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Prevalence of Chlamydia Trachomatis Infection in Pregnant Women with Preterm Labor, PROM and Abortion

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ABSTRACT

Objective: In the study we aimed to determine the prevalence of chlamydia trachomatis infection and to find out whether there is a correlation between the presence of chlamydia trachomatis and the development of preterm delivery, PROM and abortion.

MaterialandMethod: In this prospective study, 55 pregnant women with a preterm labor and/or premature rupture of membranes, 51 women with spontaneous abortion and 51 patients with uncomplicated pregnancies were analyzed. Presence of cervicitis on physical examination was noted. The prevalence of Chlamydia trachomatis was analyzed with PCR in regard to the following parameters: age, gravidity, parity, abortion, livebirths, BMI (kg/m2), level of education, number of marriages, pelvic examination findings, smoking status, obstetric history of previous pregnancies and other comorbidities.

Results: The prevalence of Chlamydia trachomatis in pregnant women and in pregnant women with preterm labor was found to be 1.2% and 3.6%, respectively. Following the pelvic examination 19 patients were diagnosed with cervicitis and their PCR analysis revealed 2 cases of chlamydia trachomatis infection; the comparison of these results with the rest of the pregnant women without cervicitis demonstrated a statistically significant difference (P <0.05).

Conclusion: Both of the PCR (+) cases in our study experienced pretermlabor; this finding, although statistically insignificant, is clinically a striking result. More research is needed to find out the definite relationship between chlamydia trachomatis and the complications of pregnancy.

Key Words: Chlamydia trachomatis, Prevalence, Preterm labor, Premature rupture of membranes, Spontaneous abortion.

ÖZET

Erken Doğum Erken Membran Rüptürü ve Spontan Abortuslarda KlamidyaTrakomatis Prevalansı

Amaç: Klamidya trakomatis prevalansını ve erken doğum, erken membran rüptürü, spontan abortus ile ilişkisini saptamaktır.

Gereç ve Yöntem: Prospektif çalışmamıza preterm eylem ve/veya EMR tanısı olan 55 gebe, spontan abortusu olan 51 gebe ve miada ulaşmış komplikasyonsuz gebeliği olan 51 hasta dahil edildi. Vajinal muayenede servisit saptanan hastalar not edildi. Demografik özellikleri incelendi. Servikal süründüde PCR tekniği ile Klamidya trakomatis taraması yapıldı. Yaş, gravidite, parite, düşük sayısı, canlı doğum sayısı, vücut kitle indeksi (VKİ; kg/m2), eğitim düzeyi, evlilik sayısı, pelvik muayene bulguları, sigara kullanımı, önceki gebeliklere ilişkin obstetrik anamnez ve eşlik eden diğer hastalıkların klamidya trakomatis prevalansıyla olan ilişkisi incelendi.

Bulgular: Gebelerde ve preterm doğum yapan hastalarda Chlamydia trachomatis prevalansı PCR ile sırasıyla % 1.2 ve %3.6 olarak bulundu. Pelvik muayenede servisit tespit edilen 19 gebe hastanın PCR ile ikisinde Klamidya trakomatis antijeni saptandı. Servisiti olmayan hastalar ile karşılaştırıldığında sonuçlar istatistiki olarak anlamlı idi.(p<0.005)

Sonuç: İstatistiksel olarak anlamlı olmasa da PCR (+) vakaların her ikisinin de erken doğum grubunda olması klinik açıdan önemli bir bulgudur. Klamidya varlığı ile preterm eylem, EMR ve spontan abortus gibi gebelik komplikasyonlarını kesin olarak ilişkilendirebilmek için daha fazla çalışmaya ihtiyaç vardır.

Anahtar Kelimeler: Klamidya trakomatis, Prevalans, Erken doğum, Erken membran rüptürü, Spontan abortus

Chlamydia is the leading cause of sexually transmitted diseases. Polygamy and age below 25 are the most important risk factors. The infection often remains asymptomatic nevertheless increases the risk for pelvic inflammatory disease (PID), infertility, chronic pelvic pain and ectopic pregnancy thus it produces permanent sequelae on the long term (1,2).

The chlamydia infection of the lower genital region also promotes the risk for an ascending infection. The preferred method of detection of a chlamydia infection is screening owing to the infection's asymptomatic course. In this way the infection could be appropriately treated and the risk for PID, ectopic pregnancy and infertility development could be lowered. The eradication of the

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disease in high risk patient groups poses significant importance (3).

In several studies the prevalence of chlamydia trachomatis in pregnant women was reported as 2.4-6% (4-6). In many pregnant women the infection has an asymptomatic course nevertheless one third of the patients display signs of urethral syndrome, urethritis or Bartholin gland infection. The role of chlamydial infections in the complications of pregnancy is a controversial subject. Some of the studies revealed a direct correlation between chlamydia trachomatis and the loss of pregnancy whereas most of the studies were unable to show a relation at all (7-11).

Whether chlamydial infection increases preterm birth, premature rupture of membranes (PROM) and prenatal mortality is a controversial issue (12-15). In a study chlamydial infections were reported to cause a ten-fold increase in the risk of abortion, still birth, preterm delivery and premature rupture of membranes (16).

The most challenging issue of the chlamydia trachomatis infections is the difficulty of diagnosis. In the past cell culture was regarded as the gold standard nevertheless this method requires an experienced team and some technical equipment. Nowadays there are new antigen determination methods such as direct fluorescent antibody (DFA) and enzyme immunoassay (EIA) which provide a rapid result. Among many molecular methods polymerase chain reaction (PCR) possesses a high sensitivity for chlamydia thus it will likely become the gold standard diagnostic modality in the future (17). The aim of this study is to determine the prevalence of chlamydia trachomatis infection and to find out whether there is a correlation between the presence of chlamydia trachomatis and the development of preterm delivery, PROM and abortion.

MATERIAL AND METHOD

Following the approval by the local ethics committee a prospective study was designed and a total of 106 pregnant women were included in the study. The patients were divided into two groups: the first group consisted of 55 pregnant women diagnosed with preterm labor and/or premature rupture of membranes whereas Group II comprised 51 nulliparous women with spontaneous abortion. Pregnant women experiencing abortion due to an anatomic, immunologic, endocrinologic and/or thrombophilic reasons as well as patients with preterm termination of pregnancy were excluded from the study. The third (control) group consisted of 51 pregnant women without a preterm labor or abortion history. All of the pregnancies in the third group were after the 37. week of gestation at the time of the study.

The presence of cervicitis on the physical examination was noted. The presence of cervical congestion, erythema, edema and fragility in addition to copious mucopurulent discharge from the endocervical canal was defined as cervicitis.

The prevalence of Chlamydia trachomatis was analyzed with PCR method in regard to the following parameters: age, gravidity, parity, abortion, live births, height, weight, BMI (kg/m2), level of education, number of marriages, pelvic examination findings (cervical opening, effacement, amniotic fluid drainage, bleeding, cervicitis, vaginitis), smoking status, obstetric history of previous pregnancies if present (abortion, preterm labor, uncomplicated pregnancy), medical illnesses (Diabetes Mellitus, hypertension, hyper-/hypotension).

Endocervical swabs were collected from all patients under sterile conditions and the PCR technique was applied with Mag Attract Virus Mini M48 (QIAGEN GMBH, D-40724, Hamburg) and Artus *C. trachomatis Plus* RG PCR (QIAGEN GMBH, D-40724, Hamburg) kits.

SPSS Windows version 15 was utilized for the statistical analysis. Shapiro-Wilk normality test was used for continuous variables. The dual comparison of groups was made with Poisson's ratio test and the triple comparison was made with Kruskal-Wallis test. Dunn's multiple comparison test was used for the differential variables. Median and quarter (25%-75%) values were assigned for the descriptive statistics. The comparison of the categorical variables was performed with Pearson exact chi-square, revised exact chi-square and Fisher exact chi-square tests. $p<0.05$ was considered statistically significant.

RESULTS

The physical characteristics, demographic features and accompanying medical disorders of the patients were summarized in Tables 1-3. Among these data the solitary statistically significant difference was noted between the body weights of the abortion group and the control group ($p<0.05$). The mean value of body weight measurements of the patients in Group II was lower than that of the control group nevertheless BMI values of both groups did not demonstrate a statistically significant difference.

The PCR analysis for chlamydia trachomatis revealed 2 positive cases in Group 1 (3.6%) and no other cases in Group 2 or 3 (p=0.329). The comparison of the first group with the control group did not demonstrate a statistically significant difference for PCR analysis results. Nevertheless the fact that all of the positive results in PCR analysis emerged in the preterm labor/PROM group is a remarkable finding from the clinical point of view. A detailed evaluation of the PCR results revealed that their connection to the main demographic features exhibited a statistically nonsignificant difference between the study groups.

During the pelvic examination 19 pregnant women (8 women in Group 1, 7 in Group 2 and 4 in Group 3) were diagnosed with cervicitis (12.1%). Two of these cases were found to be PCR (+) (10.5%) whereas all of 138 patients without cervicitis were PCR (-) (p=0.014).

Table 1. Comparison of the physical characteristics between the groups

Groups	BMI(kg/m^2) kg/m^2	P
Preterm labor/PROM	26.3 (24.1-28.7)	
Abortion	24.9 (22.5-28.6)	**0.06**
Control	27 (24.4-29.6)	

Table 2. Comparison of demographic features between the study groups

Demographic features	Preterm	labor/PROM	Abortion		Control		P
Level of education	**n**	**%**	**n**	**%**	**n**	**%**	
None	0	0	0	0	0	0	
Elementary	13	23.6	11	21.6	9	17.6	
High school	26	47.3	30	58.8	22	43.1	**0.277**
University	16	29.1	10	19.6	20	39.2	
Smoking in pregnancy							
No	50	90.9	46	90.2	49	96.1	**0.5**
Yes	5	9.1	5	9.8	2	3.9	
Occupation							
None	28	50.9	26	51	19	37.3	**0.09**
Working	27	49.1	25	49	32	62.7	
Number of marriage							
1	55	100	50	98	50	98	**0.5**
2	0	0	1	2	1	2	

Table 3. Distribution of major medical disorders among the study groups

Medical Disorders	Preterm labor/PROM		Abortion		Control		P
	n	**%**	**n**	**%**	**n**	**%**	
Diabetes Mellitus (Type I)	1	1.8	2	3.9	1	2	0.13
Gestational DM	9	16.4	1	2	13	25.5	
Gestational HT	5	9.1	1	2	1	2	**0.126**
Hypothyroidism	4	7.3	5	9.8	1	2	**0.3**

DISCUSSION

There are several studies in the literature reporting quite variable results for the prevalence of chlamydia trachomatis in pregnant women (18). In our study the prevalence of chlamydia among all pregnant women was 1.2% (2/157) and no statistically significant correlation was found between chlamydia trachomatis and preterm delivery or PROM. In a similar study by Silveria et al. on 2127 pregnant women the prevalence of chlamydia trachomatis was detected as 4.7% and chlamydia infection could not be linked to preterm labor (19). In another study by Karowicz et al. 400 pregnant women who had been hospitalized between 2005-2007 with suspicion of preterm labor had been screened with enzyme immunoassay (EIA) method and chlamydia trachomatis had not been detected at all (20). On the other hand Ramos and Polettini had screened the cervical secretions of 101 pregnant women in Brazil with PCR method and detected the prevalence of chlamydia trachomatis as 25.7% (21). As a result of their study they had emphasized the importance of screening in prevention of obstetrical and neonatal complications. This variability of prevalence of chlamydia trachomatis infection can be related to the risk factors of the infection. Being an adolescent or young adult is the most important risk factor. Other relevant risk factors include being single as the marital status, a positive history of a sexually transmitted disease, and the refusal of barrier

contraception methods and the possession of multiple sexual partners.

In previous studies certain demographic features of the patients including smoking habits, increased BMI and maternal socio-economic status were reported to cause an increase in the risk for preterm labor (18). However the comparison of both groups in our study regarding their demographic features did not reveal any statistically significant difference.

In our study 51 pregnant women experienced spontaneous abortion; the analysis of these patients with PCR revealed no sign of chlamydia trachomatis infection. The role of infections in the etiology of spontaneous abortion is controversial. Bacteria such as brucella, mycoplasma hominis, chlamydia trachomatis and listeria monocytogenes; viruses including CMV, rubella, HSV and parvovirus and toxoplasma gondii as a parasitic protozoa are well-known microorganisms accused with induction of abortion nevertheless their role in the etiology of abortion is not clear.In a study conducted by Wilkowska et al. the presence of chlamydia trachomatis in the cervical smear had been screened with PCR method and its relationship with the number of spontaneous abortions was analyzed (22). The comparison of the 76 pregnant women having a history of one spontaneous abortion with the control group of 46 pregnant women without any obstetric complication

revealed a statistically significant difference (p=0,029). In another similar study on 144 women with spontaneous abortion Dudkiewicz et al. had found out that C. trachomatis (18.7) was the most frequently isolated bacterial organism in the cervical smear (23). On the other hand there are various other studies in the literature which have revealed that chlamydia trachomatis infection was not related to spontaneous abortion (10, 24). The results of our study also demonstrated a lack of correlation between these two parameters.

Chlamydia trachomatis infection often has an asymptomatic course nevertheless the presence of cervicitis symptoms in some cases might be regarded as an alarming feature. In our study 19 patients have been diagnosed with cervicitis following the pelvic examination and the PCR analysis of them revealed 2 cases of chlamydia trachomatis infection. On the other hand all of the pregnant women without cervicitis were PCR (-) thus a statistically significant difference ensued between the two groups. Presumably the best explanation for the reason of this finding is the relatively low quantity of patients included into the study and a probable exclusion of some of the asymptomatic chlamydia infections.

2005 in Turkey chlamydia trachomatis infection has been added to a list of distinctive diseases which should be reported to the local authorities "on first sight". However there is still no screening program applicable to the pregnant women.

Pregnant women with certain comorbidities including gestational hypertension, diabetes mellitus and hypothyroidism were not excluded from the study and constituted a confounding factor. Although both the study and the control groups did match for the distribution of these patients, the possible influence of medical disorders on the risk of premature rupture of membranes and abortion was regarded as a limitation of our study.

CONCLUSION

In our study a statistically significant correlation was found between chlamydia trachomatis infection and the occurrence of cervicitis and vaginitis; on the other hand the preterm labor, PROM and spontaneous abortion was found to be unrelated to the presence of chlamydia trachomatis infection. Both of the PCR (+) cases in our study happened to be in the group of patients with preterm labor; this finding, although statistically nonsignificant, is clinically a striking result justifying the need for future research.

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