

SEROLOGICAL SCREENING FOR SYPHILIS IN ANTENATAL CASES

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Summary

Out of 23,808 sera screened for syphilis by VDRL tests from antenatal cases, 1,155 were reactive, giving an incidence of 4.85%. This has been compared with the incidence of reactive sera for syphilis in antenatal cases by various other workers. We have compared 300 sera with various reactivity by VDRL test with KVT and found only 2 false positive and 57 inconclusive, thereby indicating need to have specific tests. There was good correlation between VDRL and KVT, but VDRL was more sensitive, whereas KVT was more specific. Various serological tests for screening syphilis have been discussed in brief and ultimately concluded that VDRL is the best screening test.

Serology is the most common laboratory tool in the diagnosis of syphilis. Serological tests for syphilis consist of two general groups of procedures :-

(1) The non treponemal antigen tests with alcoholic lipid extract of various animal tissues, mainly beef heart; the active component of which is chemically a cardiolipin.

(2) The treponemal antigen tests with fluorescence techniques. The first group detects non-specific reagin or reagin-like antibodies by various flocculation tests, of which Venereal Diseases Research Laboratory (VDRL) test is the prime example. Second group detects specific treponemal antibodies by tests like fluorescent treponemal antibody absorption (FTA-ABS) and treponemal-pallidum immobilisation (TPI) tests. Since these tests

are too expensive and time-consuming to be used as screening procedures for treponemal diseases, VDRL test is widely used as screening procedure for a large population. In the present study, we have screened the antenatal cases from various Municipal Maternity Homes of Bombay by VDRL tests and tried to find out the incidence of reactive sera during pregnancy. We also tried to correlate VDRL with Kahn test and tried to exclude false positive reactions by doing Kahn-verification test for certain samples.

Material and Methods

At the V. D. reference laboratory, Bombay a total number of 23,808 sera from patients attending antenatal clinics for the first time at various municipal maternity homes were screened by VDRL test. This study was carried over a period of 10 months from January '74 to October '74. After inactivating sera at 56°C for half an hour, the following tests were performed according to standard methods —

(1) VDRL - qualitative slide flocculation test.

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Received for publication on 9-5-1977

(2) VDRL-quantitative slide flocculation test wherever the serum was reactive or doubtful by VDRL qualitative test.

(3) Kahn verification test (KVT) at 37°C room temperature and at 2°C, for 300 samples which were doubtful or reactive upto 1:64 by VDRL tests, thereby comparing two results and trying to exclude biologically false positive (BFP) reactions.

Results

Out of 23,808 sera screened, 1,155 were reactive by VDRL tests giving an incidence of 4.85%. Table I shows number of sera studied from different municipal maternity homes.

TABLE I
Incidence of VDRL reactive sera at various Municipal Maternity Homes

Maternity home	Total	VDRL-reactive	Percentage
1. Khetwadi	1577	76	4.6
2. Imamwada	2331	50	2.1
3. Kamathikura	3972	242	6.1
4. Bellasis Road	3825	208	5.4
5. S. V. S.	2041	115	5.6
6. Kurla-Bhabha Hospital	8492	378	4.45
7. Raoli Camp.	1570	86	5.47
TOTAL	23808	1155	4.85

The highest dilution which gave reactivity was 1 : 512.

Table II shows correlation of V. D. R. L. tests and KVTS on 300 sera studied.

Discussion

History and physical examination are nearly worthless to diagnose syphilis in the pregnant women. The diagnosis can be made only by serologic tests. A leading article in the Lancet¹ has emphasized the continuing need to maintain serological supervision of pregnant woman and that advice still holds good to reduce the incidence of congenital syphilis. We have tried to screen the antenatal cases by VDRL tests, but in absence of facilities to do specific tests, anti syphilitic treatment was instituted as protective measure.

Out of 23,808 sera screened, 1,155 were reactive by VDRL tests giving percentage of 4.85. Several reports have been published on the results of serology screening for syphilis on unselected pregnant women^{2,3,4}. Adeoba⁵ had extensively surveyed 3,670 pregnant women for the serology of syphilis along with clinical, history, age-distribution, parity, socio-economic status, placental changes, cord-blood

TABLE 2
Correlation of VDRL-tests and Kahn-verification-tests.

VDRL test reactivity	Total	Non-reactive	Doubtful	KVT-reactivity			Remarks
				True positive	False positive	Inconclusive.	
Non reactive	18	18	—	—	—	—	—
Doubtful	65	48	12	3	1	1	—
1 : 2	109	1	11	73	1	23	—
1 : 4	62	—	—	43	—	19	—
1 : 8	26	—	—	15	—	11	—
1 : 16	10	—	—	8	—	2	One showed prozone.
1 : 32	7	—	—	6	—	1	One showed prozone.
1 : 64	3	—	—	3	—	—	—
TOTAL :	300	67	23	151	2	57	

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for syphilitic infection and radiology of bones of newborn and found an incidence of 2.8%. Table III shows percentage of reactive sera in antenatal cases by various workers.

TABLE 3

Comparison between the results of the antenatal screening for syphilis by various workers expressed as percentage of reactive sera.

Author	Year	Place	Percentage of reactive sera.
1. Chief Medical Officer, ⁶	1955	Great Britain	0.21 to 0.43
2. Browne and McClure Browne ⁷	1958	Hammer-smith Hospital.	0.71
3. McClure Browne & Dixon ⁸	1963 to 1965	Bristol	0.3
4. Pritchard et al ⁹	1965	England (6 centres)	0.21 to 0.43
5. Adeoba ⁵	1965	Dublin & Lagos.	2.8
6. Nichol ¹⁰	1970	U.S.A.	0.1
7. Present series.	1974	Bombay (7 Mun-Mat, homes)	4.85

Our incidence is much higher as compared to other centres; probably because of two reasons. Firstly, Bombay city today seems to be having alarming increase in the venereal diseases according to reports from municipal VD clinic at Bellasis Road and from J.J. groups of hospitals during 1974. Secondly, the population screened in our series comes from 'red-light' areas with low socio-economic status. The highest incidence was 6.1% from Kamathipura maternity home and the lowest was 2.1% from Imamwada maternity home; indicating the social status of the population of these particular areas. According to a W. H. O. report, there has been a resurgence of venereal diseases in 76 of 106 nations of the world². Our incidence of 4.85% seropositivity for syphilis in antenatal cases tallies with the serological surveys done by various

workers on expectant mothers at Madras, Calcutta & Delhi; which revealed prevalence rate of 5 to 8%^{3,4,11}. According to Rangiah¹² prevalence rate has remained constant at about 8.5% among pregnant women. These figures indicate persistent uncontrolled and even enlarging syphilitic reservoirs in the community. Though few reliable statistics are available in India, Nichol¹⁰ thinks that in India, syphilis may be at least 100 times more than in U. K.

The reactive standard serologic tests for syphilis in the absence of clinical evidence of the disease, have always presented a difficult diagnostic problem because of larger number of biologically false positive reactions in the pregnant as compared to the non-pregnant women. Some workers report a significant incidence of biologically false positivity during pregnancy and others deny its existence as a result of pregnancy itself¹³. Wilkisen & Sequeira¹⁴ found that 27.5% of 244 sero-positive antenatal patients gave negative TPI reactions. This result cannot be compared with present series, as TPI was not carried out in our cases. This emphasizes the need to have facilities to do specific tests for syphilis to exclude biologically false positive reactions. In any regard, patients with positive VDRL during pregnancy, must be studied thoroughly because of the untoward effects of this curable disease upon the foetus. Morris¹⁵ suggests that continuing supervision for syphilis is necessary in each and every pregnancy both for the welfare of the infected mother and her new-born child and for the elimination of a reservoir of *T. pallidum*. In the absence of facilities to do specific tests for syphilis, antisyphilitic treatment was instituted as protective measure to patients with even weak reactivity in our study.

Various tests are recommended to differentiate BFP from true syphilitic

reactions and these are called "verification tests", a name popularized by Kahn¹⁶. In most such tests, including Kahn verification test, the result depends largely on the quantitative titer of the specimen tested. Those sera with low titer content tend to provide verification results of the "general biologic type" and those with high titer content, tend to give results of the "syphilitic" type. In syphilis, serial quantitative testing over a period of 2 to 6 months is of great value, as decreasing titer in absence of anti-syphilitic treatment, excludes BFP reaction and increasing titer proves syphilis¹⁷. In the present study, out of 300 patients, 207 had titer between 1:2 and 1:16, out of which 139 gave true positive reactivity by KVT.

We tried to correlate 300 reactions by VDRL tests and KVTs as shown in table II. From these results, it was concluded that there was good correlation between the VDRL and Kahn tests, but obviously VDRL was more sensitive and KVT more specific as compared to VDRL test, as it gave 49 negative, 23 doubtful, 151 true positive, 2 false positive and 57 inconclusive reactions out of 282 VDRL reactive sera at various dilutions. 18 nonreactive sera by VDRL test were also nonreactive by KVT. Apart from 151 true positive sera, others may be nonspecific, requiring confirmation by other verification tests like TPI or FTA-ABS. Schofield¹⁸ also concluded that VDRL was the most sensitive test missing only 3 out of 25 cases of syphilis, but lacked the specificity of Reiter Protein Complement Fixation (RPCF) test, having 38 BFP reactions compared with only 3 by the latter.

Ideally, screening tests should not miss any case of syphilis, no matter how weak the reagin or antibody production may be and irrespective of the treatment. Schofield¹⁸ noted that when the tests were paired and either or both

the tests were reactive, then the requirement of 100% sensitivity was met by the combination of VDRL and RPCF tests, but gave 38.5% specificity. VDRL + WR (Wassermann reaction) gave specificity of 21.3% with many BFP reactions. This has increased the demand for FTA-ABS and/or TPI tests by 11.5% from pregnant women. TPI tests remain positive presumably for the duration of the patient's life and in spite of the type or amount of previous treatment. Although FTA-ABS test is extremely sensitive and widely used as a confirmatory test for syphilis, additional data are needed concerning its specificity¹⁹. False positivity with this test has been reported recently in the literature²⁰.

REFERENCES

1. Leading articles-Syphilis past and present Lancet. P - 503; 1967.
2. Rajam RV : Control of venereal diseases Ind J Derm Vener 34 : 115, 1968.
3. Rao MS and Burnett KC : A preliminary estimate on the burden of venereal diseases in India. Ind J Derm Vener 38 : 156, 1972.
4. Ghosh (1945) - Quoted by (3).
5. Adeoba A : Interpretation of positive serological tests for syphilis in pregnancy Brit J Vener Dis 43 : 249, 1967.
6. Extracts from the annual report of the chief medical officer for the year 1955 Brit J Vener Dis 33 : 54, 1957.
7. Browne FJ and Browne McClure JC : Antenatal and postnatal care 9th edition J & A Churchill Ltd London 1960, P-373.
8. Browne McClure JC and Dixon G : Browne's Antenatal Care 10th edition ELBS and J & A Churchill London 1970, P-304.
9. Pritchard JG Mechie AM and McHugh JG : A study of serological tests for venereal infection in elderly people Brit J Vener Dis, 43 : 18, 1962.
10. Nichol CS : Venereology in India Ind J Derm Vener, 38 : 97, 1972.

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11. Leiby (1949)-Quoted by (3).
12. Rangiah PN : Venereal diseases in Madras Madras Med J 2 : 282, 1958.
13. Pusch, AL : Ch. - 23 : Serodiagnostic tests for Syphilis and other diseases Todd -Sauford-Clinical Diagnosis by Laboratory Methods. Edited by Davidsohn, I and Henry JB 15th edition WB Saunders Co, Philadelphia London - Toronto 1974, P 1222.
14. Wilkilsen AE and Sequeira PJL : Studies on the treponemal immobilization test - Use of the TPI as a verification test in suspected latent syphilis Brit J Vener Dis 312 : 143, 1955.
15. Morris CA: Advantage of a routine Reiter Protein Complement fixation test in the serodiagnosis of syphilis in pregnancy J Clin Path, 21 : 731, 1968.
16. Kahn RL (1940, 1941). Quoted from Cruickshank R Medical Microbiology-A guide to the laboratory diagnosis and control of infection 11th edition, ELBS 1965; P-925.
17. Moore JE : The Diagnosis of syphilis by the general practitioner Public health service publication No 426 (Formerly supplement 23 to the Jr of Ven Dis Information) 6th printing 1955, P. 54.
18. Schofield CBS : Serological tests for syphilis in pregnancy - False and missed positive reactions. Brit J Ven Dis, 49 : 420 1973.
19. Goldman JN and Lantz MA : FTA-ABS and VDRL slide test reactivity in a population of Nuns JAMA 217 : 53, 1971.
20. Sharma S Gonguly NK Mahajan RC et al ; Comparison of RPR card test with VDRL and FTA - ABS test, Ind J Path Micro, 18 : 89, 1975.

TRUE or FALSE?

The fundamental defects in lepromatous leprosy (LL) is the immune response (Ir) gene and not in the functioning of T. Lymphocytes.

(Answer Page No. 107)