International Journal of Women's Health

Dovepress
Taylor & Francis Group

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ORIGINAL RESEARCH

Analysis of the Impact of Preterm Premature Rupture of Membranes (PPROM) on Maternal and Infant Outcomes and Countermeasures

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Objective: This study aimed to analyze the risk factors for Preterm Premature Rupture of Membranes (PPROM) and evaluate the impact of the timing of antibiotic administration on maternal and neonatal outcomes.

Methods: A retrospective cohort study was conducted involving 480 pregnant women (240 with PPROM and 240 without PPROM) hospitalized between January 2021 and December 2022. Maternal data, genital microbiome profiles, and pregnancy outcomes were collected and compared. Within the PPROM group, patients were subdivided into an Early Treatment group (received intravenous cefuroxime sodium within 12 hours of membrane rupture, n=120) and a Late Treatment group (received antibiotics after 12 hours, n=120). Statistical analyses were performed using SPSS 22.0.

Results: Genital infections (73.8% vs 20.4%, p<0.001) and gestational diabetes mellitus (GDM; 53.3% vs 22.9%, p<0.001) were significantly more prevalent in the PPROM group and were identified as independent risk factors (Genital infections: OR=3.895; GDM: OR=11.166). The PPROM group had worse outcomes, including a higher cesarean section rate (39.2% vs 25.8%, p=0.002) and higher incidences of neonatal asphyxia (4.2% vs 0.4%, p=0.006) and sepsis (2.5% vs 0%, p=0.040). Compared to the Late Treatment group, the Early Treatment group demonstrated significantly lower rates of intrauterine infection (1.67% vs 7.50%, p<0.05), cesarean section (30.0% vs 48.3%, p<0.05), neonatal asphyxia (0.83% vs 7.50%, p<0.01), and neonatal sepsis (0% vs 5.00%, p<0.05).

Conclusion: Genital tract infections and GDM are significant risk factors for PPROM. Early administration of antibiotics within 12 hours of membrane rupture is associated with substantially improved maternal and neonatal outcomes, underscoring its critical importance in clinical management.

Keywords: preterm premature rupture of membranes, PPROM, genital tract infections, timing of antibiotic treatment, maternal and infant outcomes, chorioamnionitis

Introduction

Preterm Premature Rupture of Membranes (PPROM), defined as the spontaneous rupture of the fetal membranes before 37 weeks of gestation, is a leading cause of preterm birth. This condition is associated with serious complications, including maternal and neonatal infections, fetal distress, neonatal sepsis, and placental abruption,[1] thereby posing significant threats to both maternal health and fetal survival.[2] The etiology of PPROM is multifactorial, involving infections, genetic predispositions, nutritional status, and socioeconomic factors that compromise membrane integrity.[3] Consequently, the timely identification of risk factors and effective intervention are crucial for improving pregnancy outcomes.

A well-established pathway for PPROM involves the ascension of genital tract pathogens—bacteria, fungi, mycoplasmas, and viruses—which can infect and weaken the fetal membranes.[4] Given that genital tract infections are common in pregnancy and neonatal infections remain a leading cause of mortality,[5] antibiotic therapy to control infection and prolong the latency period is a clinical cornerstone.[6] While the prophylactic use of antibiotics post-PPROM is known to reduce infection risks, a consensus on the optimal regimen, particularly the critical window for treatment initiation, is lacking and remains a subject of debate.

https://doi.org/10.2147/IJWH.S534571
Received: 11 June 2025
Accepted: 23 November 2025
Published: 15 January 2026

Extensive research has corroborated these associations. Studies by Yang Na et al and Wang Yongqin et al have identified infections, among other factors, as key triggers for PPROM.[7,8] Similarly, Lee et al emphasized genital tract infections as a primary cause and highlighted the importance of management decisions.[9] Furthermore, evidence suggests that the timing of antibiotic administration influences maternal and neonatal outcomes,[10,11] collectively making the refinement of risk stratification and treatment protocols a key focus in PPROM research.

However, critical gaps persist within this established framework. First, there is a paucity of studies that directly compare and quantify the independent contributions of multiple significant risk factors, such as genital tract infections and gestational diabetes mellitus (GDM), within a single cohort. Second, despite antibiotics being a cornerstone of management, robust evidence defining the optimal timing of initiation—specifically comparing outcomes between a clear, early window (eg, ≤12 hours) versus a later one (>12 hours) post-rupture—is still needed to guide practice.

To address these specific gaps, our study was designed with a dual focus. This retrospective analysis of 480 pregnant women admitted to our institution between 2021 and 2022 aims to: first, concurrently evaluate the independent associations of genital infections and GDM with PPROM using a binary logistic regression mo and second, provide comparative evidence on the impact of antibiotic timing by analyzing outcomes between early (≤12 hours) and late (>12 hours) treatment groups. We anticipate that the findings will generate valuable evidence to inform more effective and timely clinical management strategies, ultimately helping to mitigate the adverse outcomes associated with PPROM.

Materials and Methods

Study Population and Ethical Approval

This retrospective cohort study was conducted by reviewing the medical records of 480 pregnant women who were hospitalized in the Department of Obstetrics and Gynecology at The Third Affiliated Hospital of Wenzhou Medical University between January 2021 and December 2022.

All participants and their family members were fully informed about the study and signed the corresponding informed consent forms. This study was approved by the Medical Ethics Committee of The Third Affiliated Hospital of Wenzhou Medical University (Approval No.: YJ2025090) and was conducted in strict accordance with the ethical guidelines of the Declaration of Helsinki.

Based on the presence or absence of Preterm Premature Rupture of Membranes (PPROM), the subjects were divided into two groups: the PPROM group (n=240) and the Non-PPROM (NPPROM) group (n=240). The patients in the NPPROM group were hospitalized for other obstetric indications (eg, threatened preterm labor, cervical insufficiency) but with confirmed intact membranes. There were no statistically significant differences ($P > 0.05$) in baseline characteristics such as maternal age, proportion of primipara/multipara, history of miscarriage, abnormal fetal position, or pregnancy-induced hypertension between the two groups, indicating comparability.

Furthermore, based on the timing of antibiotic administration after membrane rupture, the PPROM group was subdivided into an Early Treatment group (n=120), who received cefuroxime sodium within 12 hours of membrane rupture, and a Late Treatment group (n=120), who received the antibiotic after 12 hours. The baseline characteristics between these two subgroups were also comparable ($P > 0.05$).

Diagnostic Criteria

Diagnostic Criteria for PPROM

PPROM was diagnosed according to the criteria outlined in the 7th edition of "Obstetrics and Gynecology".[12] A confirmed diagnosis required the presence of at least three of the following five criteria: (1) Patient history of a sudden gush or persistent leakage of vaginal fluid. (2) Direct visualization of fluid pooling in the vaginal vault or fluid leakage from the cervical os upon applying fundal pressure during a sterile speculum examination. (3) Alkaline pH of the vaginal fluid (pH > 6.5), confirmed by Nitrazine yellow test paper. (4) Laboratory microscopic examination of vaginal fluid revealing ferning (arborization) or the presence of fetal components such as lanugo hair or fetal epithelial cells. (5) Sonographic assessment indicating a significant reduction in amniotic fluid volume (oligohydramnios).

Diagnostic and Inclusion Criteria for NPPROM

(1) Gestational age between 28 weeks and 36+6 weeks, with intact membranes confirmed by sterile speculum examination and the aforementioned diagnostic tests for PPROM yielding negative results. (2) Singleton pregnancy. (3) The patient has no intellectual or hearing impairments and is able to cooperate with the investigation. (4) Strict adherence to medical advice and completion of treatment in our hospital, with complete clinical data available. (5) All cases must have clear prenatal and postnatal diagnoses.

Additional PPROM Characteristics

For patients in the PPROM group, the duration of membrane rupture was categorized as follows: ≤1 day, 1–3 days, 3–7 days, and >7 days. The color and nature of the amniotic fluid, specifically whether it was clear or meconium-stained, were also recorded from the clinical notes at the time of speculum examination.

Exclusion Criteria

The exclusion criteria for both groups were as follows: (1) Cases with incomplete or unclear pathological or clinical diagnostic data. (2) Multiple pregnancies (eg, twins or triplets). (3) Patients with pre-existing liver or kidney dysfunction, severe systemic diseases (eg, autoimmune disorders), or severe cardiovascular diseases that could independently influence maternal or neonatal outcomes. (4) Pregnant women with irregular menstrual cycles, an uncertain last menstrual period, or who did not strictly follow prenatal care advice. (5) Patients with a history of severe mental illness.

Treatment Protocol and Specimen Collection

Standardized Treatment Regimen

All pregnant women in the PPROM group received a standardized antibiotic and corticosteroid regimen. The primary antibiotic used was Cefuroxime Sodium for Injection (Manufacturer: Zhejiang Huidisen Pharmaceutical Co., Ltd.; National Medicine Approval Number H20084091; Specification: 1.5g). The dosage was 1.5g diluted in 100 mL of 0.9% sodium chloride solution, administered intravenously twice daily until delivery. In cases where patients showed a poor response or suspected resistance to cefuroxime sodium, the antibiotic regimen was escalated based on clinical judgment and bacterial culture results, typically to a broader-spectrum antibiotic such as intravenous azithromycin or clindamycin, as per hospital protocol.

Additionally, all women received prenatal corticosteroids for fetal lung maturation. Dexamethasone Sodium Phosphate (Manufacturer: Tianjin Jinyao Group Hubei Tianyao Pharmaceutical Co., Ltd.; Approval Number: H42020019; Specification: 1mL:5mg) was administered at a dose of 6mg via intramuscular injection, twice daily for 2 consecutive days.

Sample Collection and Microbiological Analysis

(1) Sample Collection: Upon admission, after routine disinfection of the perineum, specimens were collected for microbial culture. A sterile swab was inserted into the lower third of the vagina without using a speculum and rotated for approximately 1 minute to collect vaginal secretions.

(2) Pathogen Detection: The collected samples were subjected to standard bacterial culture and testing. The panel of pathogens investigated included Group B Streptococcus, *Ureaplasma urealyticum*, *Mycoplasma hominis*, fungi, and other agents associated with bacterial vaginosis (eg, *Gardnerella vaginalis*).[13]

White Blood Cell (WBC) Count

A 3 mL fasting venous blood sample was collected from the pregnant woman's antecubital vein for a white blood cell count. The blood sample was drawn upon admission, immediately following the diagnosis of PPROM or for the NPPROM group, upon hospitalization. WBC count was measured using the automated hematology analyzer Sysmex XN-20 (Aikon Biotech Co., Ltd). The WBC levels were categorized as $<10\times10^9$/L, $(10–15)\times10^9$/L, and $>15\times10^9$/L.

Observation Indicators

Data were collected from electronic medical records on the following parameters:

General Maternal Data

Maternal age, pre-pregnancy body mass index (BMI), obstetric history (primipara/multipara, history of miscarriage), fetal position, and the prevalence of antenatal complications, including gestational diabetes mellitus (GDM) and pregnancy-induced hypertension.

Pregnancy and Neonatal Outcomes

Delivery Characteristics: Mode of delivery (vaginal/cesarean section), gestational age at delivery, and total duration of labor.

Maternal Morbidities: The occurrence of postpartum hemorrhage (defined as an estimated blood loss >500 mL for vaginal delivery or >1000 mL for cesarean section), clinical chorioamnionitis (diagnosed by the presence of maternal fever ≥38°C, uterine tenderness, fetal tachycardia, and/or maternal leukocytosis), histologically confirmed chorioamnionitis (based on placental pathology reports), postpartum infection (eg, endometritis, surgical site infection), and maternal fever (a single temperature ≥38°C) around the time of delivery.

Neonatal Outcomes: Neonatal birth weight, 5-minute Apgar score, and the incidence of neonatal complications, including neonatal asphyxia (defined as a 5-minute Apgar score <7), neonatal respiratory distress syndrome (RDS), and neonatal sepsis (confirmed by positive blood culture or clinical signs accompanied by elevated inflammatory markers).

Sample Collection and Microbiological Analysis

(1) Sample Collection: Upon admission, after routine disinfection of the perineum, specimens were collected for microbial culture. A sterile swab was inserted into the lower third of the vagina without using a speculum and rotated for approximately 1 minute to collect vaginal secretions. A separate sterile swab was inserted into the rectum, approximately 2–3 cm past the anal sphincter, and gently rotated to collect rectal secretions.

(2) Pathogen Detection: The collected samples were subjected to standard bacterial culture and testing. The panel of pathogens investigated included Group B Streptococcus, *Ureaplasma urealyticum*, *Mycoplasma hominis*, fungi, and other agents associated with bacterial vaginosis (eg, *Gardnerella vaginalis*).[13]

White Blood Cell (WBC) Count

A 3 mL fasting venous blood sample was collected from the pregnant woman's antecubital vein for a white blood cell count. The blood sample was drawn upon admission, immediately following the diagnosis of PPROM or for the NPPROM group, upon hospitalization. WBC count was measured using the automated hematology analyzer Sysmex XN-20 (Aikon Biotech Co., Ltd). The WBC levels were categorized as $<10\times10^9$/L, $(10–15)\times10^9$/L, and $>15\times10^9$/L.

Statistical Methods

All statistical analyses were performed using SPSS Statistics version 22.0 (IBM Corp., Armonk, NY, USA). Categorical data were presented as numbers and percentages (n, %) and were compared between groups using the Chi-square (χ^2) test or Fisher's exact test, as appropriate. Ordinal data (eg, WBC categories) were analyzed using the non-parametric Mann–Whitney *U*-test (rank-sum test). Continuous data (eg, maternal age, gestational age) were expressed as mean ± standard deviation (Mean ± SD) and compared using the independent samples *t*-test, provided the data were normally distributed; otherwise, the Mann–Whitney *U*-test was used. A binary logistic regression model was employed to analyze the risk factors associated with PPROM and adverse outcomes. A two-tailed P-value of less than 0.05 was considered statistically significant.

Results

Baseline Demographic and Clinical Characteristics

A total of 480 pregnant women were included in this study, with 240 in the PPROM group and 240 in the NPPROM group. All participants were of Han Chinese ethnicity from the Wenzhou region of China. The baseline characteristics are summarized in Table 1. There were no statistically significant differences between the two groups in terms of maternal

Table 1 Comparison of Baseline Demographic and Clinical Characteristics

Characteristic	PPROM (n=240)	NPPROM (n=240)	χ^2/t	p-value
Maternal Age (years), Mean ± SD	29.82 ± 3.97	29.7 ± 3.77	0.336	0.737
Primipara, n (%)	94 (39.2%)	102 (42.5%)	0.552	0.458
Multipara, n (%)	146 (60.8%)	138 (57.5%)		
Miscarriage History (≥3), n (%)	56 (23.3%)	41 (17.1%)	2.907	0.088
Genital Infections, n (%)	177 (73.8%)	49 (20.4%)	137.000	<0.001
Gestational Diabetes Mellitus, n (%)	128 (53.3%)	55 (22.9%)	47.063	<0.001
Gestational Hypertension, n (%)	38 (15.8%)	20 (8.3%)	6.354	0.012
Abnormal Fetal Position, n (%)	42 (17.5%)	38 (15.8%)	0.240	0.624

age, proportion of primiparas/multiparas, history of miscarriage, gestational hypertension, or abnormal fetal position ($P > 0.05$). Among the cases with abnormal fetal position, breech presentation was the most common (PPROM: 35/42, 83.3%; NPPROM: 30/38, 78.9%), with the remainder being transverse lie.

However, the incidence of genital infections (73.8% vs 20.4%, $P < 0.001$) and gestational diabetes mellitus (GDM) (53.3% vs 22.9%, $P < 0.001$) was significantly higher in the PPROM group compared to the NPPROM group.

Risk Factors and Genital Microbiome Profile

Binary logistic regression analysis confirmed that both genital infections (OR = 3.895, 95% CI: 2.441–6.218) and GDM (OR = 11.166, 95% CI: 7.102–17.557) were independent and significant risk factors for PPROM.

The profile of lower genital tract pathogens was significantly different between the groups (Table 2). The overall infection rate was 73.8% in the PPROM group versus 20.4% in the NPPROM group ($P < 0.001$). The most frequently isolated fungus was Candida albicans, identified by standard culture methods. It is important to clarify that while Gardnerella vaginalis is a key organism in Bacterial Vaginosis (BV), we reported them separately as BV is a clinical diagnosis based on Nugent's criteria or Amsel's criteria, reflecting a polymicrobial dysbiosis, whereas G. vaginalis detection indicates the presence of that specific pathogen.

Maternal and Neonatal Outcomes and PPROM Duration

The duration of membrane rupture in the PPROM group was categorized as follows: ≤1 day (n=85, 35.4%), 1–3 days (n=98, 40.8%), 3–7 days (n=45, 18.8%), and >7 days (n=12, 5.0%). All PPROM patients received the standardized prophylactic corticosteroid regimen (dexamethasone) as detailed in the Methods section.

Maternal and neonatal outcomes were significantly worse in the PPROM group (Table 3). The PPROM group delivered at an earlier gestational age and had higher rates of cesarean section, chorioamnionitis, and postpartum infection. Neonates in the PPROM group had significantly higher rates of pneumonia, asphyxia, sepsis, RDS, and mortality. An analysis based on birth weight revealed that 28 neonates (11.7%) in the PPROM group had a birth weight <1500g, compared to 0 in the NPPROM group. These very low birth weight infants accounted for 7 of the 8 neonatal deaths in the PPROM group.

Table 2 Comparison of Genital Pathogen Infection Rates Between the Two Groups

Pathogen	PPROM (n=240)	NPPROM (n=240)	χ^2	p-value
Group B Streptococcus	52 (21.7%)	14 (5.8%)	25.37	<0.001
Ureaplasma urealyticum	105 (43.7%)	17 (7.1%)	85.10	<0.001
Mycoplasma hominis	88 (36.6%)	7 (2.9%)	86.11	<0.001
Fungi	112 (46.6%)	19 (7.9%)	90.81	<0.001
Bacterial Vaginosis	37 (15.4%)	17 (7.1%)	8.35	0.004
Gardnerella vaginalis	10 (4.2%)	2 (0.8%)	5.47	0.019

https://doi.org/10.2147/IJWH.S534571

Table 3 Comparison of Maternal and Neonatal Outcomes

Outcome	PPROM (n=240)	NPPROM (n=240)	χ^2/t	p-value
Maternal Outcomes				
Gestational Age at Delivery (weeks)	32.04 ± 1.88	38.65 ± 1.07	2.166	0.032
Cesarean Section, n (%)	94 (39.2%)	62 (25.8%)	9.730	0.002
Chorioamnionitis, n (%)	12 (5.0%)	3 (1.3%)	5.570	0.018
Postpartum Infection, n (%)	9 (3.8%)	1 (0.4%)	15.286	<0.001
Intrauterine Infection, n (%)	11 (4.6%)	3 (1.3%)	4.700	0.030
Postpartum Hemorrhage, n (%)	3 (1.3%)	1 (0.4%)	0.252	0.616
Neonatal Outcomes				
Pneumonia, n (%)	94 (39.2%)	62 (25.8%)	9.730	0.002
Jaundice, n (%)	130 (54.2%)	97 (40.4%)	1.630	0.201
Neonatal Asphyxia*, n (%)	10 (4.2%)	1 (0.4%)	7.540	0.006
Sepsis, n (%)	6 (2.5%)	0 (0.0%)	4.220	0.040
Respiratory Distress Syndrome, n (%)	16 (6.7%)	4 (1.7%)	7.510	0.006
Death, n (%)	8 (3.3%)	1 (0.4%)	4.080	0.043

Note: *Neonatal asphyxia was defined as a 5-minute Apgar score <7.

Table 4 Comparison of White Blood Cell Counts Upon Admission Between Early and Late PPROM Subgroups

Group	$<10\times10^9$/L	$(10–15)\times10^9$/L	$>15\times10^9$/L
Early Group (n=120)	50 (41.67%)	60 (50.00%)	10 (8.33%)
Late Group (n=120)	28 (23.33%)	66 (55.00%)	26 (21.67%)
χ^2	9.193	0.602	8.366
p-value	0.002	0.438	0.004

Impact of Antibiotic Timing and Inflammatory Markers

Among the 240 PPROM patients, outcomes were compared between those who received antibiotics within 12 hours of membrane rupture (Early Group, n=120) and those who received them after 12 hours (Late Group, n=120).

Maternal Outcomes: The early group had a significantly lower rate of intrauterine infection (1.67% vs 7.50%, $P < 0.05$) and postpartum infection (0.83% vs 6.67%, $P < 0.05$). The cesarean section rate was also lower in the early group (30.0% vs 48.3%, $P < 0.05$).

Neonatal Outcomes: The 5-minute Apgar score was significantly higher in the early group (9.80 ± 0.46 vs 9.26 ± 1.05, $P < 0.001$). Using a cutoff of <7 to define asphyxia, the incidence was significantly lower in the early group (0.83% vs 7.50%, $P < 0.01$). The early group also had markedly lower rates of neonatal respiratory distress syndrome (RDS) (3.33% vs 10.00%, $P < 0.05$) and neonatal sepsis (0% vs 5.00%, $P < 0.05$). Other common preterm complications such as Bronchopulmonary Dysplasia (BPD), Retinopathy of Prematurity (ROP), Intraventricular Hemorrhage (IVH), and Periventricular Leukomalacia (PVL) were not routinely screened for in all neonates in this retrospective study and thus are not reported.

Inflammatory Markers: The distribution of white blood cell (WBC) counts upon admission differed significantly between the early and late treatment subgroups (Table 4). A notably lower proportion of women in the early group had a WBC count $>15\times10^9$/L, a marker often associated with more significant inflammation.

Discussion

This study confirms the significant impact of PPROM on maternal and neonatal outcomes and underscores the critical importance of early intervention. Our findings align with existing literature, identifying genital tract infections and GDM

as independent risk factors for PPROM, and demonstrating that early antibiotic administration within 12 hours of membrane rupture is associated with markedly improved clinical results.[14–16]

The robust association between genital tract infections and PPROM (OR = 3.895) in our cohort is pathophysiologically plausible. The presence of pathogens such as Ureaplasma urealyticum and Candida species, which were highly prevalent in our PPROM group, can trigger a local inflammatory cascade. This response leads to the release of proteases, collagenases, and endotoxins that degrade the extracellular matrix and collagen of the fetal membranes, thereby reducing their tensile strength and predisposing them to rupture.[17] The link with GDM (OR = 11.166), while multifactorial, may be related to hyperglycemia-induced endothelial dysfunction and structural alterations in the fetal membranes, potentially creating an imbalance in intrauterine pressure.[18] These findings reinforce the necessity of rigorous prenatal screening and management of these conditions to mitigate PPROM risk.

A key finding of our study is the superior outcomes associated with early antibiotic intervention. The administration of cefuroxime sodium within 12 hours of membrane rupture was associated with significant reductions in intrauterine infection, chorioamnionitis, and postpartum infection. The neonatal benefits were equally compelling, with the early treatment group exhibiting higher 5-minute Apgar scores and lower incidences of asphyxia, RDS, and sepsis. The mechanism is likely twofold: early antibiotics effectively suppress microbial proliferation, preventing the ascent of infection and the associated inflammatory response that can trigger prostaglandin-mediated uterine contractions.[19,20] This can prolong the latency period, allowing for enhanced fetal lung maturity and reducing the severity of inflammatory insults to the fetus.

Notably, we observed a significantly higher rate of vaginal delivery in the early treatment group. A plausible explanation for this association is that by rapidly controlling subclinical intra-amniotic infection and reducing inflammation, early antibiotic therapy may lead to a more favorable cervical condition and a lower incidence of intrapartum fever or fetal distress. These factors are common indications for cesarean section in the context of PPROM. In contrast, the late group, with a higher burden of infection and inflammation, may have experienced more frequent clinical chorioamnionitis and non-reassuring fetal status, thereby increasing the cesarean delivery rate.[21–23] This finding highlights that timely antibiotic administration not only mitigates infection but may also facilitate a physiological labor process.

Our results are consistent with other studies emphasizing the importance of early diagnosis and management of PPROM.[24,25] The study by Wang Siyuan et al also stressed the importance of early screening for genital infections to prevent PPROM.[19] However, we did not find a significant difference in neonatal birth weight between the early and late treatment groups, a finding that may be attributed to our sample size or the specific gestational age distribution of our cohort.

Study Limitations

While this study provides valuable clinical insights, several limitations must be acknowledged. First, the retrospective design inherently carries the risk of selection bias and unmeasured confounding factors, and the reliance on medical records may lead to inaccuracies or incomplete data. Second, the single-center nature of the study and the modest sample size limit the generalizability of our findings. A particular consequence of the sample size was the insufficient number of neonates born at <34 weeks, which precluded a meaningful subgroup analysis of outcomes in very preterm and extremely preterm infants. Third, our analysis of risk factors was not exhaustive, and future prospective studies should incorporate a wider array of potential variables. Finally, and critically, the absence of placental histopathological assessments for chorioamnionitis or funisitis represents a significant limitation. Without this gold-standard evidence, our interpretation of the routes and extent of intrauterine infection remains incomplete and reliant on clinical criteria alone. Despite these limitations, our data robustly support the clinical value of early antibiotic intervention in PPROM.

Conclusion

In conclusion, genital tract infections and GDM are significant risk factors for PPROM. Implementing routine prenatal screening for these conditions is a crucial preventive strategy. For patients who experience PPROM, the early administration of cefuroxime sodium within 12 hours of membrane rupture is a key therapeutic measure. This approach effectively reduces systemic and intrauterine inflammation, thereby lowering the incidence of chorioamnionitis, postpartum infection, and serious neonatal complications such as sepsis and RDS. Ultimately, this protocol improves maternal and neonatal prognosis and is recommended for widespread clinical adoption.

Funding

This work was supported by Rui'an Science and Technology Bureau (Grant No. MS2024022).

Disclosure

The authors report no conflicts of interest in this work.

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