

Recent Trends of Syphilis Prevalence in Normal Population in Korea-1986

Yang An Kim, M.D., Jung Bock Lee, M.D. and Min Geol Lee, M.D.

Department of Dermatology, Yonsei University College of Medicine, Seoul, Korea

The 6,097 blood donors in Seoul area, the 1,883 pregnant women delivered at Severance Hospital and the 5,136 physical examinees were evaluated for VDRL reactivity. Also, the FTA-ABS and TPHA tests were performed on those who were VDRL-positive, and the 19S (IgM)-FTA test were done on the subjects who were reactive for the FTA-ABS and TPHA tests. All the subjects were over the age of 20 and the study period was conducted from January of 1986 through December of 1986.

The results are summarized as follows:

- 1. VDRL-positive rates were 0.5% in the blood donors, 0.6% in the pregnant women and 0.8% in the physical examinees.*
- 2. The quantitative test of VDRL resulted in low titer below 1:4 in 96% of VDRL-positive pregnant women and physical examinees.*
- 3. The 19S (IgM)-FTA test was reactive in 3 of 12 treated subjects (25%) and 4 of 10 untreated subjects (40%).*

From the results it is clear that the prevalence of syphilis is continually decreasing compared to the mid 1970's and the early 1980's.

Key Words: *Syphilis prevalence*

INTRODUCTION

Due to the variability of study population and of the time at which the tests were performed even in the same populations, it is hard to discern a trend in the incidence of syphilis in Korea. However, according to recent studies, there was an increase in the number of healthy STS-positive subjects during the 1960's (Kim and Lew, 1963; Kim, 1967), followed by a steady decrease during the period from the 1970's to the early 1980's (Lee et al., 1975; Choe et

al., 1976; Suh et al., 1977; Lee et al., 1979; Park et al., 1980; Lee et al., 1982; Kim et al., 1986).

This study is to determine if there has been any change in the STS-positive rates in "healthy subjects" such as blood donors, pregnant women and people receiving physical examinations (physical examinees).

MATERIALS AND METHODS

1. Subjects

Total number of subjects was 13,116 and all were over the age of 20. The subjects were divided into 3 subgroups: 6,097 blood donors (3,459 male and 2,638 female) in the Seoul area, 1,883 pregnant women delivered at Severance Hospital, and 5,136

Address for Correspondence: *Jung Bock Lee, M.D.
Department of Dermatology, Yonsei University College of
Medicine, C.P.O. Box 8044, Seoul, Korea (Tel. 02) 392-0161
Ext. 3581)*

physical examinees (2,941 male and 2,195 female) at Severance Hospital. The study period was conducted from January of 1986 through December of 1986.

2. Serologic tests

All the subjects were tested for VDRL screening test. The VDRL titration, FTA-ABS and TPHA tests were performed for pregnant women and physical examinees who were VDRL-positive. Furthermore, the 19S (IgM)-FTA test were performed on 22 of the FTA-ABS and TPHA-positive subjects. Only the VDRL test was done on the blood donors.

3. Procedures of serologic tests.

The VDRL and FTA-ABS tests were done according to the 1969 Manual of Tests (CDC, 1969) and the TPHA test was performed in accordance with the directions of the manufacturer (Fujirebio Pharmaceutical Co., Ltd., Tokyo, Japan). The 19S (IgM)-FTA tests were performed as previously described (Lee et al., 1985).

RESULTS

1. VDRL screening test

Total number of subjects positive for the VDRL

screening test was 84 (0.6%) of 13,116 subjects tested (Table 1). A VDRL-positive rate of 0.5% was found in the 6,097 blood donors, and the rate was higher in subjects in their 40's and 50's than those in their 30's or 20's (Table 1,2). Among the 1,883 pregnant women, the VDRL-positive rate was 0.6%, and these subjects were mostly in their 20's and 30's (Table 1,2). The physical examinees exhibited a positive rate of 0.8% (Table 1,2). The positive rate was very low in subject in their 20's, and as the age of the subjects increased, the positive rate also increased (Table 2). The overall VDRL-positive rates were 0.8% in male and 0.4% in female.

2. VDRL titration test

With the exception of the blood donors, the 51 VDRL-positive subjects (11 pregnant women and 40 physical examinees) were evaluated with the VDRL titration test. Of the 51 VDRL-positive subjects, 49 (96%) showed a titer of lower than 1:4, while the remaining 2 (4%) demonstrated a titer of 1:8 or higher (Table 3).

3. 19S (IgM)-FTA test

Of the subjects reactive for the FTA-ABS and TPHA tests, 22 were evaluated with the 19S (IgM)-FTA test. The 19S (IgM)-FTA test was reactive in 3

Table 1. Subjects tested for STS and their reactive rates

	No. of persons tested (M:F)	No. of persons reactive in VDRL (%)
Blood donors	6,097 (3,459:2,638)	33 (0.5)
Pregnant women	1,883 (0:1,833)	11 (0.6)
Physical examinees	5,136 (2,941:2,195)	40 (0.8)
Total	13,116 (6,400:6,716)	84 (0.6)

Table 2. Results of the VDRL test in blood donors, pregnant women and physical examinees

Age	No. reactive/No. tested (%)			
	Blood donors	Pregnant women	Physical examinees	Total
20-29	12/4,162 (0.3)	8/1,342 (0.6)	2/1,598 (0.1)	22/7,102 (0.3)
30-39	14/1,422 (0.1)	3/532 (0.6)	11/1,663 (0.7)	28/3,617 (0.8)
40-49	5/438 (1.1)	0/9 (0)	21/1,139 (1.8)	26/1,586 (1.6)
50-59	2/75 (2.7)		6/736 (0.8)	8/811 (1.0)
Total	33/6,097 (0.5)	11/1,883 (0.6)	40/5,136 (0.8)	84/13,116 (0.6)

Table 3. Titers of the VDRL test in pregnant women and physical examinees reactive in the VDRL test

VDRL titer	No. of persons reactive in VDRL
1:1	42
1:2	3
1:4	4
1:8	0
1:16	1
1:32	1
Total	51

of 12 treated subjects (25%) and 4 of 10 untreated subjects (40%) (Table 4).

DISCUSSION

In the 1950's there were very few reports on the STS-positive rate in healthy Koreans, but, in the 1960's such studies became more popular. Because of the variability in study populations, areas and the times of research, it has been difficult to compare and analyze these different studies.

Table 4. Result of the 19S (IgM)-FTA test in the sera from 22 persons reactive in the VDRL, FTA-ABS and TPHA test

19S (IgM)-FTA	No. of sera reactive/No. of sera tested (%)		
	After the completion of treatment		without treatment
	≤ 1 year	> 1 year	
Reactive	1/1 (100)	2/11 (18)	4/10 (40)
Nonreactive	0/1 (0)	9/11 (82)	6/10 (60)

Table 5. Results of the VDRL test reported in blood donors

Year	No. tested	No. reactive	% reactive	Reference
1977-1978	6,220	144	2.3	Lee et al. (1979)
1981	8,501	88	1.0	Lee et al. (1982)
1986	6,097	33	0.5	Present study

Table 6. Results of VDRL test reported in pregnant women*

Year	No. tested	No. reactive	% reactive
1963	643	40	6.2
1964	515	25	4.9
1965	544	32	5.9
1966	1,070	60	5.6
1967	1,079	41	3.8
1968	1,257	38	3.0
1969	1,623	30	1.8
1970	2,347	51	2.2
1971	2,722	58	2.1
1972	2,229	37	1.7
1973	1,935	39	2.0
1974	1,992	37	1.9
1975	805	14	1.7
1981**	2,588	20	0.8
1986***	1,883	11	0.6

*Cited from Choe et al. (1976)

**Cited from Lee et al. (1982)

***Present study

Table 7. Results of the VDRL test reported in the physical examinees

Year	No. tested	No. reactive	% reactive	Reference
1974-1977	2,007	30	1.49	Suh et al. (1977)
1986	5,136	40	0.8	Present study

In previous studies, the positive rates in normal "healthy subjects" were as follows: 7.4% of 337 young males who were tested in 1962 (Kim and Lew, 1963), 4.7% of 1,527 soldiers in 1966 (Kim, 1967), 2.0% of 1,046 healthy young males in 1974 (Lee et al., 1975), 1.49% of 2,007 physical examinees for employment between 1974 and 1977 (Suh et al., 1977), 3.1% of 18,151 physical examinees for overseas employment between 1978 and 1979 (Park et al., 1980), and 2.0% of 5,413 VISA applicants between 1981 and 1984 (Kim et al., 1986). The authors reported that the VDRL-positive rate was 2.9% of 3,393 VISA applicants between 1977 and 1978 (Lee et al., 1979) and 1.5% of 2,735 VISA applicants in 1981 (Lee et al., 1982).

Previous studies done by the authors revealed that 2.3% of 6,220 blood donors tested from 1977 to 1978 were VDRL-positive (Lee et al., 1979). Also, 1.0% of 8,501 blood donors tested during 1981 was VDRL-positive (Lee et al., 1982). This study which was done during 1986, showed a 0.5% VDRL-positive rate in 6,097 blood donors. Since all of the studies have been in similar areas with similar subject groups and methods, the decreasing trend in the VDRL positive rate seems significant (Table 5).

Moreover, the study done by Choe et al. (1976) revealed that the VDRL-positive rate in pregnant women decreased between 1963 and 1975 (Table 6). In the 1970's the VDRL-positive rate in pregnant women was between 1.7% and 2.0% (Choe et al., 1976). Also, 0.8% of the 2,588 pregnant women tested during 1981 was VDRL-positive (Lee et al., 1982). This study, performed during 1986, showed a 0.6% VDRL-positive rate in 1883 pregnant women. These results suggest that syphilis has been well controlled.

Among the 5,136 physical examinees, the VDRL-positive rate was 0.8%, which was a decrease compared to the 1.49% positive rate among 2,007 subjects between 1974 and 1977 (Suh et al., 1977, Table 7).

As can be seen, syphilis does occur among normal, healthy subjects. However, 96% of the VDRL-

positive subjects showed a titer of lower than 1:4. At this titer, the infectivity is very low or zero. On the other hand, the study performed by the authors in 1978 (Kim et al., 1979) revealed that among 6,666 general entertainers and prostitutes, 5.6% showed VDRL-positive. Thirty four percent of these had a titer of higher than 1:8, a titer with high infectivity. Thus, stricter control is indicated in general entertainers and prostitutes.

Commonly used serologic tests include VDRL, TPHA, and FTA-ABS tests. However, the antilipoidal and the treponemal specific tests demonstrate mainly antibodies of the IgG class which is present in the patient's sera after treatment as a result of IgG antibody secreting memory cell activity (Franklin, 1968). In contrast with IgG antibodies, IgM antibodies to *T. pallidum* appear earlier than IgG antibodies and disappear rapidly after treatment. Also, both the treponemal specific and the antilipoidal IgG can pass through placenta into the fetal circulation. However, synthesis of specific IgM antibodies is ceased by immune system after elimination of antigenic material from the host's circulatory system, and the IgM antibodies do not cross normal placenta (O'Neill et al., 1972). Based on this supposition the 19S (IgM)-FTA test which demonstrates *T. pallidum*-specific IgM antibodies became great significance in the serological diagnosis of patients with syphilis but without known history of treponemal infection and with congenital syphilis (Lee et al., 1985; Müller and Lindenschmidt, 1982).

In a previous study, the 19S (IgM)-FTA test was nonreactive in 44% of sera from 233 VDRL and TPHA-reactive patients without history of syphilitic symptoms or treatment (Whang et al., 1987). The nonreactive subjects considered to be spontaneously healed subjects. In this study, the 19S (IgM)-FTA test was performed on 22 of the VDRL, FTA-ABS and TPHA-reactive subjects with or without syphilitic treatment. The test were nonreactive in 6 of 10 subjects without syphilitic treatment. It seems that there are not so many syphilitic patients who need treatment among VDRL-positive subjects without history of syphilitic

symptoms.

In general, however, trends of syphilis prevalence in healthy subjects are estimated through the VDRL screening test. From this study it is clear that the prevalence of syphilis is continually decreasing compared to the mid 1970's and the early 1980's.

REFERENCES

- CDC: *Manual of tests for syphilis*. Atlanta, GA, US Public Health Service, 1969.
- Choe YC, Kay CW, Yang YH, Chung S, Kwak HM: *A clinical and statistical study for the syphilis in Korean pregnant women*. *Kor J Obstet Gynecol* 19:239-249, 1976.
- Franklin EC: *Structure and function of immunoglobulins*. *N Y J Med* 69:411-422, 1968.
- Kim DH, Joung SW, Park JH: *Statistical analysis of serologic test for syphilis in normal population (1981-1984)*. *Kor J Dermatol* 24:254-258, 1986.
- Kim ES: *Clinical and statistical observation of syphilis of ROKFV soldiers*. *Kor J Public Health* 4:69-73, 1967.
- Kim JH, Lee JB, Lee SH, Cho CK: *Serologic tests for syphilis and bacteriological study for gonococci among general entertainers and prostitutes*. *Kor J Dermatol* 17:239-243, 1979.
- Kim JD, Lew J: *Syphilis among the prostitutes and a new "Test Plan" for the serologic diagnosis of syphilis*. *J Kor Med Assoc* 6:1143-1152, 1963.
- Lee CW, Lee YS, Kim JH: *Serologic survey for syphilis in Seoul*. *Kor J Dermatol* 13:1-4, 1975.
- Lee JB, Kim JH, Myung KB, Lee S: *Recent trends of syphilis prevalence in normal population in Korea*. *Kor J Dermatol* 17:203-206, 1979.
- Lee JB, Lee MG, Kim HI, Lee S: *19S (IgM)-FTA test in untreated syphilitic patients*. *Kor J Dermatol* 23:630-634, 1985.
- Lee JB, Lee S, Lee HE, Song KS: *Recent trends of syphilis prevalence in normal population in Korea—1981*. *Kor J Dermatol* 20:537-543, 1982.
- Müller F, Lindenschmidt EG: *Demonstration of specific 19S (IgM) antibodies in untreated and treated syphilis*. *Br J Vener Dis* 58:12-17, 1982.
- O'Neill P, Nicol CS: *IgM class antitreponemal antibody in treated and untreated syphilis*. *Br J Vener Dis* 48:460-463, 1972.
- Park SB, Youn JI, Lim SD: *Syphilis prevalence in young men who want overseas employment*. *Kor J Dermatol* 18:539-544, 1980.
- Suh MS, Paik SA, Han JY, Park SO, Hahm JH, Kook HI: *Statistical consideration in syphilitic patients in Ewha Woman University Hospital*. *Kor J Dermatol* 15:409-413, 1977.
- Whang KK, Lee MG, Lee JB: *Reactivity of the 19S (IgM)-FTA test among the sera from VDRL reactive patients without history of syphilitic symptoms or treatment*. *Kor J Dermatol* 25: 355-360, 1987.