

Risk Assessment for TORCH Complex Infection, Human Papilloma Virus and Parvovirus B19 Infection in Women with Bad Obstetric History

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Background: Maternal infection can lead to adverse pregnancy outcomes, which are initially inapparent or asymptomatic and thus difficult to diagnose on clinical grounds. Basic epidemiological data concerning *Toxoplasma gondii*, rubella, cytomegalovirus (CMV), herpes simplex virus type 2 (HSV-2), Parvovirus and human papilloma virus (HPV) is necessary for health planners and care providers. The present study updates and extends the earlier studies performed for other areas in Iraq regarding TORCH agents with parvovirus and HPV.

Aim: The aim of the present study is to provide a picture about frequency, distribution, risk and determinants of the seroprevalence of TORCH, HPV and Parvovirus B19 complex infections during pregnancy and their association with adverse pregnancy outcome.

Methodology:

Settings: Kirkuk General Hospital, Primary Health Care Centers in Kirkuk Governorate..

Study Design: Descriptive Case Control Study.

Study Population: The study population is women with childbearing age and was recruited from Kirkuk General Hospital. A 838 women with age range from 14 to 48 were included in the study. Of the total, 547 women were with bad obstetric history (BOH) and 291 women with normal previous pregnancy as control group. All the serum samples collected from the study and control groups were tested for *T. gondii*, rubella, CMV, HSV-2, parvovirus B 19 IgM and IgG, HPV 16 IgG, HPV 18 IgG, IL-6, IL-17, Angiopoietin 1, anti-phospholipids, anti-cardiolipin, antinuclear antibody, anti-DNA, HBs Ag, HIV, TPO and TG antibodies and TSH by commercially-available ELISA kits.

Results: The overall seroprevalence rate of *T. gondii* IgG was 24.7%, with no significant difference between women with BOH (23%) and women with normal pregnancy (27.8%). However, there was significant difference between pregnant (18.3%) and non-pregnant (31.5%) women. Out of the 838 women, 662(74.7 %) and 21 (2.5%) were rubella IgG and IgM positive respectively. Women age, occupation, education and family size were significantly associated with seropositive Rubella IgG. Women with BOH were with high Rubella IgG seropositivity than that in women with normal pregnancy. Current infection was higher in women with normal pregnancy outcomes as compared to that with BOH.

CMV IgM seroprevalence was higher in women with BOH. *CMV* IgG seroprevalence was with no significant difference between BOH and control. *CMV* IgG seroprevalence significantly influenced by age, education, smoking, and family size. However, *CMV* IgM seroprevalence significantly associated with pregnancy, residence, and animal exposure. The Odd ratio confirmed the association between *CMV* IgG and age, crowding index, residence, smoking and number of abortion in women with BOH.

The overall *HSV 2* seroprevalence was 29.9%, with a non significant difference between women with BOH and women with normal pregnancy. *HSV 2* IgM, as an indicator of current infection was demonstrated in 2% of the studied population, and was significantly ($P=0.002$) higher in women with BOH compared to women with normal pregnancy. Both *HSV 2* IgG and IgM were significantly varied with age groups, with trends of increasing with older ages.

Co-infection had a high rate (77.8%) in our studied population. Ten patterns of co-infections were recognized, but the predominant one was rubella and *CMV* (42.5%). There was a significant frequency difference in seroprevalence of (*T.gondii* plus *CMV*, $p=0.038$), (*T. gondii* + rubella + *CMV*, $p=0.001$) and (*Toxoplasma* + *HSV-2* + *CMV*, $p=0.015$) between women with BOH and control group. Parvovirus co-infections were significantly ($p=0.000$) different between BOH, inevitable abortion and control groups.

The overall *HPV* seroprevalence in our study population was 3.4% for both *HPV 16* and *HPV 18*. In women with BOH seroprevalence was 7.5% and 2.5% for *HPV 16* and *HPV 18* respectively. While in control (normal pregnancy) none of the tested sera show a positive result. In women with inevitable abortion, *HPV 18* detected in 10% of the tested samples. *HPV 16* was with higher seroprevalence in non-pregnant (5.9%) as compared to pregnant (2.9%) women, however, not reach a significant level.

Testing of sera collected from women with BOH and those with normal pregnancy (control) not indicated any positivity for antiphospholipid IgM, antiphospholipid IgG, Anticardiolipin IgM, anticardiolipin IgG, anti- DNA, and ANA. However, testing of 88 women (40 BOH, 20 inevitable abortion, 28 normal pregnancy) indicated that thyroid peroxidase antibodies (TPA) positivity was significantly more frequently detected in women with inevitable abortion (95%) and women with BOH (85%) as compared to those with normal pregnancy outcome (50%).

The present study indicated that Thyroglobulin antibodies (TGA) positivity was significantly more frequently detected in women with inevitable abortion (45%) and women with BOH (50%) as compared to those with normal pregnancy outcome (7.1%). The mean value of TSH was significantly varied among women with BOH, inevitable abortion and control. Interleukin 6 mean value was without significant ($F=2.39$, $P>0.05$) difference among women with BOH (20.79 pg/ml), women with inevitable abortion (25.11 pg/ml) and control (26.15 pg/ml). IL-6 mean value was significantly ($X^2=2.49$, $P=0.018$) lower in pregnant women with BOH (20.83 pg/ml) as compared to pregnant control (26.76 pg/ml). Interleukin 17 (IL-17) mean value was with significant ($F=3.26$, $P=0.0439$) difference among women with BOH (127.81 pg/ml), women with inevitable abortion (88.67 pg/ml) and control (85.65 pg/ml), IL-17 mean value was significantly ($X^2=20.43$, $P<0.0001$) higher in pregnant women with BOH (167.56 pg/ml) as compared to pregnant control (83.16 pg/ml). Angiopoietin mean value was with significant ($F=4.99$, $P=0.0089$) difference among women with BOH (81.72 pg/ml), women with inevitable abortion (92.66 pg/ml) and control (100.1 pg/ml). Angiopoietin mean value was significantly ($X^2=2.464$, $P=0.0393$) lower in

pregnant women with BOH (80.06 pg/ml) as compared to pregnant control (98.69 pg/ml).

Conclusion: The seropositivity of Toxoplasma was not significantly different in women with BOH as compared to control and significantly influenced by residence. This study provides important and highly useful information on baseline seroprevalence data on rubella in Iraq. A 19.1% of our women study population were none rubella immune and were susceptible for rubella infection. In addition, rubella seroprevalence associated with BOH. CMV seroprevalence was high in women with BOH as compared to women with normal pregnancy outcome. Education, family size, smoking were significantly associated with CMV seropositivity. The present study indicated a significant association between HSV 2 IgG and IgM and bad obstetric history. CMV, Parvovirus, Rubella, HV-2 and Toxoplasma coinfections was a risk factor that increased development of BOH. CMV may play an important role as primary infection that leads to immunosuppression and enhancement of secondary pathogen infection.