# Statement of the Obstetrics and Prenatal Medicine Working Group (AGG – Preterm Birth Section) on "Outpatient Management for Pregnant Women with Preterm Premature Rupture of Membranes (PPROM)"

Stellungnahme der Arbeitsgemeinschaft Geburtshilfe und Pränatalmedizin (AGG – Sektion Frühgeburt) zum "ambulantem Vorgehen bei Schwangeren mit frühem vorzeitigen Blasensprung (PPROM)"



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#### Key words

preterm birth, outpatient care, preterm premature rupture of membranes

# Schlüsselwörter

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#### ABSTRACT

Preterm premature rupture of membranes (PPROM) is one of the leading causes of perinatal morbidity and mortality. After a PPROM, more than 50% of pregnant women are delivered within 7 days. Fetal and maternal risks are primarily due to infection and inflammation, placental abruption, umbilical cord complications and preterm birth.

Standard care usually consists of an expectant approach. Management includes the administration of antenatal steroids and antibiotic therapy. Patients with PPROM require close monitoring.

The management of pregnant women with PPROM (inpatient vs. outpatient) is still the subject of controversial debate. The international guidelines also do not offer a clear stance. The statement presented here discusses the current state of knowledge.

# ZUSAMMENFASSUNG

Der frühe vorzeitige Blasensprung (PPROM) ist eine Hauptursache für perinatale Morbidität und Mortalität. Nach einem PPROM werden über 50% der Schwangeren innerhalb von 7 Tagen entbunden. Die fetalen, aber auch maternalen Risiken sind vor allem bedingt durch Infektion und Inflammation, Plazentalösung, Nabelschnurkomplikationen und durch die Frühgeburt. Üblicherweise wird ein exspektatives, abwartendes Vorgehen gewählt. Das Management beinhaltet die Applikation antenataler Steroide und eine Therapie mit Antibiotika. Patientinnen mit PPROM bedürfen einer engmaschigen Überwachung.

# Introduction

Preterm premature rupture of membranes is defined as amniorrhexis occurring before week 37 + 0 of gestation (GW). The term increasingly used in the English-language literature is PPROM (preterm/prelabor premature rupture of membranes). It affects around 3% of all pregnancies and precedes about 25–35% of all preterm births [1, 2]. Due to the sometimes long latency period between PPROM and delivery, various working groups have also considered an outpatient approach [3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15]. However, to date, the international guidelines have not taken a clear stand (**> Table 1**). Moreover, the latest version of the German guideline "Prevention and Therapy of Preterm Birth" published in 2022 did not yet consider an outpatient approach for PPROM [16]. This scientific statement aims to close this gap.

**Table 1** Comparison of international guidelines on the outpatient approach for pregnant women with preterm premature rupture of membranes (PPROM).

| Guideline                           | Recommendation                                                                                                                                                                                                                               | Monitoring                                                                                                      |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| ACOG [17]<br>(USA)                  | Inpatient monitoring as soon as<br>the fetus has achieved viability                                                                                                                                                                          | Not applicable                                                                                                  |
| RCOG [18]<br>(UK)                   | Individual decision depending<br>on risk factors for a shortened<br>latency period (evidence level 3)                                                                                                                                        | No optimal<br>monitoring method<br>capable of pre-<br>dicting adverse<br>fetal outcome                          |
| GNCOF<br>[19]<br>(France)           | If the patient remains clinically<br>stable over 48 h, outpatient care<br>possible (professional consensus)                                                                                                                                  | Clinical signs<br>of infection and<br>laboratory tests<br>No information<br>about the fre-<br>quency of testing |
| SOGC [20]<br>(Canada)               | <ul> <li>Inpatient: 72 h</li> <li>Outpatient care if:</li> <li>&gt; 23 GW</li> <li>Lives near the hospital</li> <li>No contractions, no signs of infection, no maternal or fetal risk factors, fetus is well, singleton pregnancy</li> </ul> | Perinatal center:<br>1 ×/week                                                                                   |
| Queens-<br>land [21]<br>(Australia) | Individual decision; if the patient<br>is suitable, consider outpatient<br>care                                                                                                                                                              | Self-monitoring<br>1–2×/d<br>CTG:1×/week<br>US: every 2 weeks<br>Lab tests:<br>if indicated                     |

Das Management bei Schwangeren mit PPROM (stationär vs. ambulant) wird kontrovers diskutiert. Auch die internationalen Leitlinien beziehen keine klare Position. Die vorliegende Stellungnahme erörtert den aktuellen Wissensstand.

PPROM is associated with significant perinatal morbidity and mortality. The most important risks to the fetus are Triple I (infection, inflammation, or both), umbilical cord complications, placental abruption and the consequences of a preterm birth [22, 23]. The maternal risk of bacteriemia, sepsis, endometritis and bleeding are also higher [24].

The latency period (time from PPROM to delivery) is inversely correlated with gestational age [25]. The cumulative rates of delivery in a cohort of 239 pregnant women with PPROM and a negative group B strep test were 27% (after 48 h); 56% (after 7 d); 76% (after 14 d) and 86% (after 21 d), i.e., more than half of the pregnant women gave birth within 7 days [1]. The median duration of pregnancy after PPROM recorded in this study was 6.1 days [1]. A longer latency period and therefore a higher gestational age (GA) at delivery is associated with a better perinatal outcome. However, the benefit of prolonging the pregnancy must always be weighed against the fetomaternal risks and an individual approach is required [26, 27].

Clinical management after a correct diagnosis depends on GA. This has been discussed in the guideline, which divided pregnancies into the following groups: <22+0 GW; 22+0-23+6 GW; 24+0-33+6 GW and 34+0-34+6 GW [16].

If PPROM occurs before the fetus is viable (<22+0 GW) or between 22+0 and 23+6 GW, the approach to be taken must be discussed and agreed upon with the parents in accordance with the German guideline "Preterm Infants at the Limits of Viability 024–019" [16, 28]. If the pregnancy is between 24+0 and 33+6 weeks of gestation, the first step must be to exclude any immediate threat to the fetus and the mother (e.g., Triple I). If there is no immediate threat, the standard approach is usually expectant management. An expectant approach also includes the administration of antenatal steroids and antibiotic prophylaxis over a period of 7 days [16].

# Inpatient Monitoring

As described in the guideline, pregnant women with PPROM should be routinely examined for signs of infection or the development of Triple I [16]. This includes checking clinical parameters such as maternal fever combined with any one of the following findings: fetal tachycardia (> 160 beats/min) or leukocytes > 15000/µl or purulent discharge from the cervix. Other symptoms which should be monitored include painful uterus, uterine contractions, maternal blood pressure and heart rate [16, 29]. Blood count and CRP should be monitored at least once a day. But the benefit of daily lab tests is disputed [30, 31]. Various studies have also shown that the predictive value of these clinical parameters is limited [16, 18, 32, 33].

Daily CTG monitoring is standard management practice for patients with PPROM. But there is currently no fetal monitoring method which reliably reveals intrauterine Inflammation or infection [16, 18].

# **Outpatient Care**

If monitoring is done at home, the pregnant woman is in a familiar environment. This is in accordance with the pregnant woman's right of self-determination; she is taking more personal responsibility [34, 35]. This has been associated with higher levels of satisfaction for pregnant women [34, 35]. For many pregnant women, a lengthy stay in hospital is associated with significant stress; some women are additionally worried about the risk of nosocomial infection ("hospital germs") [34]. As the use of telemedicine and telemonitoring increases, this is expected to facilitate close outpatient monitoring in future [36, 37].

# Risks/Concerns About Outpatient Care

A PPROM means that the pregnancy is a high-risk pregnancy. The top priority for any form of management is to ensure the safety of the fetus and the mother. The concern with outpatient care is that the outcome will be an unexpected unplanned preterm birth. There are additional concerns that developing infection or another obstetric complication (such as umbilical cord prolapse or placental abruption) will be diagnosed too late and the steps taken to manage complications will be taken too late. This could subsequently lead to forensic problems.

# Review of the Literature

Rath et al. published a systematic review on the issue of home care versus an inpatient approach [38]. There are two randomized controlled studies (RCT) from the 1990s which included a total of 116 patients with PPROM (59 women cared for at home; 57 women who were monitored as inpatients) [3, 4]. A meta-analysis published in 2014 evaluating these two studies found no difference with regards to severe neonatal morbidity, chorioamnionitis, gestational age at delivery, birthweight, and admission to a neonatal intensive care unit [29]. But because of the small number of cases (n = 116), the authors were unable to make a recommendation about the safety of managing PPROM at home [5].

By 2023 there was a total of 9 retrospective comparative studies (cohort and observational studies) [6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 38]. Although the inclusion and selection criteria vary, the studies showed that management at home was associated with longer latency periods, a higher GA at birth and a lower rate of respiratory distress syndrome (RDS) and bronchopulmonary dysplasia (BPD) in the neonates compared to inpatient management [6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 38]. There was a tendency towards better neonatal outcomes with outpatient care and no indication of worse maternal outcomes [35]. Randomized controlled studies will clearly be necessary to answer this question [39].

Discharging the patient home after an inpatient stay is an individual decision and requires extremely strict selection criteria [18, 35]. According to retrospective cohort studies, the following parameters are associated with the latency period: patient is clinically stable for at least 72 h, no signs of infection or inflammation, stable cervical length, amniotic fluid volume, and GA at the time of PPROM [7, 11, 12]. Prospective observational studies found that both a shortened cervical length as measured by transvaginal ultrasound and a smaller volume of amniotic fluid (amniotic fluid index, AFI) were good predictors for a preterm birth within 7 days after PPROM [40, 41].

The following risk factors for outpatient care are known from cohort studies [15, 42]:

- Early GA at PPROM (< 26 GW)</li>
- Oligohydramnios (maximal vertical pocket of amniotic fluid (AF-MVP) < 1 cm or AFI < 20 mm)</li>
- No cephalic presentation

In a retrospective study, Murillo et al. analyzed pregnant women with PPROM between weeks 23 + 0 and weeks < 34 + 0 of gestation. If the women were stable for 72 h, they were discharged home according to strict selection criteria [15].

Criteria for outpatient care, selection criteria prior to discharge were [15, 38]:

- Singleton pregnancy
- Cephalic presentation
- Patient is clinically stable for at least 5–7 d, no additional pregnancy risks such as preeclampsia, fetal growth retardation, placenta previa
- Unremarkable CTG, no fetal tachycardia, no contractions
- No signs of infection/Triple I (no fever, lab test results are unremarkable)
- Bacterial cultures: culture tests to detect Group B Streptococcus (GBS) and multi-resistant gram-negative bacilli (MRGN) are essential to allow stratification by the Neonatology Department
- Cervical opening < 2 cm, cervical length > 20 mm
- No vaginal bleeding
- No persistent anhydramnios (except < 22 GW), no green amniotic fluid
- Proximity to a perinatal center (< 30–40 min)</li>
- Requested by the pregnant woman
- Compliance of the pregnant woman, informed consent, no language barrier

# Monitoring during outpatient care (follow-up strategy)

Another controversially discussed issue is how outpatient care and monitoring should be carried out [18, 38]. In the different studies, suggestions ranged from daily controls (midwife or self-monitoring) to twice or just once a week [12, 13, 15].

As there are still no recommendations on monitoring, we propose stratifying the approach according to gestational age as follows [16, 18].

Before 22 + 0 weeks of gestation:

- initial admission as an inpatient, poss. administration of antibiotics
- outpatient management possible

 Check-up at least once a week by a gynecologist or maternity hospital

From (22 + 0) 24 + 0–33 + 6 weeks of gestation:

- between 22 + 0–23 + 6 GW: if maximum therapy is requested
- admission as an inpatient for at least 5–7 d
- interdisciplinary counselling by Obstetrics and Neonatology departments
- antenatal corticosteroids
- antibiotic prophylaxis (e.g., IV administration of ampicillin for 2 d, followed by 5 d of oral amoxicillin plus a single dose of oral azithromycin at the start)
- Group B Streptococcus status has been investigated and result is available (if status is known or test was done more than 5 weeks ago)
- If the patient is clinically stable for at least 5–7 d: outpatient management based on strict selection criteria is possible (s. above)

> 34 + 0-36 + 6 weeks of gestation:

- admission as an inpatient for at least 5 d
- antibiotic prophylaxis (e.g., IV administration of ampicillin for 2 d, followed by 5 d of oral amoxicillin plus a single dose of oral azithromycin at the start)
- Group B Streptococcus status has been investigated and result is available (if status is known or test was done more than 5 weeks ago)
- if the patient is clinically stable for 5–7 d: outpatient management based on strict selection criteria is possible (s. above)

Option for outpatient monitoring:

- 2 × day: temperature measurement with recording of results
- 2 × week: lab tests (leukocytes)
- 2 × week: clinical evaluation including CTG
- 1 × week: ultrasound checkup

After discussing the current state of knowledge, this statement makes the following recommendation:

# RECOMMENDATION

Outpatient care of selected pregnant women with PPROM is possible under certain circumstances.

An outpatient approach should be discussed with the patient and recorded in the form of written informed consent in which the risks and uncertainty are described in detail.

# Emergency repeat presentation and readmission

In the report by Murillo et al., 77.5% of patients managed on an outpatient basis required emergency presentation to the hospital again or were readmitted [15]. This means that access to emergency care must be guaranteed and readmission of pregnant women as inpatients should be uncomplicated.

# Summary

The data on outpatient or home care of pregnant women with PPROM is heterogeneous. There are currently no indications that the perinatal outcome is poorer with outpatient management. All patients are initially admitted as inpatients. If the patient is clinically stable for 5–7 days and the planned approach consists of expectant management, outpatient management and care may be considered, based on strict selection criteria. It should continue to be an individual decision which is taken after careful weighing up the pros and cons. If a pregnant woman is discharged home, her further care must be guaranteed. Telemedicine could play an important role here. Emergency presentation with potential readmission in the event of any problems or even if the pregnant woman is uncertain should be assured.

Going forward, we will need randomized studies in future to find clearer answers to this question.

# Conflict of Interest

The authors declare that they have no conflict of interest.

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