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Seroprevalence of Rubella Virus in Women with Spontaneous Abortion

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Abstract: Problem statement: Recurrent abortion is a difficult medical problem happening in about 1-2% of fertile women. Rubella is of high public health importance owing to teratogenic effects that can lead to fetal death, miscarriage, stillbirth, or infants during the first 16 weeks of gestation. As there were not data about role this virus in abortion in this area of IRAN, this study was conducted to assess the seroprevalence of Rubella virus in women with spontaneous abortion in comparison with healthy women (without history of abortion) in South of IRAN in order to establish basic knowledge for future pregnancy care in this area of IRAN. **Approach:** Present survey basically was carried out in Shariatee Hospital of Hormozgan University of medical sciences, Bandarabbas, Hormozgan province, located in border of Persian Gulf-2005. A number of 220 women with definite diagnosis of previous abortion and 200 matched women with normal full term delivery and without history of miscarriage as controls were studied as case and control groups. All obtained sera from the case and the control groups were then tested using ELISA method for determine of rubella virus antibodies. Data was analyzed, using SPSS software (chi square and t-test). **Results:** There were significant differences in seroprevalence of anti-rubella IgG and IgM in the case group than in the control group. **Conclusion:** According to the results of our research, rubella virus is presented as an etiologic factor for spontaneous abortion in this area of IRAN.

Key words: Rubella virus, spontaneous abortion, etiologic factor, Enzyme-Linked Immunosorbant Assay (ELISA), full-term deliveries, control groups, blood samples, significant differences, Congenital Rubella Syndrome (CRS)

INTRODUCTION

Background: Rubella (German measles) is a viral disease that usually presents as a mild febrile rash illness with adenopathia in adults and children; 20-50% of infected persons are asymptomatic. The infection is acquired through direct contact with nasopharyngeal secretions containing the virus or through droplet spread of nasopharyngeal secretions. Laboratory diagnosis of rubella is required, since clinical diagnosis is often inaccurate. According to the case definitions proposed by the European Commission, laboratory confirmation should be based on the detection of a significant rise in rubella immunoglobulin G (IgG) antibody titers in the serum between acute and convalescent phase or on the isolation of rubella virus from nasal, blood, throat, urine, or cerebrospinal fluid specimens, on the detection of rubella virus nucleic acid by reverse transcription PCR (RT-PCR) in one of these clinical specimens, or in an outbreak situation on the detection of rubella-specific immunoglobulin M (IgM) antibody in serum or saliva. An epidemiologically confirmed rubella case is defined as a patient with a febrile generalized rash illness of acute onset and an epidemiological link to a laboratory-confirmed case (Tipples and Hiebert, 2011).

Rubella is generally a mild rush fever disease when acquired in childhood, but when infection occurs during

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the first months of gestation, leading to fetal death, miscarriage, stillbirth, or infants with a pattern of birth defects, known as Congenital Rubella Syndrome (CRS) (Canepa *et al*., 2009).

The objectives of this study were to assess the seroprevalence of Rubella virus in women with spontaneous abortion in comparison with healthy women (without history of abortion) in South of IRAN in order to establish basic knowledge for future pregnancy care in this area of Iran.

MATERIALS AND METHODS

This cross sectional and descriptive study was conducted at in the delivery population of University Hospital (Hormozgan Province, Iran) between July 2004-Feb. 2005, to investigate whether seroprevalence of rubella virus in two groups of women with spontaneous abortion and without history of abortion to determine a relationship between the roles of rubella virus infection in spontaneous abortion as well as factors which might have an influence in the pathogenesis of this infection.

Cases were 220 women who were identified with spontaneous abortion by gynecologist during the study period and control group consisted of 200 asymptomatic women with no history of abortion and with successful full term delivery who were referred to Hormozgan University Hospital.

All subjects gave written consent for obtaining their blood samples according to research purposes.

Blood samples were taken from all women in both groups. A structured interview using a standard maternal questionnaire was administered by trained interviewers with the women at their first visit. Questions were asked about the following: age, parity, gynecologic and medical history of abortion, residence and socioeconomic status.

Serologic studies: In order to determine the rubella serology, 5 cc venous blood samples were taken and isolated sera stored at -70°C until IgG antibodies for rubella were qualified by Enzyme-Linked Immunosorbant Assay (ELISA) using the Trinity Biotech Rubella ELISA kits (Trinity Biotech, Jamestown, N.Y., USA). All sera with IgG titers equal to or below 6.50 IU ml^{-1} were regarded as seronegative, titers between 6.51-8.10 IU mL^{-1} were regarded as equivocal and titers between 8.11 IU mL^{-1} and above were regarded as seropositive as indicated in the kit prospectus. Sera with titers in the equivocal range were retested once and the sera that were still in the equivocal range were presented as seronegative.

Rubella virus-specific IgM and IgG were detected by indirect Enzyme-Linked Immunosorbant Assay (ELISA) by commercial specific kits Biokit,S.A.Liscad Amunt. Barcelona-Spain).

Data analysis: For assessment of risk factors for Chlamydia trachoma is infection (exposure), characteristics of case patients and control subjects were examined using a two-sample Student t test. Cross-tabulation and chi-square or Fisher exacts tests were used to examine the relationship between variables using a 95% confidence interval as a measure of association.

All data analyses were performed using SAS 8 Statistical Software (SAS Institute, Inc., Cary, NC).

RESULTS

The mean age of participants was 25.6±7.6 and 25.3±6.5 years in the pregnant women with abortion and with full term delivery, respectively. The mean gestational age was 8 weeks and the mean parity was 2.52 children in abortion group. The mean gestational age was 37±2 weeks and the mean parity was 2.2 children in full term group. There was no significant difference between age and parity in two groups (p = 0.650) (Table 1).

There were significant differences in seroprevalence of anti-rubella IgG and IgM in the case group than in the control group (Table 2).

There was not find any statistically significant association between seroprevalence of rubella (IgG and IgM) and residence (city or village) and also between seroprevalence of rubella (IgG and IgM) and parity neither in patients nor in healthy women.

Table 1: Baseline data of case and control groups*

Variables	Cases n = 250	Controls n = 200	p-value
Age (year)	24.6±7.4	25.6±7.2 0	0.650
Residence			
city	186 (84.54%)	154 (77.0%)	0.040
Village	34 (15.45%)	46 (23.0%)	0.040

*: Data are presented as n (%) or mean ± standard deviation

Table 2: Frequency of anti-rubella IgG and IgM in case and control groups*

Variables	Cases n = 250	Controls n = 200	p-value
Anti-rubella IgG	228 (91.20%)	164 (82.0%)	0.031
Anti-rubella IgM	34 (10.80%)	11 (5.50%)	0.022

*: Data are presented as numbers and %

DISCUSSION

According to significant difference between anti-rubella IgG in women with abortion 91.20% compared women with full-term deliveries 82.0% and anti-rubella IgM in women with abortion 10.80% compared women with full-term deliveries 5.50%, rubella virus is an important causative agent for spontaneous abortion in this area of Iran.

A studies in the Baghdad, Iraq, the seroprevalence of rubella virus in women with abortion was 34.2% (Abdul-Karim *et al*., 2009) and in another study rubella was considered as an etiologic agent for abortion in Gaza strip, Palestine (Al-Hindi *et al*., 2010).

In another report from Leningrad County, Russia, the seroprevalence of rubella virus in women with abortion and in healthy women were 77.5 and 59.8% respectively (Odland *et al*., 2001). In another study in Nigeria, the seroprevalence of rubella virus in women with abortion and in healthy women were 86% and 77% respectively (Onyenekwe *et al*., 2000).

The frequency of anti-rubella antibodies resulted from these research are lower than our finding, but there is the same results from these studies and our study, which is:"rubella virus is an etiologic factor for spontaneous abortion ".

Previous studies about etiologic factors for abortion in this area of IRAN (Bandarabbas), infectious agents such as Listeria monocytogenes (Jamshidi *et al*., 2009), Toxoplasma gondii and Cytomegalovirus (Jahromi *et al*., 2010a) and also immunologic factor such as anticardiolipin antibody and antinuclear antibody and Anti ß2-Glycoprotein I Antibodies (Jahromi *et al*., 2010b) and Chlamydia trachomatis (Jahromi *et al*., 2010c) were suggested as important causative agents for spontaneous abortion.

In some countries socio-economic and demographic factors (Alpu and Kurt, 2004), dengue virus (Alvarenga *et al*., 2009) and Women age and their parity (Adeleke and Adepoju, 2010) were suggested as cause of abortion.

CONCLUSION

According to the results of our research, rubella virus is presented as an etiologic factor for spontaneous abortion in this area of IRAN. Routine screening rubella is needed for pregnant women in Iran.

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