

ASSESSMENT OF BACTERIAL VAGINOSIS INCIDENCE AND NEONATAL OUTCOME ON CASES WITH PRETERM PREMATURE RUPTURE OF MEMBRANES

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SUMMARY

Objective: The effect of bacterial vaginosis on cases with preterm premature rupture of membranes (PPROM) was searched via screening for bacterial vaginosis (BV) in cases with PPRM and healthy pregnant women during same gestational weeks.

Material and method: The study incorporated 121 patients who applied to obstetrics poly-clinics at our hospital. Detailed medical histories were obtained from all patients, prior to vaginal examination by sterile speculum. Vaginal samples were taken for analysis via Nugent scoring system. Through verbal scoring, the symptoms due to vaginitis, namely, vaginal discharge, vaginal burning, pruritis, dysuria and malodor were recorded. With regard to pre- and postnatal periods, age, gestational week, complete blood count values, history of gravida, parity and abortion, history of PPRM and duration, gestational week at the time of delivery, mode of delivery of the cases and maternal morbidity were evaluated. All participants were asked to grant informed consents. The study was held under approval by Ethics Committee of the Hospital.

Results: The study incorporated 72 cases of pregnant women with PPRM as study group, and 49 cases of healthy pregnant women as control group. No statistically significant difference was determined in terms of average age, gravida and parity values. Nugent scoring system revealed bacterial vaginosis in 75 cases (75/121; 61.9%) in total: 43 in PPRM study group (43/72; 35.5 %) and 32 in control groups (32/49; 26.4%). Statistically, BV was determined at a higher ratio in PPRM study group; similarly, vaginal delivery ratio was higher and APGAR scores of neonates at 1st and 5th minutes were lower in PPRM study group, compared to control group ($p < 0.05$).

Conclusion: Bacterial vaginosis is a frequently detected infectious disease for pregnant women. It can be considered as an important factor in etiology of PPRM and perinatal morbidity.

Key words: bacterial vaginosis, preterm premature rupture of membranes, nugent score.

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PRETERM ERKEN MEMBRAN RÜPTÜRÜ OLGULARINDA BAKTERİYEL VAGİNOZİS İNSİDANSI VE NEONATAL SONUÇLARIN DEĞERLENDİRİLMESİ

ÖZET

Amaç: Preterm erken membran rüptürü (PEMR) tanısı konan gebelerde ve benzer gebelik haftalarındaki sağlıklı gebelerde bakteriyel vaginosis (BV) araştırılarak BV'nin PEMR olgularındaki etkisi araştırıldı

Gereç ve yöntemler: Hastanemiz gebe polikliniklerine başvuran toplam 121 hasta çalışmaya alındı. Tüm hastalara ayrıntılı anamnezi takiben steril spekulum ile vajinal muayene yapıldı. BV tanısında kullanılan Nugent skorlaması için vaginal örnekleme alındı. Olguların vaginite bağlı olabilecek yakınmaları; akıntı, yanma, kaşıntı, dizüri, koku semptomları verbal skorlama ile belirlendi. Çalışmaya alınan olguların yaş, gravida, parite, abortus hikayesi, gebelik haftası, membran rüptür öyküsü ve süresi, hemogram değerleri doğum haftası, doğum şekli, doğum öncesi ve sonrası

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maternal morbidite sonuçları değerlendirildi. Çalışma için hasta onamı ve hastane etik kurul onayı alındı
Bulgular: Preterm erken membran rüptürü tanısı alan 72 hasta ve kontrol grubu olarak sağlıklı 49 gebe çalışmaya alındı. Gruplar arasında yaş, gravida ve parite ortalamaları bakımından istatistiksel olarak anlamlı bir farklılık saptanmadı. Çalışmaya alınan 121 hastanın 75 'inde (%61.9) Nugent skoruna göre BV (+) saptandı. PEMR grubunda 43 gebede (%35.5), kontrol grubunda ise 32 gebede (%26.4) BV saptandı. İstatistiksel olarak PEMR grubundaki hastalarda kontrol grubuna göre daha yüksek oranda BV saptandı ($p<0.05$). PEMR grubundaki hastaların normal doğum oranı daha yüksek ve 1.ve 5.dakika Apgar skorları kontrol grubundaki hastalardan anlamlı derecede düşük olarak saptandı ($p<0.05$).
Sonuç: Bakteriyeel vaginosis gebelerde sık görülen vaginal enfeksiyonlardan biri olup, PEMR etyolojisinde ve sonucundaki perinatal morbiditede önemli bir etken olarak kabul edilebilir.

Anahtar kelimeler: bakteriyel vaginosis, erken membran rüptürü, nugent skoru

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INTRODUCTION

80% of premature births are caused by spontaneous preterm actions and PPRM. The causes of rest 20% depends on maternal and fetal causes. PROM is observed in 5-15% of all childbirths and 20-40% of preterm childbirths. But PPRM, which is seen in 1-4% of all pregnancies, takes place within the factors seriously increasing the risks of perinatal mortality, neonatal mortality and maternal infection⁽¹⁾.

The most frequent complication occurring after PROM is intrauterine infection. In 13-60% of PPRM cases, chorioamniyotitis is observed, and decollement placenta is observed in 4-12% of PPRM cases. Postpartum hemorrhage and placenta retention as a result of infection (12%) are seen more frequently in PPRM cases than in other pregnancies⁽²⁾. The frequency and severity of neonatal complications may change depending on the week of pregnancies when membrane rupture is formed. The studies which were conducted right after membrane rupture showed that the isolation of pathologic microorganisms from vaginal flora may play role in PROM pathogenesis of bacterial infection. Some organisms causing the group B streptococcus, Staphylococcus aureus, Trichomonas vaginalis and bacterial vaginosis may shatter the collagen by secreting protease⁽³⁾. The inflammatory response of host occurring secondary to bacterial infection plays role in PROM pathogenesis. BV is the most frequently seen genital infection in pregnant women. The incidence is represented as 2-12% and 9-28% in some resources⁽⁴⁾.

Within the scope of our study, the BV was researched in pregnant patients applying with PPRM diagnosis and in healthy pregnant women in same gestational weeks. The fetal prognosis is compared within the two groups.

MATERIAL AND METHOD

72 cases applied to our hospital with premature rupture of membranes symptom and had the definitive diagnosis, and 49 healthy pregnant women, as control group, were incorporated in study. In PPRM group, there were 72 pregnant women between 20th and 37th gestational weeks. For control group, the pregnant women who applied for pregnancy control and had no complaint about water break and whose membrane rupture diagnosis were eliminated by routine anamnesis and examination were included. In that group, there were 49 pregnant women between 20th and 37th gestational weeks. The pregnant women who has not experienced any preterm childbirth, preterm membrane rupture or multiple pregnancies in their previous pregnancies, who has no uterine pathology or anomaly diagnosed formerly, and whose ultrasonographic fetal biometrical measurements were within the normal limits as of the date of last menstrual period, were included in study. The pregnant women who has vaginal hemorrhage and the women who has diagnosed as placenta previa but who has not kept up with follow-up regularly were excluded from study.

After detailed anamnesis, vaginal examination was applied to all of patients by sterile speculum. During vaginal examination; patients were evaluated in terms of liquid ponding, liquid drainage from cervix during Valsalva maneuver, cervical patency and effacement. Then vaginal samples were taken from patients for Nugent scoring. During Nugent score evaluation, swab samples were evaluated by microbiology specialist in microbiology laboratory of our hospital by applying gram coloration and spreading on lamellae without any information about the patient group of case.

For scoring; the existences big gram (+) bacillaries (lacto-

bacillary), small gram labile bacillaries (*G. vaginalis*), small gram (-) bacillaries (*Bacteroides* spp.) and curly gram labile bacillaries (*Mobilincus* spp.) were examined. The existence of each or morpho-type was evaluated in accordance with their numbers in each of immersion region. Their values were as follows; 1+ if there is none of them, 2+ if there are 1-4 pcs, 3+ if there are 5-30 pcs and 4+ if there are more than 30 pcs. The scoring was performed between 0 and 10 in accordance with those values.

The complaints of cases, which may depend on vaginitis, such as symptoms of discharge, burning sensation, pruritus and dysuria were determined via verbal scoring. The scores were as follows; 0 if there is no complaint, 1 if there are light complaints (staining in underwear), 2 if there are medium complaints (need for using pads), 3 if there are severe complaints (need for changing pads continuously).

SPSS for windows 10.0 statistical package software was used for evaluations of data. For comparisons; continuity correction test, Pearson chi-square test, Kruskal Wallis test and Mann-Whitney-U Test were used. The values of diagnosis were calculated and $p < 0.05$ was accepted as significant.

FINDINGS

72 patients with preterm premature rupture of membranes (PPROM) diagnosis and 49 healthy pregnant women, as control group, were included in study. The mean age of PPRM group was 29.01 ± 6.6 (18-46), and the mean age of control group was 26.49 ± 5.63 (17-39). No statistically significant difference was observed between groups in terms of age, gravida and parity means ($p > 0.05$) (Table I).

Table I: The range of PPRM and control groups in terms of age of mothers, the numbers of pregnancies and parity.

	PPROM group (n=72)	Control group (n=49)	p
Age	29.01±6.6	26.49± 5.63	NS
Gravide	2.18 ±1.41	2.14 ± 1.08	NS
Parity	1.79 ± 0.95	1.80 ± 0.68	NS

S: significant, NS: non-significant

Table II: The Nugent Score range of PPRM and control groups patients.

Nugent Score	3	4	5	6	7	8	9
PPROM group (n)	12	12 (clu cell+)	5 (clu cell+)	16 (clu cell+)	18	9	-
Control group (n)	1	8 (clue cell+)	8 (clu cell+)	4 (clue cell+)	19	5	4

In 75 of included 121 patients (61.9%), BV (+) was detected according to Nugent score (43 patients in PPRM group (35.5%) and 32 patients in control group (26.4%)) (Table II). Statistically, BV was observed in patients in PPRM group more frequent than in patients in control group ($p < 0.05$).

When the discharge, burning sensation, smell and dysuria symptoms of two groups were compared, the symptoms in PPRM group were observed statistically significantly more frequent (Table III) ($p < 0.05$).

Table III: The range of vaginitis-caused symptoms in PPRM and control group patients.

	PPROM		Control Group		p
	n	%	n	%	
Discharge	61	%58,6	43	%41,4	S
Pruritus	52	%83,8	10	%16,1	S
Burning sens.	50	%92,5	4	%7,5	S
Smell	61	%71,7	24	%28,3	S
Dysuria	52	%85,2	9	%14	S

S: significant, NS: non-significant

PPROM and control group patients were expressed in Table IV in terms of type of childbirth. In patients with PPRM, the rate of normal vaginal delivery was determined statistically significantly higher than in control group, ($p < 0.05$).

Table IV: The type of childbirth in PPRM and control group patients.

Group	G sarean section		Normal birth	
	n	%	n	%
PPROM group	29	%24,0	43	%35,5
Control group	25	%20,7	24	%19,8

In PPRM cases; the duration from occurring of membrane rupture to start of delivery was accepted as latent period. In order to compare statistical analyses of cases, they were separated into 3 classes as 24 hours and less, 24 - 48 hours and more than 48 hours. The mean latent period was determined as 3.8 ± 4.7 day (Table V).

Table V: The range of latent period in PPRM cases according to gestational week.

	≤24 hours		24-48 hours		≥48 hours	
	n	%	n	%	n	%
≤28 w	2	%10.5	2	%10.5	15	%78.9
29-32 w	6	%30	8	%40	6	%30.5
≥33 w	23	%69.6	7	%21.2	3	%9
Total	31	%43.0	17	%23.6	24	%33.3

The rate of cesarean section due to fetal distress in PPRM group was higher than that of in control group (p=0.00). According to all cesarean section indications, no difference was observed between groups in terms of repeating cesarean section indication rates (p>0.05). When the range of delivery type is evaluated according to gestational week, it was observed that the difference between groups was not statistically significant (Table VI) (p>0.05).

Table VI: The range of PPRM cases according to type of childbirth and gestational week.

Group	Spontaneous normal birth		Induction normal birth(n)		G-sarean(n)	
	n	%	n	%	n	%
	≤28w	9	%42.1	2	%10.5	8
29-32w	3	%15	6	%30	11	%55
≥33w	8	%24.2	15	%45.4	10	%30.3
Total	920	%27.7	23	%31.9	29	%40.2

The PPRM and control group patients are showed in Table VII according to birth weight and gestational week. The birth weight and gestational week of patients in PPRM group were found significantly less than those of patients in control group.

Table VII: The birth weight and birth week values of patients in PPRM and control groups.

	Weigh of Birth(g)	Week of birth(w)
PPROM group	1837,78 ± 672,79	31.05 ± 24.05
Control group	3336,33 ± 465,49	38.26 ± 6.82

The APGAR scores of patients in PPRM group at 1st and 5th minutes (5.9-7.19) were determined significantly less than those of patients in control group (7.61-8.55) (p<0.05).

DISCUSSION

PROM is seen in 5-10% of all pregnancies (11,12), and 30-50% of preterm births⁽¹⁰⁾. Because it is one of the most important causes of maternal and fetal morbidity and mortality, the rapid and accurate diagnosis of PROM is important.

The studies in recent years support the role of infection in etiology of preterm actions. The roles of sub-clinic infection of placental membrane, chorioamnionitis forming after and before chorioamnion membranes, and histological infection in etiology gain importance (5-7). Microorganisms were isolated 2-4 folds more frequent in placental membranes of pregnant women who had preterm childbirths than pregnant women who had childbirths in term⁽⁵⁾.

While bacterial vaginosis is one of the most frequent infections seen in pregnant women, 50% of women are asymptomatic. The causing of infection to "abortus, preterm childbirth, prematurity, premature rupture of membranes, amniotic fluid infection and postpartum sepsis" increases its clinical importance⁽⁸⁻¹¹⁾. It was determined that premature rupture of membranes is seen in pregnant women with BV 7.3 times more⁽¹²⁾. In cesarean section cases with bacterial vaginosis, it was determined that postpartum endometritis and wound infection development rates are 5 times more than patients without BV^(12-14,16,17).

When the studies were viewed in order to research the vaginal infections in pregnant women, Di Bartolomeo et al.⁽¹⁸⁾ found BV in 27.5% of 198 pregnant women, Candida forms in 34.3%, Group B streptococcus in 4.5% and Trichomonas Vaginalis in 3.5%. Within 284 pregnant women, Begüm et al.⁽¹⁹⁾ found BV in 17.7% and Trichomonas Vaginalis in 1.4%, and they expressed that BV rate was higher in women with lower socio-economical conditions.

Within 534 pregnant women, Gravett et al. detected bacterial vaginosis in 19% of them (102 women), and it was showed that 24% of patients with BV had preterm childbirth⁽²⁰⁾. Within 5432 pregnant women between 10th and 17th gestational weeks, Keki et al. determined the BV prevalence as 10.4%.

In a Cochrane meta-analysis study, during evaluation of 15 studies covering 5888 pregnant women with asymptomatic BV and average preterm childbirth risk; the elimination of infection by antibiotic treatment was seriously efficient. But the rates of preterm childbirths

and the risk of premature rupture of membrane did not decrease significantly⁽²¹⁾.

In another meta-analysis covering 5 studies with total 2387 women, it was determined that preterm childbirth risk can be decreased by treating BV before 20th gestational week.

Within a meta-analysis study covering 3 studies of United States Preventive Services Task Force (USPSTF) group, no statistically significant decrease was observed in preterm childbirth rates of 526 pregnant women with asymptomatic BV and having low preterm childbirth risk as a result of treatment. In another meta-analysis study of same group covering 8 studies, no significant decrease can be obtained via treatment in preterm birth rates of 4972 pregnant women with medium risk factors and asymptomatic BV⁽²²⁾. According to those data; preterm birth and its results cannot be prevented via BV scanning and treatment of pregnant women with asymptomatic BV. So the regular treatment of women is not recommended.

During our study, the duration from development of membrane rupture in PPRM cases to beginning of birth was accepted as latent period. Average latent period was 3.8 ± 4.7 days, average birth week was 31.05 ± 24.05 , and average weight of newborn babies was 1837.78 ± 672.79 g.

Independently from obstetric intervention or clinic table, the most possible result is childbirth in 1 week in PPRM cases without treatment. When gestational week gets earlier, latent period increases parallelly⁽²³⁾. While latent period is less than 48 hours in term pregnancy, it may vary between 1 day and a couple of weeks in preterm cases. 70% of pregnant women in 29th-32nd weeks after PPRM and 80% of those in 33rd-36th weeks give birth in 2 days, it was reported that although it varies due to gestational week, mean latent period is 8.8 days⁽²⁾. In the study of Mercer et al.⁽²⁴⁾, it was stated that latent period is longer in early weeks of pregnancy, and induction response is lower than expected because cervical maturation is not completed. We calculated the mean latent period as 3.8 ± 4.7 days and we determine that it lasts longer in earlier weeks of pregnancy. While latent period is longer than 24 hours in 89.4% of pregnancy cases in 28th and less weeks, the same duration was observed in 70% of pregnancy cases in 29th-32nd weeks and 30.2% of pregnancy cases in 33rd and more weeks. From different viewpoint, 66.5% of our PPRM cases

experienced labor in first 48 hours. While longer latent period provides time for interventions which can provide lung maturation of fetus, it increases the maternal infection and neonatal sepsis rates significantly.

High ceserrian section rate is observed secondary to cord pressure in membrane rupture especially due to oligo-hydramnios and acute fetal distress^(25,26). During our study, the rate of ceserrian section was calculated as 40.2%. While that rate is similar with studies of Tanır (34%)⁽²⁷⁾, Pasquier (43.7%)⁽²⁸⁾ and Karabulut (42.6%)⁽²⁹⁾, it was higher than the rates of Kenyon (29%)⁽³¹⁾ and Ozumba (14.5%)⁽³⁰⁾. The ceserrian section rate of control group of our study was calculated as 51.02%. The normal vaginal birth rate in PROM group was higher than control group. We think that this rate was caused by choosing the induction-application group from cases with higher vaginal childbirth possibility (higher pregnancy age, appropriate Bishop score, enough amnion fluid).

The ceserrian section rate was determined as 17.8% in cases where induction was applied. This result developed due to fetal distress arising as a result of induction. In cases with membrane rupture, secondary to decrease in the amount of amnion fluid, the risks of fetal distress, ablatio placenta and cord prolapsus increase⁽²⁵⁾. For PPRM cases, it was reported that the risk of cord prolapsus is 1-2%, the incidences of ablatio placenta and acute fetal distress vary between 2 and 10% and 2 and 20% respectively⁽²⁹⁾. During our study, we calculated those incidences as 1.85%, 1.85% and 31.4%. Those values significantly differ from rates in literature. When considering APGAR score, 1st minute score in PROM group was 5.90 ± 2.08 and 1st minute score in control group was 7.61 ± 0.73 . 5th minute APGAR score was determined as 7.61 ± 0.73 in PROM group and as 8.55 ± 0.65 in control group. The perinatal morbidity and mortality in cases with PPRM vary according to gestational week. As expected, the 1th and 5th minutes APGAR scores of newborns were found lower in earlier gestational weeks. Besides problems which are caused by prematurity, the higher infection risk which is seen especially in cases where latent period lasts longer is seen as responsible from that decrease. This result is in accordance with other studies which were conducted in this field⁽²⁹⁾. In their study, Tanır et al.⁽²⁷⁾ compared 80 preterm childbirths with PPRM and 100 preterm childbirths without

PPROM, and they did not find any difference between two groups in terms of 1st and 5th minutes newborn APGAR scores.

Result: Bacterial vaginosis is one of the most frequent vaginal infections seen in pregnant women. It can be accepted as an important factor in PPRM etiology and perinatal morbidity which is a result of PPRM etiology.

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