THE WASSERMANN REACTION IN OPHTHALMIC PRACTICE.

A RECORD OF 250 CASES.

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In the past it has been necessary, in assessing the part played by syphilis in the production of ocular lesions, to place reliance on: (1) The admission on the part of the patient of previous syphilitic infection; (2) the previous history of the patient as regards symptoms indicative of syphilis; (3) the nature of the lesion—for example, the comparatively rare occurrence of iritis with a gumma on the iris or retinitis syphilitica; (4) the presence of other known syphilitic lesions at the time of examination; (5) pathological examination in some instances; (6) the response to antisyphilitic treatment.

While in many cases a clear history of previous syphilitic symptoms may be elicited, in other instances it is quite impossible to obtain actual evidence, owing to the fact that the patient aims at concealing the essential facts, that he may have forgotten the occurrence (several years before) of the characteristic primary and secondary lesions, or that the primary and secondary symptoms may never have developed in their characteristic fashion or may have been altogether suppressed. If other well-recognized signs of syphilis are present along with the ocular disease, then there is the strongest presumption that the eye condition is due to syphilis, as in the case of interstitial keratitis associated with the various evidences of congenital syphilis or when iritis develops as part of the secondary stage. On the other hand, ocular lesions may develop as isolated phenomena unaccompanied by other symptoms—for example, primary optic atrophy as the earliest symptom of spinal tabes and iritis is occasionally the only sign of syphilis present at the time of examination.

In ophthalmic practice it not infrequently happens that the nature of the lesion indicates the possibility of a syphilitic origin, but by clinical methods alone it is impossible to make more than a tentative diagnosis. While it has long been accepted that interstitial keratitis is in the majority of cases due to syphilis, cases occur which are undoubtedly non-syphilitic. In iritis, also, while the syphilitic virus may be responsible for the disease, a condition clinically similar may be produced by other infective agents. Again, while paralysis of ocular muscles may be definitely due to syphilitic lesions, the same effects are produced by other pathological conditions, such as intracranial haemorrhage or malignant tumour.

Clearly, therefore, as a diagnostic method, a specific serum test, such as the Wassermann reaction, is of great value in determining the syphilitic nature of eye lesions. By submitting to the Wassermann test without any selection based on history, accompanying symptoms, etc., the serums of patients suffering from various ocular conditions recognized as possibly of syphilitic nature, we have been able to obtain direct evidence of the proportion of these conditions which are due to the syphilitic virus, and by extending the researches to other conditions, we have in some instances elicited the existence of a possible syphilitic basis where none has hitherto been suspected—for example, myopia with choroiditis. Obviously a more definite statement can be made from the results of such an objective test than from conclusions drawn entirely from the personal or family history of the patient concerned.

Granted that the Wassermann reaction is carried out by an accurate and reliable method the positive results obtained are indubitably valid. The conclusions to be

Table of Cases taken as they appeared at the Clinics of the Glasgow Eye Infirmary.

	Cases.	Positive	Negative.	Doubtful.
1. Congenital corneal opacities	1	0	1	0
2. Interstitial keratitis ...	63	56	7	0
3. Pemphigus of conjunctiva	1	0	1	0
4. Episcleritis and scleritis ...	6	2	4	0
5. Sclero-keratitis ...	3	1	2	0
6. Iritis and iridocyclitis ...	50	27	22	1
7. Cyclitis ...	3	0	3	0
8. Choroiditis and choroidal atrophy	26	5	20	1
9. Sympathetic ophthalmitis	4	0	4	0
10. Retinitis pigmentosa ...	3	0	3	0
11. Retinal detachment ...	5	0	5	0
12. Neuro-retinitis with haemorrhage	8	2	6	0
13. Optic neuritis ...	6	3	3	0
14. Optic atrophy ...	21	12	8	1
15. Vitreous opacities ...	2	1	1	0
16. Congenital cataract ...	2	1	1	0
17. Paralysis of ocular muscles	13	7	6	0
18. Nystagmus ...	2	0	2	0
19. Dacryocystitis ...	3	1	2	0
20. Cerebral syphilis ...	1	1	0	0
21. Disseminated sclerosis ...	1	0	1	0
22. Myopia with choroiditis ...	6	2	4	0
23. High myopia ...	2	1	1	0
24. Trachoma ...	2	0	2	0
25. Retro-ocular tumour (fibro-sarcoma)	1	0	1	0
26. Glaucoma ...	4	1	3	0
27. "Strumous keratitis" ...	8	0	8	0
28. Parinaud's conjunctivitis ...	1	1	0	0
29. Choroideremia ...	1	0	1	0
30. Paradoxical pupillary reflex	1	1	0	0
	250	125	122	3

The cases recorded in the above table have not been in any way selected apart from the two following considerations: (1) Where syphilis is one of the known etiological factors; thus a series of unselected cases of interstitial keratitis, episcleritis, scleritis, sclero-keratitis, iritis, iridocyclitis, cyclitis, choroiditis, choroidal atrophy, optic neuritis, retinitis, ocular palsies, were examined irrespective of the presence or absence of other symptoms; (2) where no definite etiology is known.

drawn from negative results are less definite, since in the tertiary and latent stages of the disease only 75 per cent. and 50 per cent. respectively yield a positive result.¹ Thus any estimate of the frequency of syphilitic lesions based on the results of the Wassermann reaction is bound to be an understatement. A positive Wassermann reaction obtained under the most reliable conditions is in itself conclusive proof of the presence of syphilis, even where there is no other clinical evidence of the existence of the disease, and therefore a positive reaction in a clinically suspicious case affords a very striking confirmatory test.* It may also be mentioned here that the test is of inestimable value in eliciting admissions from patients regarding their previous history; thus in a number of cases of iritis in which no history of syphilis was at first obtainable, and where subsequently a positive Wassermann reaction was found, intimation to the patient of the fact that he must have been infected was followed by complete confession.

The method employed has been the lecithin-cholesterin method of Browning, Cruickshank and MacKenzie (Browning and MacKenzie).

The essential feature of this method depends on the characteristic power of cholesterol to increase the amount of

* Of course, diseases common to this country are alone under consideration.

complement deviated by a syphilitic serum in the presence of "lecithin." While strongly positive serum may along with "lecithin" alone give a very striking degree of complement deviation, weakly reacting serums, on the other hand, may exhibit very little deviation with the "lecithin" antigen by itself. The determination of the result, then, depends on the difference between the amounts of complement deviated by serum *plus* lecithin-cholesterin and serum *plus* lecithin. In addition, each of the results was determined only after comparison with those obtained with known negative and positive serums tested under precisely similar conditions as the serum in question. In this way fallacies due to the variability of different specimens of guinea-pig complement were eliminated.

Extreme accuracy, combined with delicacy may be claimed for this method, and the extensive investigations of Watson have established a very striking proof of the specificity of the reaction (Browning).²

Interstitial Keratitis.—In this, the largest class of cases, the reaction was positive in 88.8 per cent. In general the reaction was most markedly positive, even although in many instances the disease had been quiescent for a long time, the patients attending the infirmary only for the resulting opacity of the cornea. One of these was a man aged 80. The families of four of the patients were examined; in two of these brothers or sisters gave positive Wassermann results and showed signs of choroiditis without subjective symptoms. This series of cases was examined at two periods, with an interval of ten months intervening. The first group consisted of 37 cases, and showed 35 positives and 2 negatives; in the second group of 26 cases, 21 were positive and 5 negative. The interest here lies in the fact that each group showed a very large and approximately equal percentage of positive cases.

Strumous Keratitis.—The results were negative in all.

Iritis and Iridocyclitis.—These cases were also obtained in two series; 22 in the first group gave 12 positive and 10 negative results. In the second group of 28 cases, 15 were positive, 12 negative, and 1 doubtful. Thus, 54 per cent. of the patients with iritis and iridocyclitis are proved to be syphilitic, and in a number there was also a definite history of gonorrhoea.

Cyclitis.—This condition, uncomplicated by affection of the iris, was diagnosed in three cases, and it is interesting to note that these were all negative.

Choroiditis.—Parsons³ states that "syphilis is one of the commonest causes of choroiditis," and refers to the information obtained from the scanty records of cases in which the syphilitic element was undoubted. From this point of view our results are interesting. Of 26 cases examined 5 gave positive and 20 negative results, while 1 was doubtful. These results do not suggest that syphilis is the preponderating factor in the causation of choroiditis. Two of us in connexion with a series of cases availed ourselves of the luetin reaction of Noguchi for testing patients who gave negative Wassermann results. According to Noguchi, the value of the luetin test lies in its capacity for giving positive results in cases of syphilis which are negative to the Wassermann reaction.⁴ Of 5 cases of choroiditis which gave a negative Wassermann reaction the luetin test was also negative in four; these additional results lend further support to the conclusion stated above, and indicate that in the majority of cases of choroiditis some other causal agent than syphilis must be sought for, contrasting with what is found in cases of iritis and iridocyclitis. It is an interesting fact, therefore, that inflammatory conditions of the uveal membrane differ in their etiology according to the site of the lesion.⁵

Sympathetic Ophthalmitis.—Of the 4 cases examined all gave negative results. One of these was of special interest since the patient returned five weeks after enucleation of the injured eye, suffering from this disease; mercurial inunction seemed to produce a good effect and the patient left the hospital with very useful vision, a not unknown but very exceptional result.

Retinitis Pigmentosa.—Three cases were all negative. These results support the generally accepted view that the disease is unconnected with syphilis.

Retinal Detachment.—We failed to find any positive reactions in 5 such cases.

Inflammation of the Optic Nerve and Retina.—Only 5 positive cases were obtained out of a total of 14.

Optic Atrophy.—Of 21 cases of optic atrophy 57 per cent.

* The results of Mackie and Manson on the luetin reaction in diseases of the eye will shortly be published.

gave positive results, and it is interesting to note that 10 diagnosed as *primary* optic atrophy were all positive.

Paralysis of Ocular Muscles.—Seven out of 13 cases were positive. The following is the grouping of the paralyses:

	Positive.	Negative.
Third nerve	4	0
Fourth nerve	1	0
Sixth nerve	1	6
Sixth and third combined	1	0

Dacryocystitis.—One out of these patients reacted positively. This case was atypical. The swelling, redness, etc., in the region of the lacrymal sac suggested acute dacryocystitis, but the induration and chronicity were suspicious. After performing our routine examination and being strengthened by the possession of a positive result we were able to elicit a history of syphilitic infection ten years before.

Myopia.—The cases of myopia accompanied by choroiditis are interesting as showing that syphilis may be a factor in the production of this lesion.

Glaucoma.—Four cases were examined, with one positive result. In view of the association of vascular disease with syphilis, it is important to note that Fergus⁶ has drawn attention to the possibility of glaucoma being in some cases due to venous stasis. Our results are, of course, too small in number to permit of a conclusion regarding the part played by syphilis in the causation of glaucoma; but such cases, whenever they are met with, would be well worth examining from this point of view.

As a result of these investigations, in which the Wassermann reaction has been employed as a means of arriving at a direct diagnosis apart from the uncertainties of clinical methods, we have been enabled to collect some information as to the prevalence of syphilis in ophthalmic practice.

The interesting fact emerges that, excluding such conditions as ocular injuries, conjunctivitis, cataract, and the ordinary errors of refraction, if all other ocular affections without selection are analysed on the basis of the Wassermann test, practically 50 per cent. of these collectively are associated with a positive reaction. Since many of such lesions occur in the tertiary and latent stages of syphilis in which only a certain proportion yield a positive result, it is a justifiable presumption that this is probably an under-estimate, and that syphilis plays an even more prominent part in the production of ocular disease than our figures show.

The results of the Wassermann reaction are, however, striking in themselves, and the conclusions to be drawn are exceedingly instructive. We are strongly of opinion that, apart from the previously mentioned conditions (injuries, etc.), all cases presenting themselves at an eye clinic should be submitted to the Wassermann test; if this were carried out systematically the clinician would have at his disposal direct evidence which would be of great value in respect to effective treatment, and in a very large number of cases clinical inference would be converted into practical certainty. Moreover, certain etiological obscurities might be definitely resolved as the result of such systematic and extensive investigations.

REFERENCES.

- ¹ Browning and MacKenzie, *Recent Methods in the Diagnosis and Treatment of Syphilis*, p. 101.
- ² BRITISH MEDICAL JOURNAL, January 10th, 1914.
- ³ J. Herbert Parsons, *The Pathology of the Eye*, p. 461.
- ⁴ *Presse Médical*, September and October, 1913.
- ⁵ Glaucoma Associated with Venous Congestion, *Trans. Roy. Soc. Med.*, vol. vi, No. 9, 1913.

THE late Dr. Henry Charles Hilliard, of Bletchingley, Surrey, left estate valued at £10,587.

RUCHER, in the United States Public Health Reports for 1914 (Supplement No. 15, June 12th, 1914; Washington Government Printing Office, 1914), lays it down that the objects of a yellow fever campaign should be (1) to prevent the breeding of *Stegomyia calopus*; (2) to locate all persons sick of yellow fever or suspicious fever as early as possible in the disease; (3) to prevent *Stegomyia calopus* from biting them and becoming infected; and (4) to destroy all infected mosquitos. All details are fully described, including the arrangement of the staff, the location of the cases, and the destruction of the mosquitos. Such a pamphlet should prove of considerable use to communities where yellow fever is liable to occur.