

## Original Research Article

# A retrospective observational comparative study of VDRL vs. TPHA and their role in serodiagnosis of syphilis in a tertiary care centre

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## ABSTRACT

**Background:** Syphilis is difficult to diagnose challenging the clinicians. Combined use of both non treponemal and treponemal serological tests will give correct diagnosis of syphilis. The aim of the study was to evaluate the role of VDRL and TPHA in the serodiagnosis of syphilis.

**Methods:** Open label retrospective study done in the department of dermatology of a tertiary care centre after getting IEC approval. One hundred and seventy patients' serological reports done for syphilis during the month January 2017 to May 2017 were taken for the study and were analysed retrospectively after categorizing into three groups. Frequency and percentage of patients who were reactive to VDRL, weakly reactive to VDRL, positive for prozone phenomenon and reactive to TPHA were noted in each group and analysed statistically.

**Results:** In our study two cases showed biological false positive results in group 1 and three cases in group 3 were biological false reactors. In our study five patients in group 1 and three patients in group 3 were non-reactive to VDRL but were reactive to TPHA due to the presence of Ig G antibodies and all these patients gave a past history of treatment of syphilis.

**Conclusions:** Our study was successful in evaluating the role of TPHA and VDRL in the sero-diagnosis of syphilis. The VDRL and TPHA being simple and economical tests can be combined in the assessment of syphilis and ensures that no cases are missed.

**Keywords:** Syphilis, Serodiagnosis, VDRL, TPHA

## INTRODUCTION

Syphilis is a sexually transmitted disease caused by bacteria *Treponema pallidum*. First sign of disease is painless sore known as chancre which commonly occurs on sexual organs, rectum and oral cavity. Patients often fail to notice the sore. Syphilis is difficult to diagnose since people can be infected without any symptoms or signs for years and may present with diverse clinical

manifestations. Undiagnosed and untreated syphilis can damage major organs like heart and brain.<sup>1</sup> Moreover, *Treponema pallidum* cannot be cultured; so serological tests are most commonly used for laboratory diagnosis. There are four stages in syphilis-primary, secondary, latent and tertiary. The stage at which the patient presents has impact on diagnosis and treatment because it is difficult to diagnose very early syphilis, neurosyphilis, asymptomatic congenital syphilis, IV drug abusers with

no symptoms, co-infection with serological cross reaction agents and HIV.<sup>2</sup>

There are two categories of serological tests. One is non treponemal tests for screening of syphilis and they detect IgM and IgG antiphospholipid antibodies. And the other one is treponemal tests which use *T. pallidum* as Ag detects mainly Ig G and are confirmatory test for syphilis.<sup>3</sup> False positive non treponemal tests can be confirmed with treponemal tests where the sera will be non-reactive. Likewise primary, latent, previously treated or untreated syphilis which are usually non-reactive with non-treponemal tests will be reactive with treponemal tests.<sup>4</sup> So combined use of both non treponemal and treponemal serological tests will give correct diagnosis of syphilis. The present study is done to evaluate the role of VDRL and TPHA in the serodiagnosis of syphilis.

## METHODS

### Study type

Observational clinical study.

### Study design

Open label, retrospective clinical study.

### Study period

May 2017 to June 2017.

### Sample size

170

### Study place

Outpatient department of Dermatology, Venereology and Leprology, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur, Tamil Nadu.

### Ethical considerations

Approval from Institutional Ethical Committee of Dhanalakshmi Srinivasan Medical College & Hospital was obtained, before starting the clinical study.

### Selection criteria

Serological test reports of patients done for syphilis in the department of dermatology, venereology and leprology

during the month January 2017 to May 2017 were analysed retrospectively.

One hundred and seventy patients' serological reports were taken for the study. Based on the indications for serology, the study sample was divided into following three categories in which RPR card test were used for VDRL and ELISA for TPHA.

Group 1: 50 patients (clinically suspicious cases of syphilis).

Group 2: 20 patients (other STD cases).

Group 3: 100 patients (routinely screened cases like antenatal mothers, blood donors, master health checkup, pre-operative patients, etc.).

Frequency and percentage of patients who were reactive to VDRL, weakly reactive to VDRL, positive for prozone phenomenon and reactive to TPHA were noted in each group and analysed statistically.

### Statistics

Data was entered simultaneously using Microsoft excel worksheets designed and coded properly. The data collected was analysed using appropriate statistical tests, with the help of Epi-info version 35.1 and SPSS version 17. The results were tabulated and expressed in percentage.

## RESULTS

In our study mean age was 35 and most of the patients were male (Table 1).

After statistical analysis of reports in three groups, group 1 showed 10% (5 cases) TPHA positivity but negative for VDRL who gave a history of previously treated early and late syphilis and 4% (2 cases) VDRL positivity but negative for TPHA showing biologically false positive results.

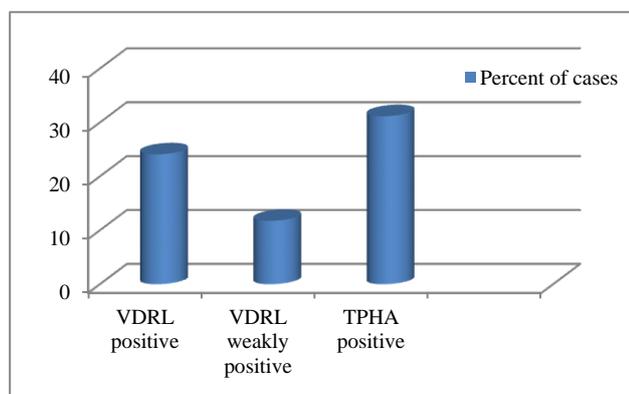
In group 2, 20% were weakly positive for VDRL but none of them showed prozone phenomenon and 35% were positive for TPHA. Group 3 showed six percent weak positivity for VDRL, 1% prozone phenomenon, 3% (3 cases) TPHA positive but negative for VDRL who had a past history of treatment of syphilis and 3% (three cases) VDRL positive but negative for TPHA showing biological false positivity.

**Table 1: Gender.**

Gender	Frequency	Percent	Valid percent	Cumulative percent
Valid	Male	69	57.5	57.5
	Female	51	42.5	100.0
	Total	120	100.0	100.0

**Table 2: Results of VDRL and TPHA.**

	Frequency (no: of patients)			Percent of cases (%)		
	Group 1: 50 patients (clinically suspicious cases of syphilis)	Group 2: 20 patients (other STD cases)	Group 3: 100 patients (routine screening)	Group 1: 50 patients (clinically suspicious cases of syphilis)	Group 2: 20 patients (other STD cases)	Group 3: 100 patients (routine screening)
VDRL positive	18	-	23	36	-	23
VDRL weakly positive	10	4	6	20	20	6
Positive for prozone phenomenon	2	-	1	4	-	1
TPHA positive	20	7	26	40	35	26
TPHA positive with negative VDRL	5	-	3	10	-	3
VDRL positive with negative TPHA	2	-	3	4	-	3

**Figure 1: Overall results of VDRL and TPHA.**

## DISCUSSION

Syphilis is an old disease challenging clinicians including obstetricians.<sup>5</sup> Only one type of serological diagnosis will not be sufficient for the diagnosis of syphilis. All reactive non treponemal test like VDRL should be confirmed by treponemal tests like TPHA and even TPHA may be required in some cases who were non-reactive to non treponemal tests based on patient's clinical history and symptoms.<sup>6</sup> So a combination of VDRL and TPHA provides an efficient screening for syphilis.

VDRL known as venereal disease reference laboratory test was first described in the year 1946 for the detection of non-specific treponemal antibodies mainly Ig M and TPHA known as *T. pallidum* haemagglutination assay was first described in the year 1967 for the detection of specific treponemal antibodies mainly Ig G.<sup>7</sup> However VDRL being nonspecific will show positive results in yaw, pinta and biological false reactors. These cases can be confirmed with TPHA in which they will be non-reactive since TPHA is specific test for syphilis. Biological false positive reaction is the one in which the reagin detection tests are reactive while the treponemal

tests are non-reactive. This may occur in patients with no history of treponemal infection and in wide variety of conditions like pregnancy, blood donors, leprosy, HIV, recent vaccination, collagen diseases, rheumatoid arthritis, SLE, cardiovascular diseases etc. In our study two cases showed biological false positive results in group 1 and on eliciting history they were found to be blood donors and three cases in group 3 showed biological false positive results with one patient reactive for HIV, one patient gave a treatment history of leprosy and third one had a recent history of vaccination.

TPHA is especially useful in the evaluation of duration of illness in untreated syphilis cases and the stage of illness in the treated cases.<sup>8</sup> In our study five patients in group 1 and three patients in group 3 were non-reactive to VDRL but were reactive to TPHA due to the presence of Ig G antibodies and all these patients gave a past history of treatment of syphilis. The combination of TPHA and VDRL detects all varieties of treponemal infection except early primary syphilis and it is difficult to diagnose the occasional occurring early primary syphilis in low risk populations which requires an additional expensive FTA test<sup>9</sup>. The VDRL and TPHA combination is very much useful while screening the antenatal mothers as the drugs used for treatment are safe during pregnancy and also enables screening of partners in positive cases.<sup>10</sup>

## CONCLUSION

Our study was successful in evaluating the role of TPHA and VDRL in the serodiagnosis of syphilis. The VDRL and TPHA being simple and economical tests can be combined in the assessment of new patients with positive serological result, in the monitoring of treatment of syphilis and ensures that no cases are missed.

### Limitations

Single centered study with limited sample size.

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