Original Research Paper

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A PROSPECTIVE STUDY ON ADVERSE OUTCOMES OF PREGNANCY IN MATERNAL SYPHILIS

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ABSTRACT **Background & objectives:** Syphilis is the second most common infectious cause of adverse outcomes in pregnancy. Indian data on antenatal syphilis seroprevalence is meagre. This study aims to determine seroprevalence of antenatal syphilis and its adverse outcomes. Methods: This was a prospective study, conducted among 381 antenatal mothers and their newborns, whose blood samples were collected, subjected to non-specific (RPR, VDRL) and specific (IgM ELISA, Total Antibody ELISA, IHA, TPHA card) serological tests. **Results:** The prevalence of antenatal syphilis in this study was 2.09 %. Adverse outcomes for antenatal syphilis in newborns was 50%. Interpretation and conclusion: Although RPR and VDRL are cost effective for mass screening of pregnant females, they may produce false positive reactions. It is good to include Treponemal test such as TPHA card test for screening of pregnant mothers. Syphilis IgM is not a good predictor of disease.

KEYWORDS : antenatal syphilis, Congenital Syphilis, Seroprevalence, TPHA.

Introduction:

Syphilis, caused by Treponema pallidum is a sexually transmitted infection. Transmission can be by sexual route, contact with mucocutaneous lesion, blood transfusion, and vertical transmission.Transplacentally from mother to the fetus or during passage through the birth canal[1]. This disease can be controlled by effective public health measures, sound diagnostic test and effective treatment options. WHO estimates 10-12 million new infections per year. Untreated antenatal syphilis can affect pregnancy outcome in 80% of cases such as stillbirth, spontaneous abortion (40%), perinatal death (20%), serious neonatal infections and low-birth weight babies (20%). It is the second most common infectious cause of stillbirth[2].

Until recently, a commonly held but erroneous obstetric principle stated that infection of the fetus does not occur before 18 weeks. But Silver and immunofluorescence staining of the fetal tissue or polymerase chain reaction showed that T. pallidum gains access to the fetal compartment as early as 9-10 weeks. Appropriate diagnosis and treatment of pregnant women often prevents complications. The screening of syphilis and treatment in antenatal care has been called as one of the most cost-effective way to reduce fetal and infant mortality and morbidity in the developing world.

Serological tests for syphilis, with the detection of non-treponemal antibodies (cardiolipin) or antibodies against T. pallidum in all stages of infection, remains the diagnosis mainstay[4]. Nontreponemal test, are used to monitor the status of infection, while treponemal test are primarily used to confirm the presence of treponemal infection. Screening in the first trimester with VDRL and RPR test combined with confirmation of reactive individuals with treponemal tests such as fluorescent treponemal antibody absorption (FTA-Abs) assay effective strategy[5]. Those at risk should be retested in the third trimester. Screening for syphilis during routine antenatal care and treating any detected infections with penicillin injections has been feasible for many years, even in low-resource settings[6]. In determining a penicillin regimen, the clinician must consider the stage of the maternal infection and the HIV status of the mother. Patients who are allergic to penicillin should be desensitised before treatment. Treatment may further be complicated by the Jarich–Herxheimer reaction, a complex allergic response to antigens released from dead micro-organisms, which can cause fetal distress and uterine contractions[6]. Despite appropriate treatment, as many as 14% will have a fetal death or deliver infected infants.

Prevalence of antenatal syphilis differs between countries and regions depending on a number of factors. Global initiatives aim to reduce the prevalence of syphilis by 90% and congenital syphilis to be less than 50 cases per 100,000 live births in the coming decade[2]. Reaching the targets can reduce the burden of maternal syphilis by 8.5 millions. Indian data on antenatal syphilis seroprevalence is meagre[3]. Therefore this study aims to estimate the seroprevalence of syphilis and its adverse outcomes among antenatal mothers at tertiary care centre.

Materials and methods: This prospective study was conducted from November 2020 to August 2022, in three hospitals attached to Osmania Medical College namely, Modern Government Maternity Hospital Petlaburz, Niloufer Hospital and Government Maternity Hospital Sultan Bazar. After taking consent, 5ml venous blood was collected from 381 antenatal mothers in red vacutainers, as per inclusion criteria.

Inclusion criteria:

- Antenatal mothers of reproductive age group, 18 to 40 years.
- Antenatal mothers of First trimester weeks (1-14weeks)
- Patients willing to give informed consent

Exclusion criteria:

- Patients not willing to give informed consent.
- Age <18years and >40 years
- Antenatal mothers >14 weeks of pregnancy.

These samples were centrifuged and aliquoted. Specific (TPHA, IHA, ELISA-IgM and Total Antibody test) and non-specific serological test (RPR and VDRL) for Treponema were conducted in Osmania General Hospital. These tests were also done for newborns of seropositive mothers.

Results: 381 participants formed the study group.Seroprevalence of antenatal syphilis was 2.09%. Mean age of participants was 24.7years (Range 18-22years). 251 (66.7%) participants were from rural areas and 229 (59.44%) obtained secondary education. 260 (67.13%) were housewives. 194 (50.34%) participants were primigravida. Adverse outcomes for antenatal syphilis in newborns was 50%.

Figure-1:

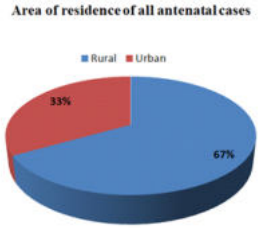

Figure-2

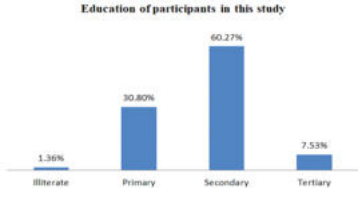

Figure-3

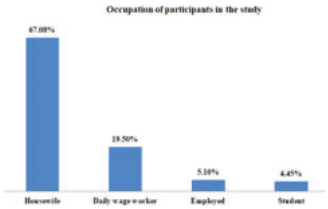

Table-1: Summary of antenatal cases with one or more positive serological tests and outcome of newborn

Antenatal cases	RPR	VDRL	TPHA CARD	IgM ELISA	Total Ab ELISA	IHA	OUTCOMES OF BABY
Case 1	+	+	-	-	-	-	None
Case 2	+	+	-	-	-	-	None
Case 3	-	-	-	+	-	-	None
Case 4	-	-	-	+	-	-	None
Case 5	-	-	-	+	-	-	None
Case 6	-	-	-	+	-	-	None
Case 7	-	-	+	-	+	+	**Neurosyphilis**
Case 8	-	-	+	-	+	+	**IUD**
Case 9	-	-	+	-	+	+	**None till date**
Case 10	+	+	+	Nil	+	+	**Baby Reactive**
Case 11	+	+	-	Nil	Nil	Nil	None
Case 12	+	+	+	Nil	+	+	**Baby Reactive**
Case 13	+	+	+	Nil	+	+	**Baby Reactive**
Case 14	+	+	+	Nil	Nil	Nil	Date Due
Case 15	+	+	+	Nil	Nil	Nil	Date due

Table 2: Outcomes in newborns of Positive antenatal cases

RPR- Rapid Plasma Reagin, VDRL- Venereal Disease Research Laboratory, TPHA-Treponema Pallidum Haemagglutination Test, ELISA-Enzyme –Linked Immunosorbent Assay, IHA-Indirect Haemagglutination Test

Case	NEWBORN OUTCOME
Case 7	• VDRL titre of 1:512 dilution • IHA titre >1:10240 dilution • IgM ELISA with OD value 0.893 (cut-off >0.29) • ELISA for Total IgM and IgG – 2.22 (cut-off >0.138) • Neurosyphilis
Case 8	Intrauterine death
Case 9	Specific and non specific tests negative. No adverse outcomes till date
Case10	Specific and Non specific test were positive RPR-Reactive VDRL-titre of 1:4 dilution TPHA –Reactive following which treatment was given and under follow up
Case12	Specific and Non specific test were positive . • RPR-Reactive • VDRL- titre of1:1 dilution • TPHA- Reactive • IgM-Negative • IHA titre-640 dilution following which treatment was given and under follow up
Case 13	Specific and Non specific test positive RPR-Reactive VDRL- titre of 1:1 dilution TPHA- Reactive, IgM-Negative, Total Ab-Reactive following which treatment was given and under follow up
case 14	Delivery Date Due
Case 15	Delivery Date Due

Discussions:

Of the 381 participants, the seroprevalence of antenatal syphilis was 2.09%, which was comparable to the studies conducted in 2021 by Maharazu et al[7] (2.7%) and Kebede et al[8] in 2009 (1.8%). The mean age was 24.7years (Figure 1), similar to Nessa et al[9]. Of 15 cases, with reactive serological tests, 8 were from rural areas, similar to Endris et al[10] and Yang et al[11]. Of the 15 reactive/positive cases, 4 completed primary and 11 completed secondary education. This is in correlation with Macêdo et al(2017). All cases with reactive tests were housewives similary to Melku et al(2015). As in Table-1, 3 participants were RPR/VDRL reactive but negative for specific treponemal tests, likely biological false positive. 4 participants were IgM-ELISA positive but negative for other tests. Outcomes of newborns of positive mothers are mentioned in Table-2. Newborn of Case 7 had neurosyphilis with positive serological test at 2 months of age, which were negative at birth. Case 8 had intrauterine death at 32 weeks of gestation. Case 9 had no history of syphilis treatment during previous 2 pregnancies (both stillbirth). She underwent treatment for current pregnancy and newborn is negative for serogical tests with no adverse outcomes. Newborns of cases 10, 12 and 13 were reactive for Treponemal and non-treponemal tests and are on treatment. Adverse outcomes for antenatal syphilis in newborns in this study, was 50% comparable to Gomez et al[12] (66.5%) and Rutgers et al[13] (56%).

Conclusion:

RPR and VDRL are cost-effective for mass screening but may produce false positive reactions. Hence, it is good to include Treponemal test such as TPHA card test for screening. Syphilis IgM is not a good predictor of disease. Untreated maternal syphilis is associated with adverse pregnancy. Creating awareness about congenital syphilis in the community, promoting pregnant women for seeking ANC are important for the eradication of antenatal syphilis and congenital syphilis.

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