

# Papers and Originals

## Changing Incidence of Trachoma in the West Midlands

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**Summary:** An increasing incidence of trachoma in an urban Midland population has been shown to be mainly due to immigration of infected carriers from the Punjab. In areas where trachoma is common special clinics should be established for the treatment and follow-up of patients and contacts. Public health measures should be introduced to prevent the spread of the infection. Laboratory methods should be more widely used in the diagnosis and control of trachoma.

### Introduction

Trachoma is an eye disease in which the conjunctiva is infected by a large virus-like organism, *Bedsonia* (the psittacosis-lymphogranuloma-trachoma group). It is now possible to confirm the diagnosis not only by demonstrating the intracellular inclusion particles (Halberstaedter-Prowazek bodies) but also by yolk-sac culture (see below). The trachoma infection appears to continue over many years, either by recrudescence following secondary microbial infection or by reinfection by the virus itself; eventually a severe cicatrization of the upper tarsal plate develops, producing entropion and trichiasis. Trachomatous pannus with vascularization of the upper cornea is typical and early, and may involve other areas of the cornea, eventually leading to corneal opacity and deterioration of visual acuity.

This disease was described in antiquity in Greece and Egypt, and during the whole of recorded history it has remained prevalent in the Near and Middle East. It was brought into Europe by the armies after Napoleon's Egyptian campaign, and Moorfields Eye Hospital in London was founded to deal with the Egyptian ophthalmia (Cook, 1961). Despite the fact that there are 400 million trachoma sufferers in the world (Duke-Elder, 1965) permanent residents of the United Kingdom have been virtually free of infection.

In this paper we show that there has been an increasing incidence of the disease involving Asian patients in the area served by the Wolverhampton and Midland Counties Eye Infirmary. The results of a study of the geographical, ethnological, religious, and hygienic factors concerned, together with the diagnosis, treatment, and control of the infection is discussed.

### Methods and Materials

**Statistical.**—The incidence of trachoma and conjunctivitis over the four-year period was assessed by means of the hospital's punch-card diagnostic index.

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**Clinical Material.**—Of the new patients first attending between September 1967 and 31 December 1968 90 with a principal diagnosis of trachoma were recalled for detailed clinical assessment. Of these, 58 (35 men and 23 women) attended, all of whom had confirmed trachoma. The social and ethnic details were based on this group, and the age distribution is shown in Table I. No cases of trachoma were discovered among European residents.

TABLE I.—Age Distribution of Group Recalled for Detailed Assessment

Age	0-2	2-4	5-9	10-14	15-19	20-29	30-39	40-49	>50
No. of cases	1	1	2	5	4	10	19	12	4

**Clinical Methods.**—Clinical diagnosis has been based on a slit-lamp examination, and a detailed assessment has been recorded as recommended by the third report of the Expert Committee on Trachoma (World Health Organization, 1962), as well as the classification of MacCallan (1934).<sup>1</sup>

**Laboratory Methods.**—The diagnosis was confirmed not only by the demonstration of the intracellular inclusion bodies and virus particles but also by inoculation into the yolk-sac of a chicken embryo (Grayston, Wang, Woolridge, Yang, and Johnston, 1960).<sup>2</sup>

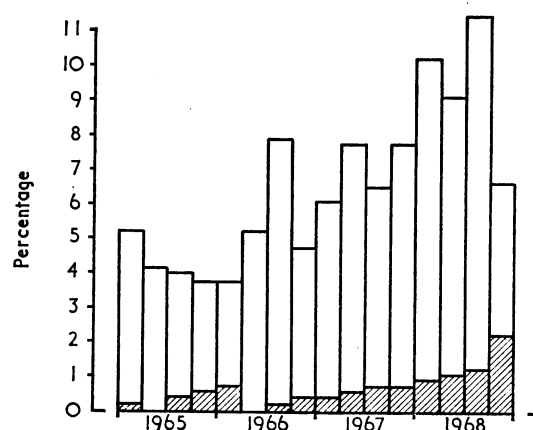


FIG. 1.—Incidence of trachoma (shaded) and incidence of conjunctivitis (clear) as percentages of total outpatients in each quarter 1965 to 1968.

<sup>1</sup> First stage of trachoma with pin-head follicles (Tr. I), second stage with gelatinous follicles or papillary development (Tr. II), third stage of commencing cicatrization (Tr. III), and fourth stage of healed cicatrized trachoma (Tr. IV) (MacCallan, 1934). Trachoma dubium with clinical signs suggestive of early trachoma (Tr. D) and prefollicular trachoma confirmed by laboratory methods (Pr. Tr.) are terms recommended by the Expert Committee on Trachoma, as well as four grades of Tr. IV, indicating the degree of visual loss.

<sup>2</sup> Details of the methods used are available from Dr. C. H. L. Howells, Virus Laboratory, New Cross Hospital, Wolverhampton.

Results of Study

**Incidence of Trachoma in Wolverhampton Area.**—The rising incidence of trachoma as a percentage of the total new patients attending the Wolverhampton and Midland Counties Eye Infirmary during the four years 1965 to 1968 is shown in Fig. 1. The total number of new patients attending each year varied insignificantly.

**Geographical Distribution.**—In the plan of the Wolverhampton area with a 2-mile (3·2-km.) radius (Fig. 2) the place of resi-

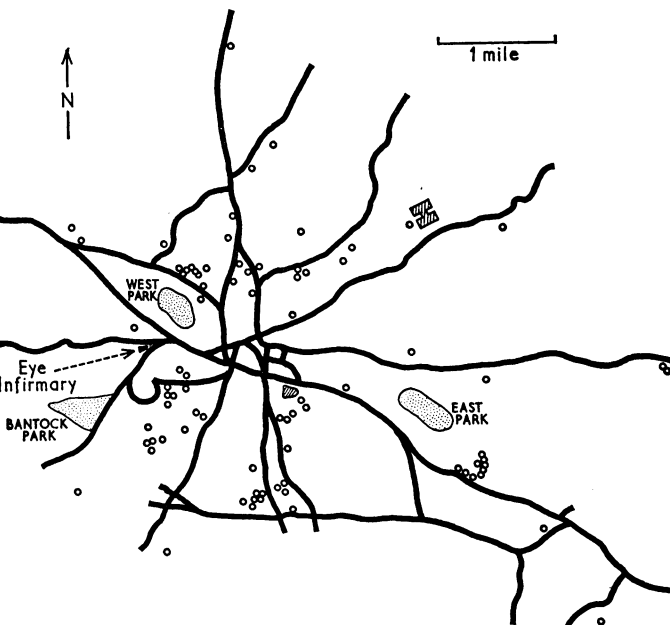


FIG. 2.—Map of Wolverhampton area; residence of each trachoma patient in series shown as a circle

dence of each patient for follow-up is indicated. Most of these lived within confined areas, which shows the tendency for immigrants from overseas to keep together and to live in the older residential areas.

**Ethnological Factors.**—Most of the patients in the follow-up group came from the Jullundur district of the Punjab and might have been attracted to Wolverhampton by the large Punjabi community already established there (Table II).

TABLE II.—Country and District of Birth of 58 Patients Recalled		
Country	District	No. of Patients
India .. .. .	Jullundur	40
	Hoshiarpur	6
	Ferozepur	1
	Jagadhri	1
	Bombay	1
	Mysore	1
Pakistan .. .. .		4
Kenya .. .. .		2
U.K. (parents Indian)		2

**Social Factors.**—The results of a questionnaire on housing and hygiene showed that though most patients used separate towels there was a sufficiently extensive use of communal towels for the spread of infection (Table III). The extensive use of

TABLE III.—Analysis of Hygienic Factors in the Group Recalled		
	Yes	No
Bath in house .. .. .	39	19
Separate towels available .. .. .	38	20
*Surma used .. .. .	30	28

\* Surma is the black powder used for shading the eyelashes.

eyelash blackening (surma) might have been an even more significant factor and is discussed below.

**Clinical and Laboratory Findings.**—The 58 patients recalled were examined with the Haag-Streit 900 slit-lamp, the severity of trachoma being graded according to the W.H.O. (1962) Expert Committee's recommendations. The results of this analysis according to stage and sex showed that whereas there was no significant sex difference there was a distinct kurtosis (peak of distribution) around the more advanced stages of trachoma (Table IV). This may have been due to the pre-

		Grade of Trachoma							
		Tr. D.	Pr. Tr.	I	II	III	IV <sub>0</sub>	IV <sub>1</sub>	IV <sub>2</sub>
Male ..	1				4	11	8	4	7
Female ..					2	5	5	3	6
Total	1				6	16	13	7	13

ponderance of adults among immigrants as well as the tendency not to seek advice for treatment until symptoms were severe or vision was failing. Fortunately an increasing number of infected children are being identified through the school medical service. The relation between the clinical and laboratory diagnosis of trachoma according to the stages of the disease—active (Tr. II, III) or quiescent (Tr. IV) is shown in

TABLE V.—Laboratory Results in Clinically Active (Tr. II, Tr. III) and Healed (Tr. IV) Trachoma					
Stage of Trachoma	Positive Smear and Yolk Sac	Positive Smear, Negative Yolk Sac	Negative Smear, Positive Yolk Sac	Negative Smear and Yolk Sac	Total
Tr. II and Tr. III ..	8	6	4	4	22
Tr. IV .. .. .	9	11	2	6	28
Total ..	17	17	6	10	*50

\* Further 8 cases under study (1 case Tr. D and 7 cases Tr. IV) did not submit to laboratory studies.

Table V. In both groups there was a high rate of laboratory recovery (18 out of 22 and 22 out of 28), and it is especially noteworthy that the organism was recovered from patients late in the disease with every appearance of being clinically "healed."

Discussion

The results of this investigation show an increasing incidence of trachoma in the area. It is significant and reassuring that to date there have been no cases among the non-immigrant population.

It is relevant, therefore, to examine the factors which may be responsible for this situation. The country of origin (Table II) is obviously important. Most patients came from the Jullundur district of the Punjab, a Sikh area. According to a recent trachoma survey in India 80% of the Punjabi population is infected (Gupta and Preobragenski, 1964).

Once an infected individual settles in the area other factors combine to facilitate the spread of infection. For example, one-half of the patients admitted to the habitual use of "surma," a lead sulphide powder, applied with a communal steel rod ("salai"). The latter commonly produces minute conjunctival abrasions, and these could act as a route for inoculation. Easy transfer of ocular infection is achieved by the use of communal towels (Table III) and by the low standard of housing, particularly over-occupancy of bedrooms and lack of bathing facilities (Table III).

To control the disease early diagnosis, effective treatment, and the limiting of any possible spread by adequate public health measures are necessary.

## Diagnosis

The diagnosis of trachoma is likely to be missed in a community unused to its presence, especially since symptoms can be mild until late in the disease. Any conjunctivitis in an Asian patient should be examined for evidence of trachoma, and the following points may be helpful to the macroscopic diagnosis of the disease, though any final diagnosis requires confirmation by slit-lamp and laboratory examination.

(a) A slight ptosis with drooping eyelashes gives a somnolent appearance. This is due to early deformity of the upper tarsal plate, and eversion of the upper lid will confirm this.

(b) Before scarring has occurred a definite diagnosis may be difficult, but any conjunctivitis with widespread follicles in upper and lower fornices should be suspect, especially if contact with trachoma can be confirmed. These patients should be referred for slit-lamp examination under the microscope for the detection of pannus and vascularization of the cornea. Early trachoma may be difficult to differentiate from other follicular conjunctivitis such as inclusion blennorrhoea (paratrachoma), adenovirus conjunctivitis, acute herpetic conjunctivitis, and Newcastle disease conjunctivitis, and the finding of microscopic pannus can be crucial for diagnosis.

(c) The diagnosis of trachoma in a child is an indication that other members of the family are infected (Thygeson and Dawson, 1966), and they should be seen and treated. This requires the co-operation of the public health departments, and statutory notification, as practised in countries such as New Zealand, will be essential if all patients with trachoma are to be followed up and treated.

(d) The diagnosis of trachoma in the neonatal period can be difficult, as it may present as an ophthalmia neonatorum with a secondary pyogenic infection. The trachoma organism has been isolated from the genital tract of the parents of such babies (Jones, Khalaf Al-Hussaini, and Dunlop, 1964), so that all babies born to parents with trachoma should be suspect and examined for infection. It follows that examination of the eyes for trachoma should be part of the antenatal examination.

## Treatment

Our treatment of trachoma has been a combination of sulphonamide by mouth (sulphamethoxypyridazine 0.5 g. daily for three weeks) and a topical antibiotic (chlortetracycline eye ointment twice daily for three months). A similar regimen has been advocated by Watson and Gairdner (1968), but, though this would seem to produce a clinical cure, in view of finding the organism in clinically quiescent cases it is clear that this is not an adequate criterion; it is therefore important to follow up treated cases by laboratory methods as well as by clinical examination. Eradication of trachoma from a community, as with tuberculosis, will depend on laboratory methods.

## Public Health Aspects

The prevention of a wider spread of infection is of the greatest importance; at present it seems to be confined to the immigrant and his direct descendants. We feel that the following points should be considered by those concerned with the problem. (a) The use of disposable or paper towels in public toilet rooms, including those attached to the schools, hospitals, and places of employment. (b) The recognition that the disease can be acquired during the neonatal period. (c) The advice that all candidates for immigration from areas where trachoma is endemic should be examined in their country of origin within two months of departure (World Health Organization, 1962). (d) The observation that the trachoma organism can be recovered from clinically quiescent cases is important; such cases therefore are potential sources of infection until clearance by negative laboratory results.

The high incidence of trachoma within the affected population group produces socioeconomic problems as well as medical. The diagnosis, treatment, and eventual eradication of the disease will depend as much on a detailed follow-up of contacts and education in ocular hygiene as on the treatment of individual cases. Especially important will be the follow-up of relatives and contacts of children diagnosed when attending school, so that, in areas of endemicity, examination of the eyes for trachoma should be part of the routine school medical examination.

We would also suggest that trachoma follow-up clinics should be established in areas where trachoma is endemic. In these the clinical assessment can be standardized and the facilities for clinical and laboratory diagnosis co-ordinated. A special clinic would also be responsible for the follow-up of contacts and the education of patients in the fundamentals of ocular hygiene. It must be remembered that trachoma is a blinding disease, and the economic potential of many infected individuals will be materially reduced unless facilities for rehabilitation are available.

## REFERENCES

- Cook, C. (1961). *British Journal of Ophthalmology*, **45**, 241.
- Duke-Elder, S. (1965). *System of Ophthalmology*, vol. 8, pt. 1, p. 260. London, Kimpton.
- Grayston, J. T., Wang, S. P., Woolridge, R. L., Yang, Y. F., and Johnston, P. B. (1960). *Journal of the American Medical Association*, **172**, 1577.
- Gupta, U. C., and Preobragenski, V. V. (1964). *Journal of All India Ophthalmological Society*, **12**, 39.
- Jones, B. R., Khalaf Al-Hussaini, M., and Dunlop, E. C. M. (1964). *British Journal of Venereal Diseases*, **40**, 19.
- MacCallan, A. F. (1934). *British Journal of Ophthalmology*, **18**, 625.
- Thygeson, P., and Dawson, C. R. (1966). *Archives of Ophthalmology*, **75**, 3.
- Watson, P. G., and Gairdner, D. (1968). *British Medical Journal*, **3**, 527.
- World Health Organization (1962). *World Health Organization Technical Report Series*, No. 234.