



A Comparative Study of Various Screening Algorithms in the Diagnosis of Syphilis

Authors

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Abstract

Introduction: Worldwide two strategies are followed to diagnose syphilis. One is conventional method of testing the serum by non-specific treponemal test VDRL followed by specific Treponemal Pallidum Hemagglutination Assay (TPHA). The other method is viceversa. We aim to study the percentage of syphilis case detection rate by both the methods.

Material and Methods: A retrospective cross-sectional study was conducted amongst the high risk group patients attending the STD-OP of Institute of Venereology, Chennai for a period of 12 months. The study population was divided into 2 groups. Group A with conventional screening method (i.e. VDRL followed by TPHA) and Group B with TPHA followed by VDRL.

Results: A total of 1527 cases were recruited into the study, 767 in Group A and 760 in Group B. Group A: Out of 767 cases, 90 (11.7%) were reactive by VDRL. 65 (72.2%) were TPHA positive among the 90 VDRL reactive. The case detection rate and correlation between the two tests were 11.7% and 72.2% respectively. Group B: Out of 760 cases, 263 (34.6%) were TPHA positive 166 were VDRL reactive among the TPHA positive. The case detection rate and correlation between the two tests were 34.6% and 63.1% respectively.

Conclusion: The results of comparative data clearly demonstrate that the case detection rate was higher (three times) in reverse screening than that of conventional screening method. In conclusion, consistent with recommendations, laboratories should consider implementing the reverse algorithm for the diagnosis of syphilis.

Introduction & Background

In developing countries, STIs (Sexually Transmitted Infections) and their complications are amongst the top five disease categories for which adults seek health care. Everyday nearly 1 million people acquire a new STI, and more than 340million new cases of curable STIs occur throughout the world each year.¹ Syphilis constitute a major percentage of curable STI and this infection can also be passed on from a mother to her fetus during pregnancy. As a cause of

genital ulcer disease, syphilis has been associated with an increased risk of HIV transmission and acquisition. Clinical diagnosis of Syphilis is complex and often missed because of its latency, typical& asymptomatic clinical presentation. Serological diagnosis using VDRL (Venereal Disease Research Laboratory) a non-specific test and TPHA (Treponema pallidum hemagglutination) a specific test plays a vital role in the diagnosis of syphilis. In recent years some clinical laboratories have implemented are verse

screening algorithm in the diagnosis of syphilis² (specific treponemal tests followed by non-treponemal tests). But most of the laboratories follow the traditional approach of testing (non-specific treponemal tests followed specific treponemal tests). These two algorithms have created some confusion among health care providers. Hence this study was undertaken to find out the case detection rate and concordance between the two tests in a given sample by both methods.

Materials & Methods

The present study involved the case detection rate using TPHA and VDRL by conventional and the reverse screening method. The study period was between January 2012 and December 2012. The samples were collected from the individuals attending the STD-OP of tertiary care centre with the history of premarital, extramarital exposure, multiple partners, intravenous drug abuser, homosexuals, trans genders and female sex workers (FSW) were included in the study. The study population was divided into two groups Group A and Group B. The study samples were recruited into each group sequentially. In Group A conventional screening algorithm (VDRL followed by TPHA) and in Group B reverse screening algorithm was adopted.

Results

The test results of conventional & reverse screening algorithm were shown in Figs. 1 and 2. 1527 samples were recruited into the study, 767 in Group A and 760 in Group B (see Fig. 2).

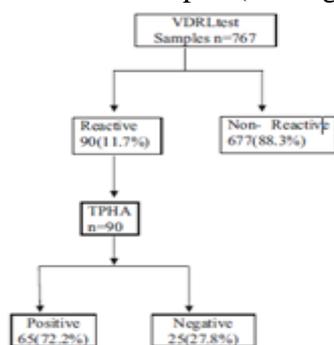


Fig. 1 e Group A conventional screening algorithm.

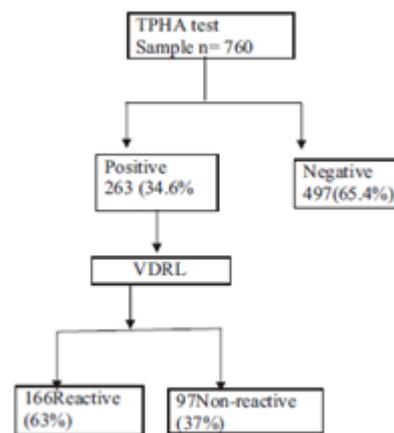


Fig. 2 e Group B reverse screening algorithm
3.1. Group A

Out of 767 samples e 90 samples were reactive by VDRL. The case detection rate is 11.7%. The reactive samples by VDRL were subjected to TPHA. Out of 90 cases, 65 (72.2%) samples showed positive results and 25 (27.8%) samples showed negative results for TPHA test. The percentage of concordance between the VDRL and TPHA by conventional method was 72.2%.

Group B

Out of 760 samples 263 were positive by the specific TPHA test. The case detection rate by reverse screening method was 34.6%. Out of 263 TPHA positive samples 166 (63%) were reactive and 97 (37%) were non reactive by VDRL. The percentage of concordance between the VDRL and TPHA by reverse screening method was 63%.

Discussion

The case detection rate in the conventional method is 11.8%, when compared to reverse method e 34.6%. Our study shows that the case detection rate was higher by 3 times in the reverse screening method. Our study correlates with the study of Huh-HJ et al (2007). Study by Huh HJ, Lee KK, Kim ES, ChaeS3 showed RPR a non-specific tests the positive rate is 0.23% and in the specific test the case detection rate is 1.6% in the general population. The case detection rate in their study was increased by 5 times while following the reverse screening method. Also Binicker et al, 2012 has clearly stated that screening for syphilis

using treponemal assay detects a higher number of patients with reactive results compared to traditional screening by non-treponemal tests.⁴ The higher case detection rate by reverse method (TPHA) may be attributed due to the use of specific antigen, automation of tests, capacity for detecting in early, latent cases, past, treated and untreated syphilis. The lower case detection rate of non-specific test may be attributed to the fact that it is reactive when the disease activity is high (i.e.) secondary and tertiary syphilis missing few cases of primary, latent syphilis, false negative due to prozone phenomenon and technical errors. The use of treponemal immunoassays to screen for syphilis eliminates biological false positives due to the presence of anticardiolipin antibodies from other diseases. A number of studies have shown that specific treponemal immunoassays have fewer false positives than non treponemal assays.^{5e7} Rare false negative immunoassay results during early primary syphilis can be mitigated. After the introduction of reverse sequence syphilis screening in Alberta, Canada, there was an increase in the diagnosis of late latent syphilis in individuals screening positive with the treponemal test. The concordance in the conventional method was (72%) between VDRL and TPHA. This discordance may be due to biological false positive reactions or due to technical errors. In the reverse screening method out of 760 samples 166 were positive by both TPHA and VDRL. 97 (37%) samples were TPHA positive, VDRL negative (75 cases had a history of treated syphilis). The concordance between TPHA and VDRL 63% this kind of situation may arise in fully treated patients or latent or late syphilis, false negative due to VDRL (Prozone phenomenon & technical error). Non treponemal test has less sensitivity in late stage of syphilis. The titre of Cardiolipin antibodies may be less in latent syphilis. In the UK considering the sensitivity and specificity of treponemal test have proposed that either TPHA alone or a combination of VDRL/RPR tests and TPHA/TPPA can be used for syphilis screening.

Conclusion

The results of comparative data clearly demonstrate that the case detection rate was higher (three times) in reverse screening than the conventional screening method. In conclusion, consistent with recommendations,^{8e10} laboratories should consider implementing the reverse algorithm for the diagnosis of syphilis.

Conflicts of Interest

All authors have none to declare.

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