A COMPARATIVE STUDY OF EYE AFFECTIONS IN LEPROSY WITH MULTI DRUG THERAPY AND MONO THERAPY

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ABSTRACT

BACKGROUND

Leprosy is one of the common neuro-paralytic disease in a developing country like India. It reduces functional integrity of the different parts of our body and subsequently as it reduces the sensation, so anatomical disfiguration follows. Having a complex neuronal supply, eye is also commonly affected in Leprosy.

MATERIALS AND METHODS

In this study done in rural areas of West Bengal, after clinical and bacteriological diagnosis, leprosy patients were divided into two standard groups i.e. Multi-Bacillary (M.B.) Pauci-Bacillary (P.B.). After randomization by computer generated randomization technique, both the groups are divided into two sub-groups. One group receives Multi-Drug therapy and the other receives single drug therapy. After collection of data in follow up period, the data is compared and tabulated.

RESULTS

This study was done on 2317 adult Leprosy patients. Total Eye complications in M.B. cases were 30% and 10% in P.B. cases. Incidence of Eye complications in M.B. cases reduced to 4% within 3 months of the onset of M.D.T. The Morphological index which was in the range of 25-75% also reduced to 0 within 3 months of the onset of M.D.T. in 92% of cases. Monotherapy did not have any significant effect in reducing the incidence of Eye complications in M.B. cases. In P.B. cases both M.D.T. and Monotherapy were equally effective in reducing the incidence of eye complications. (2% and 3% respectively within 3 months of the onset of therapy).

CONCLUSION

Multidrug therapy is very much helpful in reducing the ophthalmologic complications in multi-bacillary cases though it has no such effect in pauci-bacillary cases.

KEYWORDS

Leprosy, Eye Complications, M. D. T, Monotherapy, M.B. and P.B. Cases.

HOW TO CITE THIS ARTICLE: Chatterjee S, Mazumdar S. A comparative study of eye affections in leprosy with multi drug therapy and mono therapy. J. Evid. Based Med. Healthc. 2018; 5(44), 3075-3079. DOI: 10.18410/jebmh/2018/628

BACKGROUND

Leprosy, caused by Mycobacterium leprae, mainly affects skin, nasal mucosa, peripheral nerves, eye and may lead to disabilities and blindness. It presents a large spectrum of clinical and pathological manifestations that depend on bacterial load, the type and intensity of the patient's immune response to the bacteria.[1] So early detection and treatment not only cure the disease but also prevents its complications. On the basis of clinical appearance of skin lesions, involvement of nerves and number of lepra bacilli in skin bipsy, Leprosy is classified as multibacillary leprosy (MB) and paucibacillary leprosy (PB).[2] The eye is affected in this disease in four ways[3] i.e. (i) by direct invasion of lepra bacilli which reach the ciliary body through blood stream and then spread into other structures, (ii) secondary to involvement of facial nerve and ophthalmic division of trigeminal nerve, (iii) in the form of hypersensitivity reaction to the antigenic substances released in the breakdown of lepra bacilli which are present in the circulating blood; and (iv) secondary to changes in the skin and support tissue of the lids, tear drainage system. One or more of the factors may be responsible for eye lesions, especially when the disease is long standing and in advanced stage. Ophthalmologic manifestations in leprosy is not only due to involvement of cranial nerves, but also due to cutaneous anesthesia and chronic inflammatory sequalae. The manifestations in M.B. Cases ranged relatively benign conditions like madarosis, conjunctivitis, to serious conditions like uveitis, interstitial Keratitis and secondary glaucoma. In P.B. cases the eyes were less frequently involved. Lagophthalmos, exposure keratitis leading to ulceration were seen.[4] Early detection of Leprosy followed by Multidrug therapy (M.D.T.)[5] and simple medications with atropine, broad spectrum antibiotic drops and ointment helped in markedly reducing the incidence of ocular complications and corneal blindness.

Financial or Other, Competing Interest: None.
Submission 02-10-2018, Peer Review 05-10-2018,
Acceptance 20-10-2018, Published 24-10-2018.
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DOI: 10.18410/jebmh/2018/628

Aims and Objectives

1. To detect and describe the ocular lesions in Leprosy and its correlation with bacteriological load.
2. To determine the outcome of ocular lesion and bacteriological load following drug treatment.

MATERIALS AND METHODS

Inclusion Criteria

1. Clinically and microbiologically diagnosed Leprosy patients
2. Age >12 years and <60 years
3. Patients giving informed consent

Exclusion Criteria

1. Patients having any other neurological disease
2. Patients having any systemic disease which may have neurological complications
3. Previous trauma causing neurological damage or during study period that may alter the treatment outcome as per assessor.

The study was conducted in rural areas of Burdwan where after clinical diagnosis of leprosy Bacteriological investigation[6] was done for confirmation of diagnosis. Smear taken by slit and scrape method from active thickened margin of the skin lesion.

- Earlobes.
- Nose by scraping method.

It is stained by Modified Ziehl-Neelsen method. Bacteriological index was recorded in Dharmendra Scale.[7] Morphological index[8] was also recorded.

In this study on 2317 adult Leprosy patients out of which 595 were M.B. cases and rest were P.B. cases. The M.B. cases were again divided into two groups of 298 and 297 patients randomly. Pharmacotherapy[9] to one group was given combination therapy with Dapsone, Rifampicin and Clofazimine. Daily supervised treatment was given during the initial intensive phase for 14 days with the following drugs:

- Rifampicin 600 mg if body weight >35 kg. 450mg if less than 35 kg.
- Clofazimine 100 mgm.
- Dapsone 100 mg.

Continuation phase treatment with the following drugs- Rifampicin 600 mg once monthly supervised. Dapsone 100 mgm daily self-administered. Clofazimine 300 mgm once monthly supervised and 50 mg daily self-administered.

The other group was given only Dapsone in a dose of 100 mg daily.

In the same way the P.B. cases were divided into two groups of 361 each randomly and one group was given combination therapy with Rifampicin and Dapsone. Rifampicin 600 mgm once monthly supervised for adults greater than 35 kg and 450 mg for adults less than 35 kg and Dapsone 100 mg daily self-administered. The other group was just given Dapsone in a dose of 100 mg daily.

All the patients were monitored quarterly for ocular manifestations for a period of one year after the commencement of treatment. The clinical examination consisted of the following.

i) visual acuity in each case
ii) Laterality
iii) Thorough examination of the following done, especially-
   a) Lid-margin.
   b) Lacrimal sac.
   c) Conjunctiva.
   d) Cornea and corneal sensitivity.
   e) Evidence of iridocyclitis
   f) Tension.

Detail examination of the cornea done by

i) Torch light examination
ii) Corneal loupe (10x), Haag-Streit Slit lamp

Figure 1

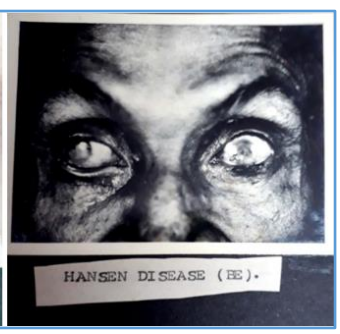

Figure 2

Figure 1. Unilateral Involvement
Figure 2. Bilateral Involvement

RESULTS

Total Eye complications in M.B. cases were 30%. Incidence of Eye complications in M.B. cases reduced to 4% within three months of the onset of M.D.T. The Morphological index which was in the range of 25-75% also reduced to 0 within three months of the onset of M.D.T. in 92% of cases.

In case of M.B. cases receiving Monotherapy the incidence of Eye complications in M.B. cases only slightly reduced to 22% within 3 months of the onset of Monotherapy. It reduced to 8% within 6 months of the onset of Monotherapy. The Morphological index which was in the range of 25 -75% also reduced to 0 within 6 months of the onset of Monotherapy in 85% of cases.

The incidence of eye complications again increased from 8% to 13% on ninth month of Monotherapy.

Total Eye complications in P.B. cases were 10%. Incidence of Eye complications in P.B. cases reduced to 2% within 3 months of the onset of M.D.T. In case of P.B. cases receiving Monotherapy the incidence of eye complications also reduced to 3% within 3 months of the onset of M.D.T.

	Lid and Ocular Adnexa	Conjunctiva	Corneal Lesion	Ant Uveitis	Lacrimal Sac inf.	IOP High/Normal/ Low	No PL	V. Acuity CF 3/60	V. Acuity 3/60-6/60	V. Acuity 3/60-6/18
Onset of M.D.T.	9	12	18	39	22	10/248/4	NIL	9	23	57
3rd Month	2	2	3	3	2	3/294/1	do	2	22	60
6th month	2	0	1	2	2	2/295/1	do	1	20	63
9th Month	2	0	1	1	2	2/295/1	do	1	18	65
12th Month	1	1	1	0	1	1/296/1	do	1	15	68
Both eyes were affected in 96% cases.										

Table 1. Ocular Complication of MB Cases at the Onset of M.D.T. and at Quarterly Follow up for a Year. (Total M.B. Patients receiving M.D.T. were 298)

	Lid and Ocular Adnexa	Conjunctiva	Corneal Lesion	Ant Uveitis	Lacrimal Sac inf	IOP High/Normal/ Low	No PL	V. Acuity CF-3/60	V. Acuity 3/60-6/60	V. Acuity 6/60-6/18
Onset of M.D.T.	7	14	22	35	18	12/283/2	nil	6	25	56
3rd Month	5	11	16	26	7	8/288/1	do	5	23	37
6th month	2	5	5	8	4	6/290/1	do	2	10	12
9th Month	3	8	7	15	6	14/280/3	do	5	15	19
12th Month	3	9	6	17	5	16/278/3	do	5	17	20
Both eyes were affected in 96% cases.										

Table 2. Ocular Complication of MB Cases at the Onset of Dapsone Therapy and at Quarterly Follow Up for a Year (Total M.B. Patients Receiving M.D.T. were 297)

	0 to 1+	1+ to 2+	2+ to 3+	3+ to 4+	0-25%	25-50%	50-75%
At onset of Monotherapy	280	120	90	38	9	200	90
3rd Month	288	15	3	Nil	274	24	Nil
6th month	292	9	1	Nil	282	16	Nil
9th Month	296	6	Nil	Nil	290	8	Nil
12th Month		2	Nil	Nil	298	Nil	Nil

Table 3. Bacteriological and Morphological Index of MB Cases at the Onset of M.D.T. and at Quarterly Follow up for a Year. (Total M.B. Patients Receiving M.D.T. were 298)

Bacteriological Index (Dharmendra).

	0 to 1+	0 to 1+1+1 to 2+	2+ to 3+	3+ to 4+	0-25%	25-50%	50-75%
At Onset of M.D.T.	56	120	80	50	10	200	83
3rd Month	213	70	11	4	160	128	10
6th month	250	46	2	Nil	253	45	Nil
9th Month	225	68	5	Nil	230	68	Nil
12th Month	205	84	8	1	214	82	2

Table 4. Bacteriological and Morphological Index of MB cases at the onset of Dapsone Monotherapy and at Quarterly Follow up for a Year (Total M.B. Patients Receiving Dapsone Monotherapy were 297) B I (Dharmendra)

	Lid and Ocular Adnexa	Conjunctival lesion	Corneal lesion	Ant Uveitis	Lacrimal Sac infection	IOP High/Norma/ Low	No PL	V. Acuity CF-3/60	V. Acuity 3/60-6/60	V. Acuity 6/60-6/18
Onset of M.D.T.	8	3	22	2	1	20/337/4	Nil	5	12	19
3rd Month	2	1	3	1	Nil	3/357/1	Nil	Nil	3	4
6th Month	1	Nil	1	Nil	Nil	1/359/1	Nil	Nil	1	2

Table 5. Ocular Complications of PB Cases at the Onset of M.D.T and at Quarterly Follow up for 6 Month (Total P.B. Patients Receiving M.D.T. were 361)

	Lid and Ocular Adnexa	Conjunctival lesion	Corneal lesion	Ant Uveitis	Lacrimal Sac infection	IOP High/Normal/ Low	No PL	V. Acuity CF-3/60	V. Acuity 3/60-6/60	V. Acuity 6/60-6/18
Onset of Monotherapy	7	2	20	4	2	21/339/1	Nil	4	15	16
3rd Month	3	1	5	1	1	5/355/1	Nil	1	5	5
6th Month	1	1	2	Nil	Nil	2/359/0	Nil	Nil	2	3

Table 6. Ocular Complications of P.B. Cases at the Onset of Dapsone Monotherapy at Quarterly Follow Up for 6 Months. (Total P.B. Patients receiving Dapsone Monotherapy were 361)

DISCUSSION

"There is no disease which so frequently gives rise to disorders of the eye, as Leprosy does"[10] - in our present study we have seen that ocular complications in leprosy occurred in 30% of M.B. cases and 10% of P.B. cases. There are three main ways in which the eyes can be damaged.

1. Exposure and anaesthesia
2. Bacillary invasion. In lepromatous leprosy the eye is invaded through the blood stream. Leproma may form on the conjunctiva and infiltration extends onto the cornea.
3. Hypersensitivity II reaction. This is especially true of the iris and ciliary body.

Associated factors which can keep the eye always at risk in the leprosy patients are-

a) Infected insensitive ulcerated extremities
b) Deformed extremities
c) Infection at the focus namely osteomyelitis.

The degree of positivity of the bacteriological index in M.B. cases had a direct relationship with the eye affections.[11] As the positivity of the bacteriological index decreased with the onset of therapy, ocular manifestations also improved in our present study. The Morphological index which was in the range of 25 - 75 % also reduced to 0 within 3 months of the onset of M.D.T. in 92% of cases.

In M.B. cases receiving Monotherapy the incidence of eye complications decreased significantly (8%) within 6 months of the onset of Monotherapy. But the eye complications again increased from 8% to 13% on 9th month of Monotherapy. This is most probably due to organisms developing drug resistance to Dapsone and Type 2 Lepra reaction. Monotherapy did not have long term beneficial effect in reducing the incidence of eye complications in M.B. cases. A study[12] conducted by Daniel E et al. has revealed approximately 5.6% of patients with M.B. who have completed MDT per year, can be expected to develop new ocular complications of leprosy, which often (3.9%) are potentially vision threatening.

Incidence of eye complications in P.B. cases reduced to 2% from 10% within 3 months of the onset M.D.T. In case of P.B. cases receiving Dapsone Monotherapy the incidence of eye complication also reduced to 3% within 3 months of the onset of M.D.T. so, in P.B. cases both M.D.T. and Monotherapy were equally effective in reducing the incidence of eye complications. A study[13] by K V Desikan showed multibacillary as well as paucibacillary cases are cured faster by multi-drug therapy than monotherapy. As the ocular complications are proportionately related to microbiological burden, so leprosy cases will have less ocular complications if active pharmacotherapy is started in time. Since the advent of MDT, the pattern of leprosy has drastically changed. The cases are more towards the tuberculoid end of the spectrum. Frequency of reactions is considerably reduced. However, despite the advent of multidrug therapy (MDT) in the early 1980s, leprosy remains a significant cause of visual impairment in countries where it is still prevalent.[14]

CONCLUSION

Leprosy is one of the common systemic diseases involving the eye in the developing country. Early diagnosis and aggressive multi-drug treatment are very much helpful in reducing ocular lesion and reducing bacterial load. As recurrences or appearances of new lesions is common, periodic follow up with slit-lamp examination is mandatory.

REFERENCES

[1] WHO Expert Committee on Leprosy. World Health Organ Tech Rep Ser 2012;(968):1-61.

[2] WHO. Guide to eliminate leprosy as a public health problem. 1st edn. Geneva: World Health Organization 1995.
[3] Brand MB. Care of the eye in Hansen's disease. 2nd edn. Carville: The Star 1987: 1.
[4] Somerset EJ. Leprous lesions of the eye. Indian J Ophthalmol 1956;4(1):7-14.
[5] Noordeen KS. Leprosy control through multidrug therapy (MDT). Bull World Health Organ 1991;69(3):263-269.
[6] Hosokawa A. A clinical and bacteriological examination of Mycobacterium leprae in the epidermis and cutaneous appendages of patients with multibacillary leprosy. J Dermatol 1999;26(8):479-488.
[7] Bhatia VN. Bacterial index: Ridley's vs. Dharmendra's scale. Indian J Lepr 1987;59(1):80-83.
[8] Padma MN. Morphological index in untreated cases of leprosy. Lepr India 1976;48(4 Suppl):787-789.
[9] Becx-Bleumink M. Relapses in leprosy patients after release from dapsone monotherapy; experience in the leprosycontrol program of the all Africa Leprosy and Rehabilitation Training Center (ALERT) in Ethiopia. Int J Lepr Other Mycobact Dis 1992;60(2):161-172.
[10] Bull OB, Hansen GA. The leprous diseases of the eye. Christiana: Albert Cammermeyer 1873.
[11] Courtright P, Daniel E, Rao S, et al. Eye disease in multibacillary leprosy patients at the time of their leprosy diagnosis: findings from the longitudinal study of ocular leprosy (LOSOL) in India, the Philippines and Ethiopia. Lepr Rev 2002;73(3):225-238.
[12] Daniel E, Ffytche JT, Kempen HJ, et al. Incidence of ocular complications in patients with multibacillary leprosy after completion of a 2 year course of multidrug therapy. Br J Ophthalmol 2006;90(8):949-954.
[13] Desikan KV. Multi-drug regimen in leprosy and its impact on prevalence of the disease. Med J Armed Forces India 2003;59(1):2-4.
[14] World Health Organization. Weekly epidemiological record relevé épidémiologique hebdomadaire. WHO Epidemiological Record 2005;80(34):289-296. http://www.who.int/wer/2005/wer8034.pdf?ua=1