THE RISK FACTORS OF INFECTION OF THE LOWER REPRODUCTIVE TRACT AND STREPTOCOCCUS B AND ITS INFLUENCE ON PREGNANCY OUTCOME

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ABSTRACT

Objective: *This study aimed to analyze the risk factors of reproductive tract infection and b-streptococcus infection and their influence on pregnancy outcome.*

Methods: *60 pregnant and lying-in women who received regular examination in our hospital from August 2020 to March 2021 were randomly selected as the research subjects. Vaginal and rectal secretions were collected for bacterial culture of group B streptococcus. Real time fluorescent quantitative PCR was used for detection. According to whether the culture of group B Streptococcus had positive results, they were divided into infection group (n=29) and non-infection group (n=31). The clinical data of all subjects were collected, and the changes of clinical data of the two groups were compared. The risk factors of lower genital tract infection and group B streptococcus infection were analyzed. Logistic regression analysis was used to analyze the independent risk factors of lower genital tract infection and group B streptococcus infection. The pregnant women were followed up to the end of pregnancy to observe the effect of lower genital tract infection and group B streptococcus infection on pregnancy outcome and perinatal outcome.*

Results: *60 cases of lower genital tract infection and group B streptococcal infection were mainly under 35 years old, high school and below, and the number of antenatal examinations was not less than 7 times. Most of the pregnant women had no history of abortion, vaginitis, anemia during pregnancy, gestational diabetes mellitus, gestational hypertension and other diseases. They were mainly primiparas, and had a history of pregnancy protection during pregnancy. Compared with the uninfected group, the proportion of pregnant women with age ≥35 years old, prenatal examination times ≤ 6 times, vaginitis and abortion history in the infected group was significantly higher (P<0.05). Age, times of prenatal examination, vaginitis and abortion history may be the risk factors of lower genital tract infection and group B streptococcus infection. Logistic regression analysis showed that age, number of prenatal examination, abortion history and vaginitis were the independent risk factors for lower genital tract infection and group B streptococcus infection (P<0.05). Compared with the uninfected group, the incidence of amniotic infection, premature rupture of membranes, chorioamnionitis, postpartum hemorrhage and premature birth in the infected group were significantly higher (P<0.05); The incidence of neonatal infection, pneumonia, sepsis, intrauterine distress, hyperbilirubinemia and asphyxia in the infection group were significantly higher than those in the control group (P<0.05).*

Conclusion: *Age, the number of prenatal examination, abortion history, vaginitis may be the independent risk factors of lower genital tract infection and group B streptococcus infection in pregnant women, and lower genital tract infection and group B streptococcus infection will cause serious adverse outcomes in pregnant women and newborns.*

Keywords: *Lower genital tract infection, group B streptococcus infection, risk factors, pregnancy outcome.*

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Introduction

The vagina of a normal woman contains many bacteria such as Escherichia coli, candida, Group B streptococcus and Lactobacillus. Under normal circumstances, a variety of bacteria in the vagina are kept in a dynamic balance with the surrounding environment(1). When in pregnancy, the body's estrogen increased significantly, vagina glycogen content gradually rises, enhanced glycolysis of lactobacillus function gradually, in addition, the mother during pregnancy immune function declined obviously, vaginal cell membrane permeability increased significantly, makes the pathogenic bacteria multiply, cause the dysbacteriosis, eventually happen under the incidence of reproductive tract infections(2). Group B streptococcus is one of the most common pathogens that cause lower genital tract infections.

According to relevant statistics, lower reproductive tract infection and group B streptococcus infection can cause uterine cavity infection, endometritis, premature delivery, neonatal septicemia, pneumonia and even neonatal death and other adverse pregnancy outcomes[3]. Among the newborns who survived, most of the children also had severe sequelae, which had a serious impact on their families[4].

Therefore, it is important to search for risk factors of lower reproductive tract infection and group B streptococcus infection and timely treatment. In this study, the risk factors of lower reproductive tract infection and group B streptococcus infection and their influence on pregnancy outcome were discussed and analyzed.

Data and methods

Experimental materials

Sixty cases of pregnant women who underwent regular examinations in our hospital from August 2020 to March 2021 after inclusion and exclusion were randomly selected as the research subjects. Vaginal and rectal secretions of all the research subjects were collected for the culture of Group B streptococcus bacteria and detected by real-time quantitative PCR. To find out whether group B streptococcus culture had positive results, 29 cases were divided into the infected group and 31 cases were not in the infected group.

Inclusion criteria:

• Patients and their families all gave informed consent and signed informed consent;

• No antibiotics or immunosuppressants or vaginal medication were used within 1 month before the study;

• The gestational age is 36-38 weeks;

• The study was approved by the ethics committee of the hospital and was in line with the principles of medical ethics.

Exclusion criteria:

• Previous history of drug use and smoking;

• Have a history of mental illness;

• With heart or liver or kidney dysfunction;

• With AIDS, syphilis infection;

• Genital deformity.

Identification of group B streptococcus

Acquisition

All the research subjects in the supine position, use physiological saline to wipe genital secretions, sterile cotton swab in about one third collects the vulva vagina secretion, insert another sterile cotton swab to 3 cm on the anal sphincter in rectal secretions, the sterile cotton swab into sterile swabs tube, checkout room inspection.

Culture

The qualified specimens were placed on AGAR medium for culture, and the bacteria were identified.

Detection

Group B streptococcus infection was detected by real-time fluorescence quantitative PCR. The secretion sample was taken, mixed with 1mL normal saline, centrifuged, the precipitate was taken, 1mL normal saline was added, the centrifugation and phosphate buffer flushing steps were repeated, the precipitate was taken, 150μL nucleic acid extract was added, mixed, centrifuged, the supernatant was taken and placed on a fluorescence PCR instrument for amplification.

If the Ct value of the samples to be tested is within the range of 38~40, group B streptococcus infection is negative; If the Ct value is lower than 38, group B streptococcus infection is positive.

Observation indicators

Clinical data were collected on all subjects, including age (< 35, 35 years old), degree of culture or (and the following high school, college and above), number of antenatal examinations (6, 7 times or more or less), whether with vaginitis (yes or no), production time (primipara, multipara), being associated with gestational diabetes mellitus (yes, no), having pregnancy drugs spuc history (yes or no), being associated with anemia in pregnancy (y, n), being associated with pregnancy Hypertension during pregnancy (yes or no), history of abortion (yes or no), and maternal residence (rural or urban).

The clinical data of the two groups were compared, and the risk factors of lower reproductive tract infection and group B streptococcus infection were analyzed.

Logisitic regression was used to analyze the independent risk factors for lower reproductive tract infection and group B streptococcus infection in pregnant women.

The pregnant women were followed up to the end of pregnancy to observe the effects of lower reproductive tract infection and group B streptococcus infection on pregnancy outcome and perinatal outcome.

Statistical methods

SPSS22.0 software package was used for statistical analysis. The counting data were expressed as percentages and χ^2 test was used. For measurement data, an independent sample test-test was used for comparison between groups, paired sample t-test was used for comparison before and after treatment, repeated measure. ANOVA was used for comparison of the same index at different time points, an independent sample t-test was used for comparison of inter-group differences at different time points, and LSD-t-test was used for comparison of time differences between groups. Results were compared with data. 0.5 means the difference is statistically significant.

Results

Analysis of related indicators of 60 pregnant women

60 cases with reproductive tract infection, and group B streptococcus infection in the maternal at less than 35 years old, high school, and the following qualifications, antenatal examination number not less than 7 times, most of the maternal history of miscarriage, vaginitis, anemia during pregnancy, gestational diabetes, gestational hypertension, and other diseases, mainly for first-time mothers, and having a history of pregnancy drugs spuc. See Table 1.

Index		n	Ratio (%)
Age (Year)	<35	43	71.67
	≥35	17	28.33
Degree of education	High	42	70.00
	Junior	18	30.00
Prenatal examination (time)	≤6	11	18.33
	≥7	49	81.67
Parity	Unipara	36	60.00
	Multipara	24	40.00
Abortion	With	13	21.67
	Without	47	78.33
Vaginitis	With	18	30.00
	Without	42	70.00
Place of residence	Rural	15	25.00
	City	45	75.00
Anemia	With	6	10.00
	Without	54	90.00
Gestational diabetes	With	10	16.67
	Without	50	83.33
Medication during pregnancy to protect pregnancy history	With	8	13.33
	Without	52	86.67
Group B streptococcus infection in the lower genital tract	With	29	48.33
	Without	31	51.67
Gestational hypertension	With	1	1.67
	Without	59	98.33

Table 1: Analysis of related indicators of 60 pregnant women.

Risk factors analysis of lower reproductive tract infection and group B streptococcus infection in pregnant women

Compared with the uninfected group, the proportion of pregnant women aged ≥35 years, the number of prenatal examinations ≤6 times, vaginitis and abortion history was significantly higher in the infected group ($P<0.05$); There were no significant differences between the two groups in education level, birth rate, gestational diabetes, history of pregnancy medication, pregnancy anemia, pregnancy hypertension and residence ($P>0.05$).

Age, the number of prenatal examinations, vaginitis, and history of abortion may be risk factors for lower reproductive tract infection and group B streptococcus infection in pregnant women. See Table 2.

Index		n	Infected group (n=29)	Uninfected group (n=31)	χ^2	*P*
Age (Year)	<35	43	16 (55.17)	27 (87.10)	7.520	0.006
	≥35	17	13 (44.83)	4 (12.90)		
Degree of education	High	42	21 (72.41)	21 (67.74)	0.156	0.693
	Junior	18	8 (27.59)	10 (32.26)		
Prenatal examination (time)	≤6	11	9 (31.03)	2 (6.45)	6.048	0.014
	≥7	49	20 (68.97)	29 (93.55)		
Vaginitis	With	18	13 (44.83)	5 (16.13)	5.876	0.015
	Without	42	16 (55.17)	26 (83.87)		
Parity	Unipara	36	18 (62.07)	18 (58.06)	0.100	0.752
	Multipara	24	11 (37.93)	13 (41.94)		
Gestational diabetes	With	10	5 (17.24)	5 (16.13)	0.013	0.908
	Without	50	24 (82.76)	26 (83.87)		
Medication during pregnancy to protect pregnancy history	With	8	5 (17.24)	3 (9.68)	0.742	0.389
	Without	52	24 (82.76)	28 (90.32)		
Anemia	With	6	4 (13.79)	2 (6.45)	0.897	0.344
	Without	54	25 (86.21)	29 (93.55)		
Gestational hypertension	With	1	1 (3.45)	0 (0.00)	1.087	0.297
	Without	59	28 (96.56)	31 (100.00)		
Abortion	With	13	10 (34.48)	3 (9.68)	5.432	0.020
	Without	47	20 (68.97)	28 (90.32)		
Place of residence	Rural	15	6 (20.69)	9 (29.03)	0.556	0.456
	City	45	23 (79.31)	22 (70.97)		

Table 2: Risk factors analysis of lower reproductive tract infection and group B streptococcus infection in pregnant women.

Multivariate analysis of lower reproductive tract infection and group B streptococcus infection in pregnant women

Logisitic multivariate regression analysis showed that age, number of prenatal examinations, history of abortion, and vaginitis were independent risk factors for lower reproductive tract infection and group B streptococcus infection ($P<0.05$). See Table 3.

Index	Risk Ratio	B value	Standard error	Wald value	*P* value	95% CI	
						Lower limit	Upper limit
Constant	0.685	-0.263	1.383	0.042	0.874	—	—
Age	1.393	0.886	0.322	4.530	0.034	0.165	0.938
Number of prenatal visits	1.083	1.532	0.579	8.263	0.005	0.053	0.586
Number of prenatal visits	2.684	1.113	0.483	4.536	0.022	1.086	7.128
Number of prenatal visits	2.469	0.853	0.416	4.825	0.035	1.128	5.824

Table 3: Multivariate analysis of lower reproductive tract infection and group B streptococcus infection in pregnant women.

Influence of reproductive tract infection and group B streptococcus infection on pregnancy outcome

Compared with the uninfected group, the incidence of amniotic cavity infection, premature rupture of membranes, chorioamnitis, postpartum hemorrhage, and preterm delivery was significantly higher in the infected group (P<0.05); There was no significant difference in the incidence of asymptomatic bacteriuria between the two groups (P>0.05). See Table 4.

Group	Infected group (n=29)	Uninfected group (n=31)	χ^2	*P*
Amniotic cavity infection	8 (27.59)	2 (6.45)	4.819	0.028
Asymptomatic bacteriuria	1 (3.45)	0 (0.00)	1.087	0.297
Premature rupture of membranes	12 (41.38)	4 (12.90)	6.213	0.013
Premature rupture of membranes	6 (20.69)	1 (3.23)	4.434	0.035
Premature rupture of membranes	6 (20.69)	1 (3.23)	4.434	0.035
Preterm birth	11 (37.93)	3 (9.68)	6.686	0.010

Table 4: Effects of reproductive tract infection and group B streptococcus infection on pregnancy outcome.

Influence of reproductive tract infection and group B streptococcus infection on perinatal outcome

Compared with the uninfected group, the incidence of perinatal infection, pneumonia, sepsis, intrauterine distress, hyperbilirubinemia, and asphyxia was significantly higher in the infected group (P<0.05); There was no significant difference in the incidence of group B streptococcus infection between the two groups (P>0.05). As shown in Table 5.

Group	Infected group (n=29)	Uninfected group (n=31)	χ^2	*P*
Neonatal Infection	9 (31.03)	3 (9.68)	4.271	0.039
Pneumonia	7 (24.14)	1 (3.23)	5.220	0.022
Sepsis	8 (27.59)	1 (3.23)	6.444	0.011
Intrauterine Distress	5 (17.24)	0 (0.00)	5.831	0.016
Intrauterine Distress	2 (6.90)	1 (3.23)	0.425	0.514
Hyperbilirubinemia	15 (51.72)	5 (16.13)	8.543	0.003
Choking	6 (20.69)	1 (3.23)	4.434	0.035

Table 5: Influence of reproductive tract infection and group B streptococcus infection on perinatal outcome.

Discussion

The vaginal group B streptococcus infection is one of the most common diseases in the pregnancy, group B streptococcus is a gram-positive diplococcus, normal action figures have no obvious symptoms, but pregnant women due to hormones change, immunity to reduce many reasons, such as easy to cause the body vaginal dysbacteriosis, resulting in a series of maternal adverse pregnancy outcomes occur[5-6]. Therefore, the early diagnosis and treatment of group B streptococcus infection play an important role in improving the adverse outcomes of pregnant women and newborns.

The results of this study showed that age, number of prenatal examinations, vaginitis, and history of abortion may be risk factors for lower reproductive tract infection and group B streptococcus infection in pregnant women. Logisitic multivariate regression analysis showed that age, number of prenatal examinations, history of abortion, vaginitis, and other factors might be independent risk factors for lower reproductive tract infection and group B streptococcus infection in pregnant women. This may be because with the increase of age, the resistance to the outside world of pregnant women who have experienced abortion or accompanied by vaginitis significantly decreases, thus significantly increasing the risk of group B streptococcus infection in pregnant women[7]. A regular prenatal examination can timely find problems that may exist during pregnancy, and can timely carry out relevant intervention treatment, thus effectively reducing the risk of group B streptococcus infection.

The results of this study showed that lower genital tract infection and group B streptococcus infection could significantly increase the incidence of amniotic cavity infection, premature rupture of

membranes, chorioamnitis, postpartum hemorrhage and premature delivery in pregnant women. At present, the cause of premature rupture of membranes is still unclear, and some studies have proposed that the upward infection of pathogenic bacteria in the lower reproductive tract of pregnant women is an important cause of premature rupture of membranes[8]. After group B streptococcus infection occurs in pregnant women, group B streptococcus will infect the fetal membrane upward, stimulate inflammatory cells to produce cytokines or inflammatory mediators and aggravate the brittility of the fetal membrane. In addition, group B streptococcus degrades the fetal membrane, resulting in rupture of the fetal membrane[9]. After the rupture of membranes, group B streptococcus continued to be infected upward, further causing the occurrence of chorioamnitis[10]. In addition, premature rupture of membranes is also one of the important factors causing premature delivery[11]. Postpartum hemorrhage is a serious complication during childbirth and a major cause of maternal death. Some scholars have confirmed[12] that group B streptococcus infection can cause uterine weakness in pregnant women and change the intrauterine environment, thus causing postpartum hemorrhage in pregnant women.

The results of this study showed that lower genital tract infection and group B streptococcus infection significantly increased the incidence of perinatal and neonatal infection, pneumonia, sepsis, intrauterine distress, hyperbilirubinemia and asphyxia. Group B streptococcus infection is an important cause of neonatal invasive diseases and a major threat to neonatal death. Some studies have found[13] that group B streptococcus infection in newborns can be caused by reproductive tract or amniotic fluid with the development of pregnancy after the occurrence of group B streptococcus infection in pregnant women. Group B streptococcus infection is also the most common cause of neonatal pneumonia and sepsis[14].

Fetal distress mostly occurs before and after delivery, and even causes fetal death or neonatal asphyxia in severe cases. Previous studies have found that group B streptococcus infection can significantly increase the incidence of fetal distress[15]. The result is the same as that of this study. In conclusion, age, the number of prenatal examinations, history of abortion, vaginitis and other factors may be independent risk factors for lower reproductive tract infection and group B streptococcus infection in pregnant women, and lower reproductive tract infection and Group B streptococcus infection may cause serious adverse outcomes in pregnant women and newborns.

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