

Relationship between the timing and mode of termination of pregnancy and maternal and infant outcomes in full-term primiparous premature rupture of membranes

Xueling Zhang*, Jingya Li, Zhexia Hu, Biyun Luo, Lishe Chen

The Fourth Hospital of Shijiazhuang, Obstetrics Department, Hebei Province, Shijiazhuang, Hebei, China 050000

CITATION

Author Name. (2025). Article title. Journal of Infrastructure, Policy and Development. 9(x): X.
<https://doi.org/10.24294/jipdxxxx>

ARTICLE INFO

Received: Date Month Year
Revised:
Accepted: Date Month Year
Available online: Date Month Year

COPYRIGHT



Copyright © 2025 by author(s).
Psycho-Oncologie is published by PiscoMed Publishing Pte.Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license. <https://creativecommons.org/licenses/by/4.0/>

Abstract: objective: to explore the different ways of timing and termination of pregnancy to full term premature rupture of membranes first-timer maternal and outcomes. Selection methods: from May 2019 to May 2022 treated 320 cases of full term bond position as head of premature rupture of membranes, maternal according to rupture to the length of time to termination of pregnancy, childbirth time is divided into four groups: Including < 12 h group (rupture to the delivery time less than 12 h), 12 ~ 24 h group (rupture to delivery time 12 hours or more but less than 24 hours), 24 ~ 48 group (rupture to delivery time 24 hours or more but less than 48 hours), or greater 48 h group (rupture to the delivery time is greater than or equal to 48 hours).

Compare pregnancy time with different modes of delivery and outcomes. Results: under different time to termination of pregnancy, four groups of vaginal delivery (including midwifery, shun deliser), cesarean delivery (including social factors cesarean section, cesarean section), baby total incidence of poor prognosis, maternal aderse outcome, compared to the total incidence of statistically significant difference ($P < 0.05$). Different delivery modes, four groups of neonatal prognosis total rate, maternal outcome, compared to the total incidence of statistically significant difference ($P < 0.05$). Conclusion: the different timing and termination of pregnancy and outcomes are different, the way of termination time < 12 h for the optimal timing of termination of pregnancy, can improve its and outcomes, reduce the incidence of adverse outcomes.

Keywords: term; First-time mothers; Premature rupture of membranes; Time to termination of pregnancy; Childbirth way; And outcomes

The introduction

Premature rupture of membranes for labor before rupture of membranes, increases perinatal mortality, intrauterine infection rate, rate of puerperal disease risk^[1,2], etc. Research pointed^[3,4] out that the term premature rupture of membranes occurred after, can lead to complete loss of fetal membrane barrier function, pathogenic bacteria along the genital tract into the uterine cavity and maternal blood circulation, causing puerperal infection. Therefore, when premature rupture of membranes occurs, the effect of the mode and timing of pregnancy termination on maternal and infant outcomes cannot be ignored. Clinical

studies suggest[5,6] that different ways of timing, termination of pregnancy, and outcomes are gained by the differences, if rupture in 24 h after has not been in labor, may be caused by longer rupture in time of the amniotic fluid and prolonged wound contact with pathogenic microorganisms, increase the risk of infection. Based on this, this study explore the single fetal position head term premature rupture of membranes first-timer timing and way and the termination of pregnancy and outcomes.

1. The data and methods

1.1 the research object and general information

The object of study for our hospital 320 cases of full term premature rupture of membranes first-timer maternal, selected fixed number of year to may, 2019 to May 2022, the age of 19 to 34 years old, the average age was $(27.95 + 5.34)$, gestational age at 37 ~ 40 weeks, the average gestational age was $(39.61 + 2.06)$, Body mass index for 18 to 29 kg/m², average body mass index was $(26.35 + / - 2.91 \text{ kg/m}^2)$

Inclusion criteria: (1) clinical data integrity; (2) full term, position head; (3) for the first time production. Premature rupture of membranes (4) conform to the diagnosis and treatment guidelines (2015) in the diagnosis of premature rupture of membranes standards; ^[7]5. Older than 19 less than 34 years old.

Exclusion criteria: (1) history of middle and above induced labor; (2) in patients with chronic diseases such as hypertension, diabetes during pregnancy; (3) history of severe disease of heart liver and kidney, pancreas disease; (4) the gastrointestinal, respiratory and urinary tract potential infection; 5. Within 1 week before the used antibacterial, hormones and other drugs.

1.2 research method

1.2.1 termination timing

Patients on the basis of rupture to the length of time to termination of pregnancy, childbirth time Including < 12 h group (rupture to the delivery time less than 12 h), 12 ~ 24 h group (rupture to delivery time 12 hours or more but less than 24 hours), 24 ~ 48 group (rupture to delivery time 24 hours or more but less than 48 hours), or greater 48 h group (rupture to the delivery time is greater than or equal to 48 hours).

1.2.2 for termination of gestation

Termination way including cesarean delivery (social factors cesarean section, cesarean section), or oxytocin induced labor of assisted vaginal delivery (midwifery, oxytocin induced labor deliser), natural labor suitable deliser.

1.2.3 Maternal and infant outcomes

Statistical group infants prognosis (cranial hematoma, infection, respirato-

ry distress, intracranial hemorrhage, suffocation, a broken collarbone, jaundice, pneumonia, necrotizing enterocolitis) and maternal outcomes (> 1000 ml, urinary retention, postpartum bleeding wound healing, postpartum hemorrhage, 500-1000 ml, chorioamnionitis, produce fever) between what is happening.

1.3 statistical analysis

SPSS25.0 software was used to analyze and process the data. The measurement data were in accordance with normal distribution and were expressed as mean $\pm$ standard deviation ($\bar{x} \pm s$). Comparison between count data set for X-ray2 inspection, use cases (percentage)/n (%). ($P < 0.05$), showed statistically significant difference.

2. Results

2.1 Comparison of delivery modes under different termination timing

As shown in **Table 1**, among the 320 cases of full-term premature rupture of membranes, cesarean section accounted for 43.75% (140/320), and vaginal delivery accounted for 56.25% (180/320). There were 93 cases (29.06%, 93/320) who delivered within 12 hours after rupture of amniotic membrane. 48.44% (155/320) delivered within 12-24 hours after water breaking; 20% (64/320) in broken water 24 hours but less than 48 hours after childbirth, only 0.62% (8/320) after 48 hours after breaking the water delivery; The rupture within 48 hours after birth was 97.5% in patients with comparison of four groups of childbirth way, statistically significant difference ($P < 0.05$).

Table 1. Comparison of delivery modes under different termination timing [n (%)]

group	Number of cases	Vaginal delivery	Cesarean section	Midwifery	Cis-delivery	Social factors Cesarean section	Transfer to cesarean section
< 12h group	93	22 (23.66)	71 (76.34)	5 (5.38)	17 (18.28)	40 (43.01)	31 (33.33)
12 to 24h group	155	109 (70.32)	46 (29.68)	33 (21.29)	76 (49.03)	17 (10.97)	29 (18.71)
24 to 48 sets	64	43 (67.19)	21 (32.81)	16 (25.00)	27 (42.19)	7 (10.94)	14 (21.88)
Acuity 48 h group	8	6 (75.00)	2 (25.00)	2 (25.00)	4 (50.00)	0 (0.00)	2 (25.00)
x2		56.875	81.466	13.816	24.069	43.965	7.022
P		<0.001	<0.001	0.003	<0.001	<0.001	0.071

2.2 comparing different termination time of neonatal prognosis

As shown in **table 2**, 48 h p group total rate is higher than the < 12 h group, 12 ~ 24 h, 24 ~ 48 group; The total incidence of 24-48 h group was higher than that of < 12h group and 12-24 h group. Lowest total incidence and < 12 h group, difference has statistical significance ($P < 0.05$).

Table 2. Comparison of infant prognosis under different timing of termination [n (%)]

Groups	Number of cases	Respiratory distress	Jaundice	Infection	Choking	Intracranial hemorrhage	Cephalohematomas	Fractured clavicle	pneumonia	Necrotizing enterocolitis	Total incidence (%)
< 12h group	93	1 (1.08)	9 (14.06)	2 (2.15)	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.08)	2 (2.15)	0 (0.00)	15 (16.13)
12 to 24h group	155	0 (0.00)	27 (17.42)	12 (7.74)	0 (0.00)	1 (0.65)	0 (0.00)	0 (0.00)	3 (1.94)	1 (0.65)	44 (28.39)
24 ~ 48 group	64	0 (0.00)	9 (14.06)	6 (9.38)	0 (0.00)	3 (4.69)	1 (1.56)	0 (0.00)	3 (4.69)	0 (0.00)	22 (34.38)
≥48h group	8	0 (0.00)	2 (25.00)	1 (12.50)	0 (0.00)	0 (0.00)	1 (12.50)	0 (0.00)	0 (0.00)	0 (0.00)	4 (50.00)
x2		2.449	3.485	4.589	-	7.864	20.629	2.499	1.711	1.068	9.710
P		0.485	0.323	0.204	-	0.049	<0.001	0.485	0.635	0.785	0.021

2.3 comparing the influence of different time to termination of pregnancy on maternal

As shown in **table 3**, and < 12 compared h group, 12 ~ 24 h group, 24 ~ 48, acuity 48 h group total rate increases; Compared with 12 ~ 24 h group, 24 ~ 48, acuity 48 h group total rate increases; Compared with the 24-48 h group, the total incidence of the ≥48h group increased, and the difference was statistically significant ($P < 0.05$).

Table 3. Comparison of maternal effects of different timing of termination of pregnancy [n (%)]

Groups	Number of cases	Postpartum hemorrhage > 1000ml	Postpartum hemorrhage 500-1000ml	Poor wound healing	Chorioamnionitis	Urinary retention	Intrapartum fever	Total incidence (%)
< 12h group	93	0 (0.00)	8 (8.60)	0 (0.00)	22 (23.66)	0 (0.00)	0 (0.00)	10 (10.75)
12 to 24h group	155	0 (0.00)	8 (5.16)	(1)	32 (20.65)	0 (0.00)	6 (3.87)	47 (30.32)
24 to 48 sets	64	0 (0.00)	4 (6.25)	0 (0.00)	18 (28.13)	0 (0.00)	6 (9.38)	28 (43.75)
≥48h group	8	0 (0.00)	1 (12.50)	0 (0.00)	2 (25.00)	0 (0.00)	1 (12.50)	4 (50.00)
x2		-	4.318	1.068	1.467	-	10.048	24.026
P		-	0.229	0.785	0.690	-	0.018	<0.001

2.4 To compare the effects of different delivery modes on neonatal prognosis

As shown in **table 4**, the total rate of midwifery is highest, followed by cesarean section, natural birth, and the lowest incidence of total social factors cesarean section, and the four groups, compared to the total incidence of statistically significant difference ($P < 0.05$).

Table 4. Comparison of the effects of different delivery modes on neonatal prognosis [n (%)]

Groups	Number of cases	Jaundice	Fractured clavicle	Asphyxia neonatorum	Infection	pneumonia	Necrotizing enterocolitis	Cephalohematomas	Intracranial hemorrhage	Admission to pediatrics	Respiratory distress	Total incidence (%)
Vaginal birth	124	12 (9.68)	0 (0.00)	0 (0.00)	5 (4.03)	2 (1.61)	1 (0.81)	1 (0.81)	1 (0.81)	8 (6.45)	0 (0.00)	30 (24.19)
Midwifery	56	17 (30.36)	1 (1.79)	0 (0.00)	9 (16.07)	4 (7.14)	0 (0.00)	1 (1.79)	2 (3.57)	10 (17.86)	0 (0.00)	44 (78.57)
Social factors Cesarean section	64	4 (6.25)	0 (0.00)	0 (0.00)	3 (4.69)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	5 (7.81)	0 (0.00)	12 (18.75)

Trans-fer to cesarean section	76	14 (18.42)	0 (0.00)	0 (0.00)	4 (5.26)	2 (2.63)	0 (0.00)	0 (0.00)	1 (1.32)	13 (17.11)	1 (1.32)	35 (46.05)
x2		17.939	4.729	-	10.129	6.999	1.586	2.161	3.455	8.675	3.221	61.429
P		<0.001	0.193	-	0.018	0.072	0.663	0.540	0.327	0.034	0.359	<0.001

2.5 Compare the maternal effects of different delivery modes

As shown in **table 5**, the transit caesarean section maternal aderse outcome total rate higher than the natural labor, social factors cesarean section, midwifery; The rest three groups of total incidence of aderse outcome for midwifery in turn, social factors cesarean section, natural birth, and four groups, compared to the total incidence of statistically significant difference ($P < 0.05$).

Table 5. Comparison of the effects of different delivery modes on mothers [n (%)]

Groups	Number of cases	Postpartum hemor-rhage > 1000ml	Postpartum hemor-rhage in 500-1000 ml	Poor wound healing	Chorioamnionitis	Total rate (%)
Vaginal birth	124	0 (0.00)	0 (0.00)	0 (0.00)	13 (10.48)	13 (10.48)
Midwifery	56	0 (0.00)	1 (1.79)	0 (0.00)	25 (44.64)	26 (46.43)
Social factors Cesarean section	64	0 (0.00)	9 (14.06)	0 (0.00)	7 (10.94)	16 (25.00)
Transfer to cesar-ean section	76	0 (0.00)	11 (14.47)	1 (1.32)	29 (38.16)	41 (53.95)
x2		-	24.421	3.221	40.740	51.204
P		-	<0.001	0.359	<0.001	<0.001

3. Discuss

Term premature rupture of membranes is a common obstetric complica-tions, the incidence of about 8%, the impact and outcomes, and increase the risk of puerperal infection occurred, and cause of placental abruption, fetal distress, such as the occurrence of the event, threat of maternal-fetal life, further increase the adverse and outcomes of the risk. [8,9]Relevant studies have shown [10,11] that the occurrence of maternal and infant outcomes of premature rupture of membranes is closely related to the duration of rupture of membranes and the mode of labor induction. Prolonged rupture of membranes in full-term premature rupture of membranes may threaten the safety of mothers and infants. This study confirms this point of view. This study said < 12 h group adverse incidence and outcomes were less than 12 ~ 24 h group, 24 ~ 48, acuity 48 h group. The results suggest that induction of labor within 12h of PROM can effectively reduce the incidence of adverse pregnancy outcomes. The causes of adverse maternal and infant outcomes after premature rupture of membranes may be that after the closed environment of the uterine cavity is opened, the amniotic fluid is discharged in large amounts, and the uterine cavity is communicated with the outside world, so that a large number of pathogenic bacteria enter the uterine cavity through the vagina. With the prolongation of the rupture of membranes, the amniotic fluid is further reduced, the placenta and umbilical cord are significantly compressed and even the umbilical cord prolapse occurs, which impedes fetal blood circulation

and increases the duration of labor. As a result, the incidence of adverse maternal and infant outcomes is increased.^[12-14]

Premature rupture of membranes is associated with increased intrauterine pressure, reproductive tract infection and other factors. It is easy to induce placental abruption, resulting in bleeding, which is not conducive to normal delivery. Due to the decrease of amniotic fluid volume, it will increase the pressure of the fetus in the intrauterine cavity, cause umbilical cord prolapse, and lead to fetal intrauterine distress. The longer the duration of premature rupture of membranes, the higher^[15,16] the risk of adverse maternal and infant outcomes. The method of termination of pregnancy can be selected according to the maternal gestational age, fetal size, and condition. The results of this study show that the total incidence of maternal and neonatal outcomes of cesarean section and random delivery is lower than that of transfer cesarean section and midwifery. The results indicate that the maternal and infant outcomes are different in different delivery modes. The reason may be that midwifery and cesarean section should be carried out actively to ensure the safety of mother and fetus when intrauterine abnormalities occur. If the time of water breaking is too long, the amniotic fluid volume will be further reduced, which will affect the fetal head into the basin, increase the cesarean section rate and the risk of postpartum hemorrhage, and lead to adverse maternal and infant outcomes^[17,18].

In conclusion, the earlier the termination of pregnancy in full-term primiparous women with premature rupture of membranes, the higher the vaginal delivery rate, the higher the quality of life of the newborns, and the better the maternal and infant outcomes, and the occurrence of adverse maternal and infant outcomes can be effectively reduced by reasonable selection of delivery methods. However, there are still limitations of this study. The sample size of this study is limited, which may be different from the results of previous studies. It is necessary to expand the sample size in the future to obtain more reliable, detailed and complete research results.

References

- [1] Yang Lili, Chen Zili, Zhang Yong-Zhan, et al. [1] Yang L L, Chen Z L, ZHANG Y Z, et al. Value of peripheral blood sTREM-1 combined with MIP-1 α in predicting acute intrauterine infection in pregnant women with premature rupture of membranes [J]. Chin J Hospital Infection, 2024, 34(15): 2368-2371.
- [2] Vaduva CC, Petrescu AM, Dira LM, et al. Probiotics in the Prophylaxis of Premature Rupture of Membranes and Cervical Incompetence [J]. Nutrients. 2024 , 16 (23) : 4230.
- [3] LI Ping, Li Lingmiao, Liu Yunxia, et al. Expression and significance of HBD-2, PCT and miRNA in peripheral blood of full-term premature rupture of membranes complicated with amniotic cavity infection [J]. Chin J Hospital Infection, 2024, 34(21): 3331-3335.
- [4] Melamed N, Berghella V, Ananth CV, et al. Optimal timing of labor induction after prelabor rupture of membranes at term: a secondary analysis of the TERMPROM study [J]. Am J Obstet Gynecol. 2023 , 228(3): 326.
- [5] Deng Yue, Wang Kefang. [5] Deng Y, Wang K F. Analysis of clinical treatment and maternal and infant outcomes of infective endocarditis in pregnancy [J]. Chin J Med, 2023, 18(9): 1371-1375.

- [6]Sheng X, Song X, Xiong Y, et al. Maternal and infant outcomes of pregnancy associated with anti-SSA/RO antibodies: a systematic review and meta-analysis[J]. *Pediatr Rheumatol Online J*. 2023 ,21(1):22.
- [7] Chinese Society of Obstetrics and Gynecology. [7] Guidelines for the diagnosis and management of premature rupture of membranes (2015)[J]. *Chin J Obstetrics & Gynecology*,2015,50(1):3-8.
- [8] Guo Tingting, Yang Xiaofeng. Vaginal microecology and group B streptococcus in pregnant women and its correlation with premature rupture of membranes and maternal and infant outcomes [J]. *Chin J Microecology*,2023,35(10):1207-1211.
- [9]Jung E, Romero R, Suksai M, et al. Clinical chorioamnionitis at term: definition, pathogenesis, microbiology, diagnosis, and treatment[J]. *Am J Obstet Gynecol*. 2024 ,230(3S):807-840.
- [10] Wang Shanshan, Shi Zhonghua. [10] WANG S S, SHI C C. Timing of induction of full-term premature rupture of membranes in gestational diabetes mellitus and its effect on maternal and fetal outcomes [J]. *Journal of Nanjing Medical University (Natural Science Edition)*,2023,43(5):720-724.
- [11] Li Qin, Huang Yaping, Lai Meile. [11] LI Q, HUANG Y P, Mai L L. Effect of termination time of pregnancy on delivery mode and maternal and infant outcomes in pregnant women with premature rupture of membranes [J]. *Heilongjiang Medicine*,2023,36(1):174-176.
- [12] Su Shaofei, Zhang Enjie, Gao Xiang, et al. [12] SU S F, Zhang E J, GaO S, et al. Risk of perinatal complications in mothers and infants with different delivery time [J]. *Chin J Med*,2023,58(2):202-206.
- [13]Saucedo AM, Calvert C, Chiem A, et al. Perivable Premature Rupture of Membranes-Maternal and Neonatal Risks: A Systematic Review and Meta-analysis[J]. *Am J Perinatol*. 2024 ,41(12):1604-1615.
- [14] Zhang Chengyan, Zhou Li. [14] ZHANG C Y, ZHOU L. Application of vaginal misoprostol induction in term premature rupture of membranes in primiparas [J]. *Chinese Journal of Medical Research*,2024,53(11):64-68.
- [15]Adewale V, Varotsis D, Iyer N, et al. Planned cesarean delivery vs planned vaginal delivery: a systematic review and meta-analysis of randomized controlled trials[J]. *Am J Obstet Gynecol MFM*. 2023 ,5(12):101186.
- [16] Huang Yun, Bao Xiangmin, Wu Kexin, et al. [16] HUANG Y, BAO X M, NG K X, et al. Association of group B hemolytic streptococcus infection with vaginal infection and pregnancy outcome in term premature rupture of membranes [J]. *Chin J Microecology*,2024,36(11):1318-1322.
- [17] Zhang Huanhuan, Chen Lin. [17] ZHANG H H, Chen L. Effect of delivery mode on adverse neonatal outcomes in severely obese women [J]. *Chinese Maternal and Child Health Research*,2023,34(1):26-31.
- [18] Gao Aimei, Wang Zhanhui, Zhang Jie. Effects of different delivery modes on maternal and infant outcomes and postpartum pelvic floor function in primiparas [J]. *Chin J Clin Ob & Gyn*, 24,25(3):210-212.