THE KLINE TEST IN SYPHILIS

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Since serological examination plays so important a part in the diagnosis and exclusion of syphilis, it follows that numerous methods have been devised to facilitate the attainment of these objects. The Wassermann reaction is, in this country, the test in most common use, but elsewhere methods of serological examination of the flocculation and slide-precipitation type have gained equal prominence. The more numerous and diverse the serological tests employed, the more accurate should be the final result. In view of this we have endeavoured to analyse the results obtained from the performance, in a series of cases, of both the Wassermann reaction and the Kline slide-precipitation test. We have later appended a further series in which it was found possible to compare the Wassermann, Sachs-Georgi, and Kline tests, but the number of cases available in this latter group was too limited to admit of any definite conclusion being drawn.

Technique

The technique employed for the Kline test was that of the diagnostic heated serum test, using fresh serum. It should be pointed out that more uniform readings were obtained when the slide was read four minutes after the mixing of the antigen emulsion and the serum had ceased.

Serum four days old gave 12 per cent. error as compared with fresh serum; ten days old gave 55 per cent.; fourteen days old gave 70 per cent.; and twenty-eight days old gave 100 per cent.

Fresh antigen emulsion also gave better results.

Antigen emulsion twenty-four hours old gave 1.9 per cent. error; thirty-six hours old gave 7.8 per cent.; forty-eight hours old gave 9.7 per cent.; and seventy-two hours old gave 92 per cent.

The number of sera examined was 1,801, representing 867 cases attending the Edinburgh venereal diseases clinic and elsewhere. The readings were interpreted on the following basis. A "one-plus Kline" represented the minimum degree of positivity, a "three-plus Kline" represented the maximum degree of positivity.

Results

We append herewith a series of tables showing the results obtained, so that the subsequent conclusions will then be the more easily understood. The percentage figures refer to agreement and disagreement between the Kline and the Wassermann, comprising syphilitic and non-syphilitic cases.

TABLE I

No. of Cases	Type	No. of Tests	Per Cent. Agreeing	Per Cent. Disagreeing
368	Total syphilitic cases ...	799	97.3	2.7
317	Treated " " ...	656	96.8	3.2
51	Untreated syphilitic cases	143	100.0	—
499	Total non-syphilitic cases*	1,002	99.6	0.4
454	Gonorrhoea	909	99.7	0.3
25	Tuberculosis... ..	52	95.0	4.0
20	Dermatological† ...	41	100.0	—

Note.—The group marked * includes cases of gonorrhoea, warts, herpes genitalis, chancroid, non-specific iritis, tumour of testis, bubonocoele, tuberculosis of the kidney, epididymitis, urethral stricture, retinal haemorrhage, glossitis, and venereal contacts. That marked † includes a variety of cases sometimes responsible for a false positive Wassermann reaction.

TABLE II

No. of Cases	Type	Per Cent. Disagreement		Positivity	
		Untreated	Treated	W. R.	K.
70	Primary... ..	Nil	3.4	60	40
43	Secondary	"	4.0	30	70
130	Latent and tertiary... ..	"	9.0	45	55
81	Neurosyphilis... ..	"	5.3	10	90
44	Congenital syphilis ...	"	5.0	10	90

Note.—The column headed "Positivity" requires fuller explanation. The figures under "W.R." and "K." represent a further analysis of the preceding percentage disagreement figures—for example, where the percentage disagreement was 3.4 the ratio of the positive Wassermann reaction to the positive Kline test in the cases showing disagreement was as 60:40.

General Conclusions

The Kline test becomes positive later in the disease than the Wassermann—a result differing from those obtained by Kline and Littman,¹ and the Kline would seem to be less reliable in the earlier stages of the disease. This latter supposition is strengthened by the fact, noted later in a special paragraph, that the Kline test applied to sera taken from suspected primary lesions yielded a false positive error in three out of the seven cases in which no clinical or serological evidence of syphilis was found. Generally speaking, the Kline test remains positive longer than the Wassermann in late cases of syphilis under treatment.

A comparison of Wassermann, Sachs-Georgi, and Kline tests was made by performing all three on fifty specimens of sera representing twenty-five cases. All three tests agreed in twenty cases. In the remaining five cases: (1) Wassermann and Kline agreed in two cases; (2) Sachs-Georgi and Kline agreed in two cases; and (3) Wassermann and Sachs-Georgi agreed in one case.

Sera from suspected primary lesions were also examined. The specimens were taken concurrently and from the same source as those for dark-field examination. Total cases numbered eighteen. Eleven cases showed *S. pallida* present with a strong positive result in both the Wassermann reaction and the Kline test. Seven cases showed a repeated absence of *S. pallida*, but the Kline test gave a repeated positive reading in three cases belonging to this latter group.

Disagreements and False Positives.—We agree with Chargin and Rosenthal² that treated cases of congenital syphilis and neurosyphilis account for the majority of divergent results in the sense that the Kline test remained longer positive. This seems to imply either a false positive Kline or the employment of a more sensitive antigen emulsion in the Kline test, and we are inclined to favour the latter view. Our reason for so doing is that the Kline results were confirmed by clinical examination and additional serological tests. In serum taken from suspected primary lesions the Kline test gave a positive reading in three cases where no evidence of syphilis was found either then or during a further observation period of three months. Furthermore, one of our limited number of cases of tuberculosis gave a positive diagnostic Kline reading where no evidence of concurrent syphilis could be found. These results seem to cast doubt upon the efficiency of the Kline test as a medium of diagnosis.

It should be noted as a contrast that no positive results were yielded by either the twenty dermatological cases or the series of 499 cases outlined under non-syphilitic cases in Table I. (This comprises all cases save those in the tuberculosis section.) These facts are of value when the efficacy of the Kline test as a means of excluding syphilis comes to be assessed.

Anti-complementary Readings.—Forty-two tests were performed on twenty-one cases. In cases to which both the Kline test and the Wassermann reaction had been applied initially, and in which the Wassermann result had been anti-complementary, repetition of the Wassermann yielded a result corresponding to the original Kline result in 89 per cent. of the cases. These results are in accordance with the views put forward by Miller³ and Stewart.⁴ We also agree with the latter when he says that the responsibility for a false positive Kline test cannot be attributed to the substance responsible for the anti-complementary Wassermann reading.

Discussion and Summary

An outstanding feature is the absolute agreement of the Wassermann reaction and the Kline test in the untreated syphilitic cases in Table I. We are of the opinion that the Kline test has a definite place in the diagnosis of syphilis, and that on the basis of sensitivity and selectivity it constitutes a suitable adjuvant to, but an indifferent substitute for, a universal test such as the Wassermann. It is relatively simple,⁵ rapid, and inexpensive, while only a very small quantity of serum is necessary for its performance; but despite these advantages it seems unsuitable for use save in laboratories (where large numbers of sera are presented for examination at one time), since the antigen emulsion—an expensive item—only retains its efficiency for a relatively short period of time. In addition, considerable practice is essential before minor deviations from the normal can be accurately assessed.

We have already emphasized the specific sensitivity of the test only in that it remains longer positive in the

later stages of syphilis under treatment, and in that respect we agree with Kilduffe,⁶ who compared his results with the Kolmer modification of the Wassermann—essentially a very delicate test. Our findings also coincided with those of Gray,⁷ who found it of value in assessing the result of antisyphilitic treatment. Osmond and Hughes⁸ remark that it is predominantly an eliminating test rather than a diagnostic one, and with these views we are in accord. They suggest, also, that it be used as a serological index in testing for cure. Allusion has already been made to the use of the Kline test where the Wassermann has given an anti-complementary result.

We might add that the test was repeated in all our cases which showed disagreement with the Wassermann, since our experience was similar to that of Kilduffe in regard to the possibility of results occasionally varying with the use of different serological tests.

We hold, therefore, that the Kline has its chief value: (1) in the later stages of syphilis under treatment; (2) in cases where it is especially important that syphilis should be excluded—for example, interstitial keratitis; and (3) as a general supplement to the Wassermann reaction.

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ABDOMINAL HYDROCELE

WITH RECORD OF TWO CASES

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On perusing the literature I can only find reference to thirty-six previously recorded cases of this condition, which is therefore of sufficient rarity to warrant publication of my cases, particularly in view of the prominence lent to the disease by the recent appearance of two other published accounts.

CASE I

The patient, a tall, thin man, aged 30, of the Buganda tribe, was admitted to the C.M.S. Hospital, Ngora, Uganda, on October 29th, 1930. He gave a five-years history of a swelling which started in the upper part of the right side of his scrotum, gradually increased in size, and spread to his abdomen.

On examination the right side of his scrotum was distended by a large hydrocele, which was evidently continuous with a large abdominal tumour. The latter resembled in appearance an eight months pregnant uterus, but could be seen to be lobulated into two parts by a constriction below the umbilicus. When the patient was in the erect position the tumour descended and became more prominent, while the scrotal swelling increased in size. On palpation the abdominal swelling was found to be tense and cystic, and to have a rounded outline. It had a well-defined edge, and was freely movable within the abdomen. Both fluctuation and fluid thrill could be elicited between different parts of the tumour and between the abdomen and scrotum, and fluid could be displaced from scrotum to abdomen and vice versa. Percussion revealed dullness over the tumour and resonance in the flanks. The size of the mass can be appreciated by a study of its

boundaries within the abdomen. When pressure was applied over the lower part of the scrotum the upper limit of the abdominal tumour was just overlapped by the costal margin, but when this pressure was relaxed its superior border receded to a point 1 inch below that margin. Its upper limit on the right side was not so high, being only 1 inch above the umbilicus. The tumour extended on the left side to a point 2 inches to the outer side of the left anterior superior iliac spine, and for a corresponding distance into the right flank. There was no tenderness. The right side of the scrotum had the usual tense elastic characters of a hydrocele, but these features became more marked when pressure was made upon the abdomen. The hydrocele was of large size, extending for a distance of 11 inches below the right pubic spine, and the scrotum, whose girth at its widest level measured 19 inches, contained on the left side a slightly smaller hydrocele, which had no communication with the abdomen. A diagnosis of abdominal hydrocele was made and operation advised.

An operation was performed on November 4th, an incision 4 inches long, with its upper extremity at the level of the pubic spine, was made over the upper part of the scrotum on the right side. The tunica vaginalis was exposed and separated from its scrotal coverings with the finger. It was pierced with trocar and cannula, and four pints of straw-coloured fluid were removed. The evacuation of the fluid was accompanied by collapse of the abdominal tumour. After enlarging the aperture in the tunica vaginalis it was possible to pass a finger into the abdominal loculus, but the limits of the hydrocele could not be reached. By means of gauze dissection combined with traction from below, the whole sac was drawn down from the abdomen. It was surprising how easily this separation could be carried out. In the abdominal portion was a completely isolated loculus about the size of a golf ball, which contained fluid of the same yellow colour. The whole hydrocele sac was excised, with the exception of a small portion sufficient to evert and suture with catgut behind the cord. A rubber drainage tube was inserted into the upper end of the wound, and removed after forty-eight hours. A high scrotal incision, 3 inches long,