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Seroprevalence of syphilis in patients attending a tertiary care hospital in Southern India

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ABSTRACT

Objective: To report our experience with two tests, anti-cardiolipin antibody test [venereal disease reasearch laboratory (VDRL) test] and specific treponemal test (*Treponema pallidum* hemagglutination assay), used for screening antenatal, high risk cases and cases from sexually transmitted infection in a tertiary care hospital from January 2006 till December 2008.

Methods: A total of 14 639 samples received from various patient groups including antenatal cases, patients attending sexually transmitted disease (STD) clinic, blood donors and HIV positive patients were screened.

Results: Among the 14 639 samples collected, 103 were positive by VDRL test. Of these 89 cases were confirmed by quantitative VDRL test and *Treponema pallidum* hemagglutination assay. The cumulative seroprevalence over two years was found to be 0.61% in this study. The syphilis seroprevalence reduced from 0.88% in 2006 to 0.40% in 2008. Among the various sub-populations studied, patients attending the sexually transmitted infection clinic showed a seroprevalence of 2.62%. The seroprevalence decreased significantly from 4.00% in 2006 to 1.39% in 2008.

Conclusions: Our study showed a statistically significant declining rate of syphilis in STD clinics as well as the overall seroprevalence. These findings could be interpreted as indicators of improved programmes for prevention and management of STDs.

1. Introduction

Syphilis, caused by *Treponema pallidum* is a classical example of a sexually transmitted disease (STD) that can be successfully controlled by effective public health measures due to the availability of a sound diagnostic test and effective and economical treatment options. The World Health Organization estimates that 10-12 million new infections of syphilis occur every year[1]. Infection rates show extreme variation between countries of the same region as well as various subcategories of populations studied[2-5]. Indian data on syphilis seroprevalence is meagre, with incidence rates ranging from 5.4 per 100 persons each year in a sexually transmitted infection clinic to prevalence of 21.9% in convenience samples of long distance truck drivers[6-8]. The present study was aimed at understanding the occurrence of syphilis among various patient groups attending a tertiary care hospital and studying the trends over a period of three years.

2. Materials and methods

The study was conducted in a tertiary care teaching hospital in Southern India from January 2006 till December 2008. A retrospective analysis of laboratory log book maintained for syphilis tests was performed for this period. A total of 14 639 samples were received from various patient groups including antenatal cases, patients attending STD clinic, blood donors and HIV positive patients.

Screening for syphilis was performed by venereal disease

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reasearch laboratory (VDRL) test. Serum samples from all patients were tested by qualitative VDRL using standard procedures. Samples positive for VDRL were subjected to a quantitative VDRL test using serum dilutions from 1 in 2 upto 1 in 64. A specific treponemal test, *Treponema pallidum* hemagglutination assay (TPHA) was peformed on samples positive in the quantitative VDRL. Samples positive in both tests were designated as seropositive for syphilis.

Statistical analysis of data was done by using SPSS version 16. Results were summarized using descriptive statistics. Pearson's *Chi*-square test was used to evaluate differences between proportions. *Chi*-square for linear trends was calculated.

The study was approved by institute ethics committee.Patient information obtained during the study was kept confidential.

3. Results

Among the 14 639 samples collected, 103 were positive by VDRL test. Of these 89 were positive by quantitative VDRL and TPHA. The year wise distribution of these cases is shown in Table 1. The cumulative seroprevalence over three years was found to be 0.61% in this study. The syphilis seroprevalence reduced from 0.88% in 2006 to 0.40% in 2008, which was statistically significant (χ^2=9.16, P=0.010 3).

Table 1
Seroprevalence of syphilis infection from the study period January 2006 till December 2008.

Year	No. tested	No. positive by VDRL [*n* (%)]	No. positive by TPHA [*n* (%)]
2008	5 188	24 (0.46)	21 (0.40)
2007	4 897	31 (0.63)	28 (0.57)
2006	4 554	48 (1.05)	40 (0.88)
Total	14 639	103 (0.70)	89 (0.61)

Among the various sub-populations study, patients attending the sexually transmitted infection clinic showed a seroprevalence of 2.62% (Table 2). The seroprevalence decreased significantly from 4% in 2006 to 1.39% in 2008 (χ^2=12.543 3, P=0.001 9). The antenatal group showed a seroprevalence of 0.12% (χ^2=1.07, P=0.58) whereas congenital syphilis was seen in 0.61% of pediatric age group tested. Among the HIV positive individuals screened for syphilis, 6.5% were positive for treponemal antibodies (Table 3). None of the blood donors were positive for syphilis. Miscellaneous groups of patients admitted to other broad specialities with features suggestive of secondary or tertiary syphilis were also screened. The seropositivity in this group was 2.11%.

Table 2
Seroprevalence of syphilis among patients attending STD clinic, antenatal screening and pediatric age group.

Year	STD clinic		Antenatal screening		Paediatric group	
	Tested	Positive [*n*(%)]	Tested	Positive [*n*(%)]	Tested	Positive [*n*(%)]
2008	1 009	14 (1.39)	1912	3 (0.16)	157	1 (0.64)
2007	902	24 (2.66)	1879	3 (0.16)	213	1 (0.46)
2006	875	35 (4.00)	1834	1 (0.05)	124	1 (0.81)
Total	2 786	73 (2.62)	5625	7 (0.12)	494	3 (0.61)

Table 3
Seroprevalence of syphilis among HIV patients screened, blood donors and other patients screened for syphilis.

Year	HIV patients		Blood donors		Others	
	Tested	Positive [*n*(%)]	Tested	Positive [*n*(%)]	Tested	Positive [*n*(%)]
2008	60	4 (6.67)	1 967	0 (0)	83	2 (2.41)
2007	53	2 (3.77)	1 763	0 (0)	87	1 (1.15)
2006	24	3 (12.50)	1 677	0 (0)	20	1 (4.00)
Total	137	9 (6.57)	5 407	0 (0)	190	4 (2.11)

4. Discussion

The present study was determined the seroprevalence of syphilis in patients attending a tertiary care centre and studied short term trends in changing rates of syphilis in various subgroups of patients. Various studies from India have shown varied rates of syphilis depending upon the population study. Studies from STD clinics have shown seroprevalence ranging from 5.4% to 8.2%[8,9]. Our study showed a statistically significant declining rate of syphilis in STD clinics as well as the overall seroprevalence. These findings could be interpreted as indicators of improved programmes for prevention and management of STDs as well as availability of treatment in STD clinics[9].

Indian studies on syphilis from antenatal groups has shown a seroprevalence of 0.84% to 0.98%[10,11]. Low seroprevalence of 0.12% was also seen in the current study. However, as syphilis can cause adverse outcomes of pregnancy in 80% of the cases, including stillbirths, abortions, perinatal death and neonatal infections in a significant number of cases, the importance of screening antenatal women for syphilis should always be highlighted[12].

Co-infection rates of syphilis and HIV have been showing a worrisome trend in several countries, with urban outbreaks in men who have sex with men showing rates of 20%-73%[13]. In India, variable syphilis-HIV coinfection rates have been described[14]. Eventhough our study shows that 6.5% of diagnosed HIV patients were positive for syphilis, the results have to be interpreted with caution. The HIV positive individuals included in our study were symptomatic individuals who had presented to clinic for antiretroviral treatment. Therefore, all HIV positive individuals were not screened in the study unlike other studies which have screened large HIV positive cohorts. Syphilis and HIV co-infection presents a complex interaction. The increased incidence of HIV in homosexual and heterosexual individuals afflicted with STD, including syphilis is epidemiologically documented in numerous studies[15,16]. HIV alters the course of syphilis as well as the response to treatment. Incidence of neurosyphilis in HIV infected individuals is high even when treated with recommended dosage[17]. Altered serological responses in HIV positive patients also underlines the need for treponemal tests in this patient group. The need for further studies in this area

should be overemphasized.

Our study had several limitations. Its retrospective nature limited evaluation of several parameters like risk evaluation of particular groups such as men who have sex with men, rural and urban population, *etc*. Secondly, it was a hospital based study and population-based community studies are likely to show different results. Finally, the study looked into short term trends ranging over a period of 3 years. Long term evaluation of these trends will undoubtedly yield more epidemiological data. Nevertheless, findings of this study can help us understand the disease trends at a larger scale.

Eventhough the prevalence of syphilis is on the decline, screen of high risk populations should be continued to avoid the complications of undiagnosed and untreated syphilis.

Conflict of interest statement

We declare that we have no conflict of interest.

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