

Differences in the severity of physical signs in the right and left eyes of patients with trachoma in Syria and Burma

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A field record card to permit the recording of physical signs separately in the two eyes, in cases of trachoma was produced by WHO in 1967. The card was used to record clinical examinations in a controlled trial in Syria in 1967 and in the running assessment of a trachoma control programme in Burma in 1968-69.

Differences in physical signs in the two eyes were observed in over 20% of cases in Syria and over 35% of cases in Burma. Even when limited to the same stage of infection, differences between the two eyes in the same individual are in the order of 10%. Limiting the examination to one eye underestimates prevalence and severity and overestimates changes in the disease pattern with time; a combined reading for both eyes should give a more accurate picture of infection. A computer could be used in special studies to free the observer from the need to make subjective judgements concerning the more severely affected eye.

A WHO Scientific Group on Trachoma Research (1966) stated: "Trachoma in its natural state is practically always bilateral and usually symmetrical", and went on to recommend that "It may be desirable in some studies to record the physical signs for each eye separately but if this is not done and if the physical signs are dissimilar in the two eyes the score [physical signs] recorded should be that of the more severely involved eye." (It should be noted that prior to this report the latter system, i.e., recording the physical signs in the more severely affected eye, had been the common practice among ophthalmologists.) The Group further stated that "trials may be based on the observation of only right or only left eyes, provided that this is decided at the time of the initial examination."

In 1967 WHO produced a field record card that would permit the physical signs to be recorded separately for the two eyes. The card was used in Syria in 1967 for the first follow-up examination in

a clinical trial of primary schoolchildren at Mohafazah Deir-ez-Zor, and for examining a number of villages in Burma in 1968-69 for the running assessment of a WHO-assisted Trachoma Control Programme in the dry zone. Differences in the physical signs in the two eyes were observed in over 20% of cases in Syria and over 35% in Burma. It is believed that no study on the differences in the readings between the two eyes in trachoma has been reported. This report describes the results of a study of this kind in Syria and Burma.

OBJECTIVES

The aims of this study were to determine in a primary school population in Syria and a village population in Burma the extent of differences in physical signs of trachoma between right and left eyes, and the effect, in terms of prevalence of active and total trachoma and the severity of disease, of making observations of one eye only (right or left) compared with recording the physical signs from the more severely affected eye.

METHODS

A controlled trial to test different schedules of local antibiotic treatment against trachoma was

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carried out in Syrian government primary schools at Mohafazah Deir-ez-Zor in 1966-67, the initial examination being conducted in October 1966. The physical signs shown by the more severely affected eye were recorded. The first follow-up examination was carried out in October 1967. By that time the WHO trachoma clinical trial record card had become available and the physical signs were recorded separately for each eye. Only the results of the first follow-up examination among controls were considered in this study.

As part of the running assessments of trachoma control programmes in the dry zone of Burma, three villages¹ were examined prior to the initiation of treatment.

In both studies the scores given to the physical signs followed the system recommended by the WHO Scientific Group on Trachoma Research (1966), and the results were studied in terms of right eye, left eye, and a combined recording of physical signs in both eyes. A computer was programmed to select the higher score for any physical sign in either eye. In recording trachoma, stage TrI-IV in one eye took precedence over TrI in the other, TrIII over TrII, and TrIII over TrIV.

RESULTS

In the Deir-ez-Zor trial 537 children in the control group were examined in October 1967. Most of the children (62.6%) were in the 8-9-years age group.²

Trachoma was diagnosed in at least one eye in 338 children but the trachoma stage was identical in only 237 children (67.2%).³ In the remaining 101 children, i.e., those in whom a difference in reading between the two eyes was noted, trachoma was diagnosed only in the left eye in 26 cases, and only in the right eye in 16 cases. Active trachoma was diagnosed in the left eye in 73 cases and in the right eye in 47 (Table 1). Even among the 237 children in whom the trachoma stage was identical in both eyes, the physical signs differed in score in 26 (11.0%).⁴

Considering follicular involvement of the conjunctiva in active trachoma (TrII and TrIII) and cicatricial involvement in TrIII and TrIV as indices of severity, it is noted that a smaller number of children had follicles in the right eye but at the same time more severe involvement. The converse is true for cicatrization, a larger number of cicatricial trachomas being seen in the right eye but with less marked scarring (Table 2).

The extent to which these differences affect the overall picture in the 537 children examined can be seen from Table 3. The recording of the physical signs in the more severely affected eye favours the diagnosis of active trachoma, and in particular stage TrIII. Furthermore, it gives a higher reading of severity, as shown by a more marked involvement of the conjunctiva by follicles in active trachoma and by scars in cicatricial trachoma (Table 4).

A total of 920 persons of all ages⁵ were examined in Burma. Trachoma was diagnosed in at least one eye in 587 persons, but the trachoma stage was identical in only 432 (73.6%). Among the remaining 155 cases with different stages of trachoma in the two eyes, trachoma was diagnosed in only one eye in 88 persons: 44 in the right eye and 44 in the left. The differences between overall readings in the two eyes (i.e., the marginal totals in Table 1) are much less marked than in Syria. Among the 432 persons in Burma with identical trachoma stages in both eyes, the physical signs differed in score in 193 (44.7%).⁶ This difference is much more marked than that in Syria.

The same difference in the findings (comparing the physical signs in both eyes irrespective of stage) for Syria and Burma is seen when only the 5-9-years age group is considered in Burma. Cases in Syria with differences in stage and/or score of physical signs accounted for 23.6% of those examined against 37.8% of the total study population and 36.1% of children aged 5-9 years in Burma.

Concerning severity (Table 2) in the Burma study, the left eye shows more severe conjunctival involvement of follicles and scars. The right eye is more affected by corneal lesions: ⁷ pannus of 5 mm

¹ The villages are Myaungpinaye and Thegone in Meiktila township and Petawgon in Yamethin township.

² 7 and 8 years at the time of entry into the trial.

³ No TrI cases were diagnosed, an observation that may be accounted for by the fact that this was a follow-up examination. In the initial diagnosis in October 1966 there were 83 cases of TrI among the 637 children examined.

⁴ The 26 children included 14 cases of TrII, 4 of TrIII, and 8 of TrIV.

⁵ Excluding those below 1 year of age who were exempted from examination.

⁶ The 193 cases included 5 TrI, 31 TrII, 50 TrIII, and 107 TrIV.

⁷ No pannus of more than 4 mm or other corneal opacities were detected in the children in Syria.

Table 1. Clinical readings in cases of trachoma with dissimilar stages in the right and left eyes

Right eye	Left eye					Total	
	Tr0	TrI	TrII	TrIII	TrIV		
Syria 1967							
Tr0	—	—	13	5	8	26	25.7
TrI	—	—	—	—	—	—	—
TrII	3	—	—	9	4	16	15.8
TrIII	3	—	28	—	—	31	30.7
TrIV	10	—	7	11	—	28	27.7
Total	16	—	48	25	12	101	100.0
	15.8	—	47.5	24.8	11.9	100.0	
			72.3				
			84.2				
Burma 1968-69							
Tr0	—	12	5	5	22	44	28.4
TrI	18	—	3	5	—	26	16.8
TrII	6	5	—	5	—	16	10.3
TrIII	3	—	7	—	18	28	18.1
TrIV	17	—	—	24	—	41	26.5
Total	44	17	15	39	40	155	100.0
	28.4	11.0	9.7	25.2	25.8	100.0	
			45.8				
			71.6				

or more and/or other corneal opacities were diagnosed in the right eye in 25 cases and in 15 cases in the left eye.

The overall picture in Burma, therefore, shows a very close similarity between the two eyes in the diagnosis of trachoma by stage (Table 3) when recorded separately, but not in the scoring of physical signs (Table 4).

Concerning cases with disabling or potentially disabling lesions (WHO Expert Committee on Trachoma, 1962), in the restricted young age group in the Syrian study, the physical signs are limited to F3C1, F2C2, C3, the numbers being: right eye, 13; left eye, 11; right and/or left eye, 19. In the

Burma study covering all ages the numbers are given in the following tabulation.¹

	Right eye	Left eye	Right and/or left eye
F3C1, F2C2, C3	80	94	110
trichiasis	27	19	34
pannus (5 mm)	2	1	2
other kop, ² central	24	14	31
total (one or more lesions)	87	97	118

Comparing the findings in the 5-9-year age group in Burma with the findings in Syria, it is noted

¹ On the other hand in the 5-9-years age group there were only 2 cases with potentially disabling lesions in both eyes.

² Kop, corneal opacities.

Table 2. Degree of conjunctival involvement by follicles and scars in cases of trachoma with different scores for right and left eyes

(a) SYRIA 1967										
Eye	Follicular involvement: TrI, TrII, TrIII									
	F ₀		F ₁		F ₂		F ₃		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
right	—	—	46	70.8	10	15.4	9	13.8	65	100.0
left	—	—	68	74.7	14	15.4	9	9.9	91	100.0
Eye	Cicatricial involvement: TrIII, TrIV									
	C ₀		C ₁		C ₂		C ₃		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
right	—	—	55	77.5	11	15.5	5	7.0	71	100.0
left	—	—	37	75.5	6	12.2	6	12.2	49	100.0
(b) BURMA 1968-69										
Eye	Follicular involvement: TrI, TrII, TrIII									
	F ₀ ^a		F ₁		F ₂		F ₃		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
right	30	19.2	71	45.5	37	23.7	18	11.5	156	100.0
left	34	21.6	59	37.5	44	28.0	20	12.7	157	100.0
Eye	Cicatricial involvement: TrIII, TrIV									
	C ₀ ^b		C ₁		C ₂		C ₃		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
right	9	3.9	93	41.1	64	28.3	60	26.5	226	100.0
left	10	4.2	77	32.6	78	33.0	71	30.0	236	100.0

^a TrIII diagnosed from evidence of conjunctival cicatrices and active pannus.

^b TrIV diagnosed from evidence of Herbert's pits.

that in active trachoma the differences between right and left eyes and right and/or left eye are more or less within the same order of magnitude in both studies. A difference is seen, however, in total trachoma as shown in the following tabulation.

	Right eye	Left eye	Right and/or left eye
active trachoma (%)			
Syria	43.5	48.4	50.2
Burma (5-9 years)	54.1	49.3	57.6
total trachoma (%)			
Syria	58.1	59.9	62.9
Burma (5-9 years)	56.2	52.0	61.1

This difference is attributed to a much higher proportion in the combined reading for the right

and/or left eye of stage TrIV to total trachoma in Syria (20.1%) than for children aged 5-9 years in Burma (5.7%).

DISCUSSION AND CONCLUSIONS

The study shows that differences between the two eyes in the same person suffering from trachoma, even when limited to stage, are much more marked than was suggested by the WHO Scientific Group on Trachoma Research (1966). In its report, it was stated that trachoma is practically always bilateral and usually symmetrical. The relative increase or decrease in prevalence estimates when the readings of one eye are substituted for

Table 3. Clinical readings for the right eye, left eye, and the more severely affected eye in trachoma

Trachoma stage	Right eye		Left eye		More severely affected eye	
	No.	%	No.	%	No.	%
Syria 1967						
Tr0	225	41.8	215	40.0	199	37.0
TrI	—	—	—	—	—	—
TrII	148	27.5	180	33.5	148	27.5
TrIII	86	16.0	80	14.8	122	22.7
TrI-TrIII	234	43.5	260	48.4	270	50.2
TrIV	78	14.5	62	11.5	68	12.6
TrI-TrIV	312	58.1	322	59.9	338	62.9
total	537	100.0	537	100.0	537	100.0
Burma 1968-69 ^a						
Tr0	376	40.8	376	40.8	332	36.0
TrI	71	7.7	62	6.7	75	8.1
TrII	102	11.0	101	10.9	105	11.4
TrIII	96	10.4	107	11.6	135	14.6
TrI-TrIII	269	29.2	270	29.3	315	34.2
TrIV	274	29.8	274	29.7	273	29.6
TrI-TrIV	543	59.0	544	59.1	587	63.9
total	919	100.0	920	100.0	920	100.0

^a In 1 case the right eye could not be examined because of phthisis bulbi.

those of the other can be about 10% and when all the three methods are compared the range is considerable. The relative percentage increase in total trachoma amounts to 8.3% in Syria and 7.9% in Burma (17.3% for children aged 5-9 years). The relative percentage increase in active trachoma in Syria is 15.4%, and 16.7% in Burma for the total population and 16.9% for children aged 5-9 years.

The relative increase in severity¹ is even much

¹ The relative increase is calculated as follows:

$$(a - b) / b \times 100$$

where a = prevalence, combined reading; and b = prevalence for less affected eye.

more pronounced. Severity measured in terms of the number of cases with disabling or potentially disabling lesions (see page 5) shows a relative increase of 72.7% [i.e., $(19-11)/11 \times 100$] in Syria and 35.6% [i.e., $(118-87)/87 \times 100$] in Burma. The result for Syria is based on a very small number of a very young population in a highly endemic area and may not therefore represent the true situation; the result from the Burma study, amounting to an increase of over one-third, should do so. It may be pointed out that almost identical findings have been obtained from two countries in two different studies conducted by different ophthalmologists, thereby indicating that the conclusions are not limited in their applicability.

The study did not provide a comparison between the recording of physical signs in each eye separately and the later assessment of the overall combined reading, and an examination of both eyes, recording only the signs in the more severely affected eye. If independent readings of both eyes are available, a data-processing system could be conveniently used for making selections according to predetermined criteria. The selection would also be more objective than those made by the observer.

Examining only one eye has the advantages that the amount of work is reduced and the observer is freed from the need to make subjective judgements about which eye is more severely affected. On the other hand, the main effort in the field is made in reaching the sample population, eliciting their cooperation, and in securing adequate coverage generally. By comparison, the additional effort involved in examining both eyes would not be great, and in any case the epidemiological advantages seem to warrant this further effort. In WHO-assisted programmes, the practice in prevalence surveys, controlled clinical trials, and running assessments of control activities has been to examine and record the findings in each eye separately, and to use a central data-processing system for decisions about the stage and severity of the disease.

The present study did not include a comparative assessment of changes in the clinical picture in the two eyes over a period of time. A longitudinal study to determine the degree of convergence or accentuation of differences in physical signs by time seems to be indicated.

Table 4. Degree of conjunctival involvement by follicles and scars in right eye, left eye and the more severely affected eye in trachoma

(a) SYRIA 1967

Eye	Follicular involvement: TrI, TrII, TrIII									
	F ₀		F ₁		F ₂		F ₃		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
right	—	—	185	79.0	28	11.9	21	8.9	234	100.0
left	—	—	207	79.6	32	12.3	21	8.0	260	100.0
the more severely affected one	—	—	208	77.0	37	13.7	25	9.2	270	100.0

Eye	Cicatricial involvement: TrIII, TrIV									
	C ₀		C ₁		C ₂		C ₃		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
right	—	—	139	84.7	18	10.9	7	4.2	164	100.0
left	—	—	121	85.2	13	9.1	8	5.6	142	100.0
the more severely affected one	—	—	154	81.0	24	12.6	12	6.3	190	100.0

(b) BURMA 1968-69

Eye	Follicular involvement: TrI, TrII, TrIII									
	F ₀		F ₁		F ₂		F ₃		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
right	32	11.8	116	43.1	71	6.3	50	18.5	269	100.0
left	36	13.3	104	38.5	78	28.8	52	19.2	270	100.0
the more severely affected one	40	12.6	123	39.0	90	28.5	62	19.6	315	100.0

Eye	Cicatricial involvement: TrIII, TrIV									
	C ₀		C ₁		C ₂		C ₃		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
right	17	4.5	178	48.1	104	28.1	71	19.1	370	100.0
left	18	4.7	162	42.5	119	31.2	82	21.5	381	100.0
the more severely affected one	15	3.7	175	42.9	122	29.9	96	23.5	408	100.0

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the immense amount of work carried out by the staff of the trachoma control projects in Syria and Burma.

RÉSUMÉ

DIFFÉRENCES DE GRAVITÉ DES SIGNES PHYSIQUES AU NIVEAU DE L'ŒIL DROIT ET DE L'ŒIL GAUCHE CHEZ DES MALADES ATTEINTS DE TRACHOME EN SYRIE ET EN BIRMANIE

En 1967, l'OMS a mis au point une fiche permettant l'enregistrement sur le terrain des signes physiques du trachome séparément pour chaque œil. On l'a utilisée en Syrie en 1967 pour les examens cliniques lors d'un essai contrôlé de chimiothérapie et en 1968/69 en Birmanie au cours d'enquêtes préliminaires dans une population rurale. Les données recueillies ont fourni le matériel de la présente étude. Celle-ci avait un double but: déterminer dans quelle mesure les signes physiques du trachome diffèrent au niveau de l'œil droit et de l'œil gauche et comparer les résultats—exprimés en termes de prévalence et de gravité de la maladie—fournis par l'examen d'un seul œil (droit ou gauche) ou par l'examen de l'œil le plus gravement atteint.

Des différences de signes physiques entre les deux yeux ont été observées dans plus de 20% des cas en Syrie et plus de 35% des cas en Birmanie. Même si les lésions étaient au même stade aux deux yeux, la différence de gravité des signes, selon l'œil examiné, était de l'ordre de 10%.

L'enregistrement des signes physiques présents au niveau de l'œil le plus fortement atteint facilite le diagnostic du trachome actif et en particulier du trachome stade Tr III. Il permet en outre de mieux apprécier la

gravité de l'endémie que celle-ci soit évaluée en fonction de l'importance des lésions de la conjonctive ou de la proportion des cas porteurs de lésions invalidantes ou potentiellement invalidantes.

Dans les études de prévalence, dans l'évaluation des programmes de lutte antitrachomateuse et dans les essais cliniques contrôlés, l'examen des deux yeux et l'enregistrement des signes physiques afférents à chacun d'eux permet d'obtenir un tableau plus fidèle de la situation. C'est la méthode utilisée dans les enquêtes menées sous les auspices de l'OMS. Si l'on se borne à examiner un seul œil, on est exposé à sous-estimer la prévalence et la gravité de l'endémie et à surestimer les modifications qu'elles subissent au cours du temps. Le fait que des résultats quasi identiques aient été obtenus dans deux pays différents, lors de deux enquêtes distinctes conduites par des ophtalmologistes indépendants, indique que ces conclusions sont susceptibles d'une application générale.

L'analyse des données est grandement facilitée si, comme cela a été le cas dans la présente étude, on recourt à un ordinateur pour déterminer, sur la base des résultats fournis par l'examen des deux yeux, l'œil le plus gravement atteint, et préciser le stade atteint par la maladie et sa gravité.

REFERENCES

WHO Expert Committee on Trachoma (1962) *Wld Hlth Org. techn. Rep. Ser.*, No. 234

WHO Scientific Group on Trachoma Research (1966) *Wld Hlth Org. techn. Rep. Ser.*, No. 330