (6%), and deformity (7%).

OCULAR MANIFESTATIONS

The ocular changes observed in the 100 patients examined were recorded according to the type of leprosy, and the findings are represented in Table 1. From the data the following observations are evident:

1. Eyebrows. The most frequent changes are found on the eyebrows and eyelashes. In 40% we could notice hair loss ranging from rarefication to complete loss of the eyebrows. The lateral parts of the eyebrows were frequently and severely affected. The majority of the patients with these changes (31%) belonged to lepromatous (LL) group.

2. Eyelashes. Changes were only seen in the LL and BL groups. Ciliary Madarosis was present in 8% while trichiasis was detected in 4% of cases. It should be noted that regrowth of hairs on the eyebrows and eyelashes can occur after starting anti-leprosy treatment in those cases where the hair loss had not been of long standing.

3. Sclera. 1 case showed involvement of the sclera in the form of episcleritis.

4. Cornea. Two cases showed the sequelae of stromal keratitis in the form of corneal leucoma (Fig.2). Superficial keratitis, pannus, or the typical white opacities having "chalk-white" appearance, neuroparalytic keratitis, exposure keratitis, or band-shaped keratopathy were not observed. Meanwhile, the cornea was very much involved in the cases of sclero-kerato-iritis, in 3% of all patients, complicated with secondary glaucoma (fig.3,4).

5. Iris. Involvement of the iris was encountered relatively often - 16% of all cases (12 cases in the LL group and 4 cass in BL). In these cases different changes could be noticed in the iris: atrophy of iris stroma (4%) (Fig.5), atrophy of the iris margin (3%), miosis (1%). Besides these, one could find posterior synechiae (6%), keratic precipitates (1%), and iris "pearls" (1%).

In all cases the eyes were white, quiet and no signs of active iris inflammation could be detected. The involvement of the iris had the features of the chronic iritis or insidious anterior uveitis seen in leprosy. The most striking appearance in this chronic form of iritis is the atrophy of iris stroma and/or iris margin (total 7%). The atrophy is very intensive, involving large areas of the iris and sometimes having an appearance similar to essential iris atrophy, with the presence of holes in the iris ("Fenestrae iridis"). Inverse heterochromia could also be seen. Pronounced iris atrophy, lack of irritative symptoms and a very chronic evolution, differentiate the iritis in lepromatous leprosy from other clinical entities of chronic anterior uveitis. For this reason, it is interesting to know which are the aetiopathogenic factors that play a role in the underlying iritis. From our experience and from data from the literature, we think that there are three pathogenic factors:

a) involvement of the autonomic nervous system supplying the fibres of sphincter and dilator muscles;

b) direct effect of Mycobacterium leprae on the iris tissue; and

c) immune or auto-immune manifestations;

Ffytche (6) estimates that chronic iritis in lepromatous leprosy is not a true inflammation, but is a form of neuroparalytic iritis, caused by early involvement of autonomic nerve fibres. Direct involvement of nonmyelinated autonomic nerve fibres results in damage to the iris muscles, particularly the dilator. Ffytche demonstrated histologically that the dilator muscle was absent or very markedly atrophied in 73%, while sphincter muscle was only atrophic in 7%. This was seen always in lepromatous leprosy while, on the other hand, both muscles were normal in tuberculoid and borderline leprosy. Because of the atrophy of the iris muscle, particularly the dilator, mydriatics have a very poor effect in lepromatous iritis.

We believe that the neuroparalytic factors play a very important but not the only role in the pathogenesis of chronic iritis. A second important role belongs to the direct effect of the Hansen bacilli on the iris tissue. This is sometimes manifested in the form of iris "pearls" which consist of tightly packed living bacilli within mononuclear cells. They are located in the middle or deeper layers of the iris, usually between the collarette and ciliary margin, but can also be free in the anterior chamber.

The above mentioned alterations of the iris muscles and iris tissue may generate some autoantigen, which can trigger immune or auto-immune reactions. To prove this immunological mechanism further investigations are necessary, because until now there is no definite evidence concerning the immuno-biological changes in the sera and aqueous humor. However, the presence of plasma cells, as shown by Ffytche in histological specimens, indicate the participation of immunological phenomena in leprosy uveitis.

Among our patients we did not observe any case of acute serous nongranulomatous iritis, which represents bacterial allergy, similar to acute erythema nodosum.

6. Chlorioretinal changes. The

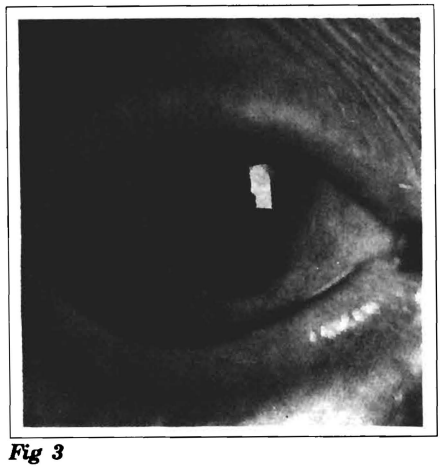

Fig 3

Table 1 - Eye changes in different types of leprosy

EYE CHANGES	TYPES OF LEPROSY					
	Lepromatous (LL)	Borderline tuberculoid (BL)	Borderline (BB)	Borderline (BT)	Tuberculoid (TT)	TOTAL %
1. Eyebrows						
Rarefication	19} 31	4} 5	0} 1	1} 1	1} 2	
Complete loss	12}	1}	1}	-}	1}	40%
2. Eyelashes						
Madarosis	7	1				8%
Trichiasis	3	1				4%
3. Episcleritis	1					1%
4. Cornea						
Stromal Keratitis	1	1				2%
Sclero-kerato-iritis	2					2%
5. Iris involved	12	4				16%
Atrophy of the stroma						4%
Atrophy of margin	4 2	1				3%
Miosis	1					1%
Posterior synechias	4	2				6%
Keratic precipitates		1				1%
Iris "pearls"	1					1%
6. Chorioretina						
Chorioretinal scars	1	1				2%
7. Glaucoma						
Primary Glaucoma						0%
Secondary glaucoma	2					2%
8. Cataract						20%

posterior uvea was very rarely affected; inactive chorioretinal scars could be detected in only 2% of cases. Their appearance was atypical and was not at all evocative of leprosy. One case was in the lepromatous group and the other of the borderline type.

7. Glaucoma in leprosy. It is rather interesting that among these 100 leprosy patients we have not detected a single case of primary glaucoma, even though the glaucoma survey carried out in Malta in April to June 1989 has established the prevalence of glaucoma to be at least 3.29% of the general population over 40 years of age. The I.O.P. in the right eye of the leprosy patients we have examined ranged from 12 to 20 mm Hg., with a mean value of 15.50 mm Hg., and that for the left eye from 11 to 21 mm Hg. with a mean value of 15.02 mm Hg.

In all the eyes having chronic iritis, we found the I.O.P. to be within normal limits. However, Brand et al. (7) have shown that I.O.P. was significantly lower in eyes with chronic plastic iridocyclitis than in unaffected eyes, even in those cases where iridocyclitis remained untreated.

In 2 of our leprosy patients we have noticed secondary glaucoma (2%) in the eyes affected by sclero-kerato-iridocyclitis; this secondary glaucoma was due to the blockage of the iridocorneal angle and obliteration of the intrascleral drainage system.

8. Cataract in leprosy. Lental opacities having different size and intensity were found in 20%. This is considerably higher than what is found in the general population over 40 years, where the incidence is 6%. These opacities, associated with small non- reacting pupils, reduce

Operation was performed in seven patients; 3 patients had bilateral and 3 patients unilateral aphakia, while one patient had pseudophakia with I.O.L. in the posterior chamber.

It is important to point out that all these eyes have tolerated the operative procedure and implantation of intraocular artificial lens very well. The visual acuity was satisfactory, as in leprosy the posterior segment is within normal limits.

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