On-site screening for syphilis at an antenatal clinic

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Objective. To determine the validity, predictive value and accuracy of the rapid plasma reagin card test performed on site to diagnose active syphilis in pregnant women so that immediate treatment can be offered to prevent congenital syphilis.

Design. Open, descriptive study.

Setting. Antenatal clinic, Mamelodi Hospital, Pretoria.

Patients. Four hundred and seventy-four pregnant women attending the antenatal clinic for the first time were entered into the study.

Methods. A rapid plasma reagin test was performed on site with no specialised equipment and the results were compared with those of the reference laboratory.

Results. In the event of rapid plasma reagin titres of 1:8 and higher, indicative of active syphilis, the on-site rapid plasma reagin test had a sensitivity of 90.5%. The test had a sensitivity of 100% if the rapid plasma reagin titres were 1:16 and higher.

Conclusion. The on-site rapid plasma reagin test identified all women with rapid plasma reagin titres higher than 1:8. This implies that all women whose fetuses were in danger of acquiring congenital syphilis were identified at the clinic and could be treated immediately.

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The average national prevalence rate of syphilis in pregnant women is 6.6%[1] and in some regions it is higher than 10%.[2] These women should be treated effectively in order to prevent congenital syphilis.[3-5] This implies that syphilis should be diagnosed and treated at the time that a pregnancy is diagnosed, to ensure a favourable outcome for the fetus.[6] In practice, this requires that all women be screened on site during their first visit to an antenatal clinic and, if found to be positive, treated immediately.[7,8] Women with active syphilis, as indicated by rapid plasma reagin (RPR) titres of 1:8 and higher,[3] are in particular need of urgent identification and treatment. The risk of fetal infection increases if the maternal RPR titre exceeds 1:16.[9] Therefore the most important objective of screening for syphilis at an antenatal clinic is to identify women with RPR titres higher than 1:8 because they have active syphilis which may also infect the fetus.[3,9,10]

The prompt identification of these women by means of on-site testing in order to facilitate immediate treatment should prevent an adverse pregnancy outcome caused by syphilis.[9]

A study was undertaken to assess the validity, predictive value and accuracy of the RPR card test performed on site at an antenatal clinic and to determine whether this test can identify all women with RPR titres higher than 1:8.

Patients and methods

Women attending the antenatal clinic at Mamelodi Hospital were studied. All women who attend this clinic are routinely screened for syphilis during their first visit. The serological tests for syphilis (STS) that are requested are the RPR test, the *Treponema pallidum* haemagglutination (TPHA) test and the fluorescent antibody absorption (FTA-ABS) test. These tests are performed at the reference laboratory and results are available after 1 week. During the period of the study an RPR card test was performed by a medical officer at the clinic in addition to the abovementioned STS. The method for the on-site RPR test was as follows: Blood was collected in a clotting tube, which was placed in an upright position and left to stand for approximately 30 minutes to allow the red blood cells to sediment down in order to obtain serum. Fifty microlitres of serum were then drawn up with a plastic, disposable pipette. The serum was then placed on a circle of an RPR card and spread out with the closed end of the pipette. A calibrated needle was used to add 50 Ul antigen suspension to the serum on the card. The card was then rotated by hand for 8 minutes. A test was reported to be positive if coarse clumping, indicative of flocculation, occurred. If no clumping occurred, the test was reported to be negative. Women whose tests were positive were counselled. They received 1.2 million units of benzathine penicillin G intramuscularly and were asked to return after 1 week for confirmation of the results and continuation of treatment if indicated. Women whose tests were negative were informed of the result and, for the purpose of the study, they were also requested to return after 1 week for verification of the result. The results of the on-site RPR test were compared with the results reported by the laboratory. The latter reported the results of the RPR test, either as positive or negative. The positive tests were those in which titres ranged from 1:2 to 1:1 024.

Results

The study was conducted between 18 January 1995 and 8 March 1995. Four hundred and seventy-four women underwent STS at the laboratory as well as RPR tests performed on site. The laboratory reported positive RPR tests in 46 women, with titres ranging between 1:2 and 1:256 (median 1:8) (Fig. 1). Twenty-five of these women had very low RPR titres ranging between 1:2 and 1:4 (median 1:2); only 5 of these women were identified by the on-site test. The remaining 21 had RPR titres ranging between 1:8

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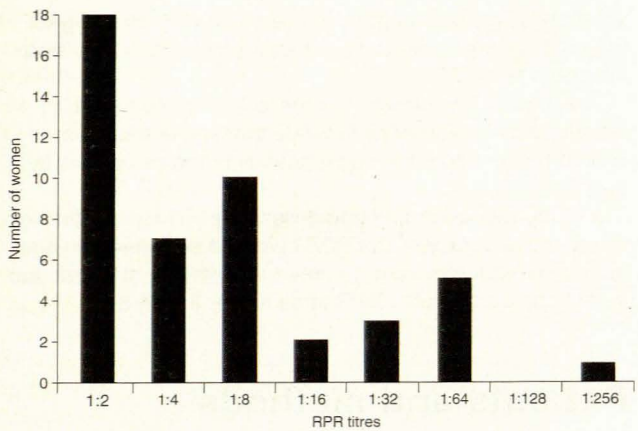

Fig. 1. Distribution of RPR titres.

and 1:256 (median 1:16) and 19 of these women were identified by the on-site test. The 2 women who were not identified on site had low RPR titres of 1:8.

If the very low RPR titres (1:2 and 1:4) are regarded as negative, the sensitivity of the on-site RPR test for titres of 1:8 and greater is 90.5%, the specificity 98.5%, the negative predictive value 99.6%, the positive predictive value 73.1% and the accuracy 98%.

If the very low RPR titres are also taken into account, the sensitivity of the on-site RPR test is 52.2%, the specificity 98.4%, the negative predictive value 95.0%, the positive predictive value 77.4% and the accuracy 93.9%.

Conclusions

The results of this study show that the on-site RPR test identified all women with RPR titres of 1:16 and higher and almost all women with titres of 1:8. This implies that all women whose pregnancies were in danger of being adversely affected by syphilis were identified at the clinic. These women could then be counselled effectively and treated immediately.

The on-site RPR test had a sensitivity of 90.5% in respect of the clinically important titres of 1:8 and higher. The sensitivity decreased to 52% if the very low RPR titres of 1:2 and 1:4 were also taken into account. The very low RPR titres (1:2 and 1:4) are therefore not detected by on-site testing, and this finding has been confirmed by others.[11] In the clinical setting, very low RPR titres are not indicative of active syphilis while high RPR titres (higher than 1:8) are and must be diagnosed expediently to facilitate immediate treatment.

Only 1.5% of the tests were falsely positive and resulted in unnecessary treatment with benzathine penicillin G. In a high-risk population group, all women in need of treatment should be identified and this will only be achieved at the cost of treating some women unnecessarily.

The advantage of the high negative predictive value of the on-site RPR test is that health workers do not need to counsel women whose on-site tests are negative. An additional advantage is that the clinical workload in clinics will decrease, because only women with positive on-site tests need to return after a short period of 1 - 2 weeks for the purpose of verification of positive on-site RPR tests. Negative on-site tests need no verification from a laboratory because of the high negative predictive value of a negative test and these women only need to return after a longer interval.

No specialised equipment was used in this study and it is recommended that the on-site RPR test be performed at antenatal clinics without the use of equipment such as a centrifuge or a mechanical rotator.[8] This equipment is costly and financial constraints will delay its purchase and the widespread initiation of screening. If equipment breaks down, an unnecessary interruption of screening may occur. If an antenatal clinic is in proximity to a laboratory, the latter should be responsible for performing the RPR test and should provide the results to the clinic before the women leave, so that treatment can be administered without delay.[8]

The feasibility and cost-effectiveness of a decentralised syphilis screening programme where nurses in antenatal clinics perform the tests have been demonstrated.[12] The most important condition for success is the motivation of clinic staff to perform the test. Importantly, continual and regular quality control and feedback are essential to sustain their motivation and should be the responsibility of the reference laboratory.

A decentralised syphilis screening programme for all antenatal clinics should receive priority in financial and manpower resource allocation.[12]

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