



Prelabor rupture of membranes at term: Management

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INTRODUCTION

Prelabor rupture of the membranes (PROM) refers to rupture of the fetal membranes prior to the onset of regular uterine contractions. It may occur at term ($\geq 37+0$ weeks of gestation) or preterm ($< 37+0$ weeks of gestation); the latter is designated preterm PROM (PPROM). Midtrimester PROM typically refers to PPRM at approximately 16 to 26 weeks of gestation; this is an arbitrary definition, which varies slightly among investigators. The frequencies of term, preterm, and midtrimester PROM are approximately 8, 3, and < 1 percent of pregnancies, respectively. Why membranes rupture at term and whether different etiologies account for prelabor versus intrapartum membrane rupture is not well understood.

The key issue in term PROM is whether to wait for spontaneous labor to begin or induce labor. Over 50 percent of expectantly managed patients will be in active labor within one day and 95 percent will be in active labor within three days, but they are at higher risk for developing maternal infection than those who are induced [1].

The management of term PROM will be reviewed here. Issues regarding midtrimester PROM and PPRM are discussed separately:

- (See "[Prelabor rupture of membranes before and at the limit of viability](#)".)
- (See "[Preterm prelabor rupture of membranes: Clinical manifestations and diagnosis](#)".)
- (See "[Preterm prelabor rupture of membranes: Management and outcome](#)".)

INITIAL EVALUATION

Pregnant people with term PROM should be evaluated by a clinician. Whether the patient should be evaluated as soon as possible or can remain at home for a few hours to see if

labor begins has not been studied extensively. In the absence of high-quality data supporting the safety of delaying evaluation, the most prudent approach is for prompt assessment to confirm membrane rupture, determine fetal position, evaluate maternal and fetal status, and discuss options for further management. (See "[Labor and delivery: Management of the normal first stage](#)", section on 'Initial examination'.)

- The diagnosis of PROM is based upon a characteristic history (ie, leaking fluid per vagina) and confirmatory speculum examination in which fluid is seen flowing from the cervical os. If the diagnosis is uncertain, diagnostic testing is performed on fluid pooled in the posterior fornix. The clinical manifestations and diagnosis of PROM are the same across gestation and are discussed in detail separately. (See "[Preterm prelabor rupture of membranes: Clinical manifestations and diagnosis](#)", section on 'Diagnostic evaluation and diagnosis'.)

Digital cervicovaginal examination should be avoided before labor, as it has been associated with an increased risk of chorioamnionitis.

- Fetal well-being is evaluated with a nonstress test. (See "[Nonstress test and contraction stress test](#)".)
- Fetal position is determined by transabdominal physical examination (Leopold's maneuvers) and/or with ultrasound examination (ultrasound dominates the modern evaluation of fetal presentation in the setting of PROM).
- Maternal evaluation includes assessment for contractions, signs of infection (eg, fever, fetal tachycardia, maternal leukocytosis), and oligohydramnios (either single deepest pocket <2 cm or amniotic fluid index ≤ 5 cm), as well as review of the prenatal record and current maternal status for medical and obstetric complications that impact decision making regarding timing of delivery.

We obtain a baseline complete blood count, recognizing that leukocytosis is a nonspecific finding and can be associated with inflammation apart from infection. A marked elevation in the white blood cell count (greater than 20,000 per cubic millimeter) or a significant left shift suggests chorioamnionitis. In other cases, impending chorioamnionitis should be suspected when leukocytosis occurs with other premonitory signs or symptoms of infection or the white blood cell count is rising. (See "[Clinical chorioamnionitis](#)", section on 'Diagnosis'.)

ACTIVE OR EXPECTANT MANAGEMENT?

Our approach — The key decision in managing uncomplicated term PROM is whether to initiate delivery or take an expectant approach. We suggest prompt delivery for patients with

term PROM. Labor is induced as soon as feasible, unless there are contraindications to labor or vaginal birth, in which case cesarean birth is performed as soon as feasible.

Our approach is based primarily on our concern about increased risks of maternal and newborn infection with expectant management, as well as our patients' general preference for expedited delivery. Prompt intervention also reduces the risk for other serious but less common complications that may occur during expectant management, such as cord prolapse or abruption, and intervention was the most cost-effective approach in one model [2]. However, labor tends to be longer with induction than when labor begins spontaneously.

For patients who decline prompt intervention, we suggest developing a time limit for expectant management through shared decision-making (see '[Duration of expectant management](#)' below). Signs of infection or other pregnancy complications are an indication for termination of expectant management and delivery by the most appropriate method for the clinical situation.

Our approach is supported by a 2021 meta-analysis of nine randomized trials including nearly 3800 patients with singleton gestations ≥ 36 weeks of gestation with PROM who were induced with [oxytocin](#) at ≤ 12 versus > 12 hours after membrane rupture [3]. Compared with expectant management (ranging from 24 to 96 hours in most trials), induction at ≤ 12 hours resulted in:

- Less neonatal sepsis (6.1 versus 11.8 percent; RR 0.46; 95% CI 0.27-0.79)
- Less chorioamnionitis (5.3 versus 9.9 percent; relative risk [RR] 0.62, 95% CI 0.40-0.97)
- Less endometritis (2.4 versus 4.2 percent; RR 0.59; 95% CI 0.40-0.87)
- Less admission to a neonatal intensive care unit (6.4 versus 12.0 percent; RR 0.54, 95% CI 0.43-0.69)
- Less time between PROM and delivery (-12.68 hours, 95% CI -16.15 to -9.21)
- A higher chance of giving birth within 24 hours of PROM (91 versus 46 percent; RR 1.93, 95% CI 1.59-2.35)
- No significant differences in the rate of cesarean birth (9.8 versus 10.1 percent; RR 0.97, 95% CI 0.79-1.08)

A subgroup analysis of induction of labor at ≤ 6 hours after membrane rupture showed similar results. The quality

of evidence of the included trials was low to moderate, given that use of antibiotics was not clearly defined, some outcomes were not reported in some trials, and older trials included digital cervical examination.

The significant reduction in risk of neonatal sepsis demonstrated in the analysis is particularly important because it can result in death. (See "[Neonatal bacterial sepsis](#):"

[Treatment, prevention, and outcome in neonates ≥35 weeks gestation", section on 'Outcome'.\)](#)

The American College of Obstetricians and Gynecologists recommends delivery for patients with PROM at ≥37+0 weeks but also states that a short period of expectant management may be offered [4].

ACTIVE MANAGEMENT (PREFERRED APPROACH)

Oxytocin induction — For patients with no contraindications to labor and vaginal birth, we suggest induction with [oxytocin](#), without preinduction cervical ripening. Oxytocin is easier to titrate than prostaglandins, and may be less expensive, depending on the prostaglandin preparation chosen. (See ["Induction of labor with oxytocin", section on 'Oxytocin administration'.](#))

Meta-analyses of randomized trials have not demonstrated a clear benefit from initial use of any prostaglandin rather than [oxytocin](#) in patients with prelabor rupture of the membranes (PROM), including those with unfavorable cervixes [5-8]; however, data for the latter subgroup are limited, as discussed below.

Alternatives for patients with an unfavorable cervix

Misoprostol or prostaglandin E2 — Although we do not perform preinduction cervical ripening in patients with term PROM, some clinicians may choose to use prostaglandin E1 or E2 for this purpose if their assessment of the advantages and disadvantages for an individual patient favors use of a cervical ripening agent. Only a few small trials have evaluated preinduction cervical ripening in patients with term PROM and an unfavorable cervix [9,10], so the absence of a statistically significant benefit in these trials does not negate the possibility of a modest clinical effect, as observed in populations with intact membranes. These agents may also induce labor, obviating the need for [oxytocin](#) [11]. (See ["Induction of labor: Techniques for preinduction cervical ripening", section on 'Prostaglandins'.](#))

Balloon catheter — We suggest not using balloon catheters for cervical ripening in the setting of PROM. High-quality data supporting safety and efficacy in these patients are not available, the risk for chorioamnionitis is increased [12], a benefit has not been demonstrated compared with using [oxytocin](#) alone [13], and both oxytocin and prostaglandins are safe and effective alternatives.

In a meta-analysis of randomized trials (4 trials, 605 participants), patients with mostly term PROM managed with a balloon catheter had an increased risk of intraamniotic infection [12]:

- Compared with use of any pharmacologic agent alone (21 of 271 [7.7 percent] versus 15 of 334 [4.5 percent]; RR 1.84, 95% CI 0.91-3.73).
- Compared with use of [oxytocin](#) alone (15 of 154 [9.7 percent]) versus 5 of 174 [2.9 percent]; RR 3.20, 95% CI 1.17-8.70).

The frequencies of other outcomes, including endometritis and suspected neonatal infection, were similar in both groups. More and larger trials are needed to improve the precision of these findings. (See "[Induction of labor: Techniques for preinduction cervical ripening](#)", [section on 'Mechanical methods'](#).)

EXPECTANT MANAGEMENT

Candidates — After weighing the risks and benefits of induction versus expectant management (see '[Active or expectant management?](#)' above), patients with otherwise uncomplicated pregnancies who are averse to prompt intervention may choose to undergo a period of expectant management. These patients should have reassuring fetal testing, no contraindications to labor and vaginal birth, and no signs of clinical chorioamnionitis or other medical or obstetric complications that increase maternal/fetal risk if birth is deferred. (See "[Clinical chorioamnionitis](#)", [section on 'Clinical findings'](#) and "[Clinical chorioamnionitis](#)", [section on 'Diagnosis'](#).)

Meconium stained amniotic fluid has been associated with an increased risk of clinical chorioamnionitis and positive amniotic fluid cultures, nonreassuring intrapartum fetal heart rate patterns, and meconium aspiration syndrome [14-16]. However, there is no evidence that immediate induction of labor will reduce the risk of these complications; therefore, we believe amniotic fluid lightly stained with meconium is not a strong contraindication to expectant management if this is the approach that the patient chooses and antepartum fetal assessment is otherwise reassuring (reactive nonstress test with no variable decelerations). In some of these cases, meconium-like staining is residual hemoglobin pigment from decidual hemorrhage. By comparison and in the absence of data from randomized trials to guide practice recommendations, we believe induction and continuous fetal monitoring are reasonable when meconium is thick. Patients with meconium-stained amniotic fluid were excluded from the seminal trial that compared outcomes of labor induction with expectant management for term PROM [1].

Duration of expectant management — There are no strong data on which to base a recommendation for the maximum duration of expectant management in patients with no pregnancy complications that warrant delivery. In the seminal term PROM trial, which limited expectant management to 96 hours post rupture, the risk of chorioamnionitis appeared to increase significantly after 24 hours [15], suggesting that 24 hours is a reasonable limit. However, waiting longer would increase the number of pregnant people who would begin to

labor spontaneously. In the term PROM trial, 50 percent of patients with PROM managed expectantly were in active labor by approximately 17 hours and 95 percent were in active labor by approximately 75 hours after membrane rupture [1].

Expectant management in hospital or at home? — We suggest hospitalizing patients with PROM. When the term PROM study group compared outcomes of expectant management at home with expectant management in the hospital, patients who were sent home were more likely to develop clinical chorioamnionitis (10.1 versus 6.4 percent) [17]. In multiple logistic regression analyses, patients managed at home had a higher risk of neonatal infection (odds ratio [OR] 1.97, 95% CI 1.00-3.90) and nulliparas managed at home more likely to receive antibiotics before giving birth (OR 1.52, 95% CI 1.04-2.24). Another risk of home management is the possibility of rapid labor and delivery before the patient can get to the hospital [18].

For patients who request expectant management at home until labor or a complication ensues, we believe the following criteria are reasonable after initial evaluation on the labor and delivery unit (see '[Initial evaluation](#)' above):

- Cephalic presentation
- No clinical suspicion of intrauterine infection (See '[Group B streptococcus colonization](#)' below.)
- Reassuring fetal heart rate tracing
- No oligohydramnios
- Patient understands and can adhere to instructions
- Assistance at home
- Dependable transportation
- Travel time to the hospital no more than 20 to 30 minutes [19]
- Ability to check pulse and temperature every six hours, with parameters for notifying their clinician (eg, pulse >100 beats per minute, temperature ≥100.4°F [38°C])
- Willingness to perform daily fetal kick counts
- Ability to undergo a daily objective fetal assessment at the discretion of the care giver

Antibiotic prophylaxis — As discussed above, our approach to minimizing risk for infection is prompt induction of labor and use of intrapartum group B streptococcus (GBS) antibiotic prophylaxis when indicated by standard guidelines, rather than expectant management with (or without) use of broad-spectrum antibiotic prophylaxis. (See '[Our approach](#)' above.)

We believe use of prophylactic antibiotics for PROM at or near term should be avoided, given the unmeasured potential adverse effects of antibiotic use, the potential for development of resistant organisms, and the relatively low risk of maternal infection in untreated patients. There is no convincing evidence of maternal or neonatal benefit from use of prophylactic antibiotics for PROM at or near term [20,21]:

- In a meta-analysis of five trials antibiotic prophylaxis for term or near-term involving a total of 2699 participants, compared with placebo or no treatment, use of broad-spectrum antibiotic prophylaxis resulted in no statistically significant reductions in chorioamnionitis (2.7 versus 3.7 percent), endometritis (0.4 versus 0.9 percent), or latency from PROM to delivery (mean difference 0.5 hours) [20]. Although no statistically significant difference in neonatal sepsis (1 versus 1.4 percent) or perinatal death (0.6 versus 0.3 percent) was observed, a clinically significant difference cannot be excluded given the even smaller number of these events. In the 37 percent of pregnancies in which latency was longer than 12 hours, subgroup analysis revealed a lower rate of maternal infection with antibiotic prophylaxis, but no statistical improvement in neonatal outcomes. No data were available on potential harms.

A large retrospective cohort study including over 5300 patients with term PROM confirmed these findings. Administration of a cephalosporin within 6 hours, between 6 and 12 hours, or after 12 hours of PROM was not associated with a reduction in maternal or neonatal infections [22].

The relative risks and benefits of antibiotic prophylaxis are different preterm. Available evidence, although limited, supports the use of antibiotic prophylaxis in preterm PROM (PPROM) because it prolongs latency, which is desirable in preterm gestations but not a goal in term PROM. (See "[Preterm prelabor rupture of membranes: Management and outcome](#)", [section on 'Administer prophylactic antibiotic therapy'](#).)

Group B streptococcus colonization — A positive screening culture for GBS (or other criteria for intrapartum GBS prophylaxis) does not necessarily preclude expectant management, but we agree with guidelines from those major organizations that have recommended induction for these patients [4,23,24]. In a secondary analysis, the termPROM trial evaluated the effect of induction of labor on neonatal infection in pregnant patients with PROM who were GBS-positive [25]. Induction with [oxytocin](#) was associated with a lower rate of neonatal infection than expectant management (2.5 versus >8 percent). However, prenatal GBS culture and chemoprophylaxis were performed at the discretion of the provider, which limits the generalizability of these results.

We approach the issue of GBS in term PROM as follows:

- **Antepartum GBS culture result positive** – In patients with ruptured membranes and a positive GBS culture, maternal intravenous antibiotic prophylaxis to reduce the risk for early onset neonatal GBS disease should be initiated as soon as possible after PROM, whether induction or expectant management is undertaken. (See "[Prevention of early-onset group B streptococcal disease in neonates](#)".)

- **Antepartum GBS culture result negative** – In patients with ruptured membranes and a negative GBS culture, GBS prophylaxis is not indicated. Intrapartum fever is diagnosed and managed according to usual protocols, which may include antibiotic therapy. Diagnosis, evaluation, and management of intrapartum fever are reviewed separately. (See ["Intrapartum fever"](#).)
- **Antepartum GBS culture not performed or result unknown** – In patients with ruptured membranes and unknown GBS status, the decision to initiate antibiotics after PROM is based on standard risk factor assessment. A detailed review of candidates for and management of GBS prophylaxis is available separately. (See ["Prevention of early-onset group B streptococcal disease in neonates"](#).)

Maternal and fetal monitoring — There are no standards for maternal-fetal monitoring in expectantly managed term PROM and no data from randomized trials on which to base recommendations. However, there is consensus that digital vaginal examination and vaginal intercourse should be avoided to reduce the risk of intrauterine infection.

We would advise patients who choose expectant management to do the following:

- Check temperature every six hours and notify the clinician if $\geq 100.4^{\circ}\text{F}$ [38°C]).
- Report changes in color or odor of vaginal discharge.
- Undergo some type of fetal surveillance (eg, kick counts, nonstress tests, biophysical profile tests) to provide some assurance of fetal well-being, but none of these tests has good sensitivity for predicting fetal infection, even when performed daily. Cord prolapse or cord compression may be first suspected because of fetal heart rate decelerations.
- Promptly notify the clinician of any developing concerns or complications.

Indications for delivery — Expectant management is terminated when the time limit defined by the clinician and patient is reached or any standard indication for delivery develops (eg, suspected chorioamnionitis, nonreactive nonstress test, low biophysical profile score, preeclampsia).

MANAGEMENT OF THE NEWBORN

(See ["Neonatal bacterial sepsis: Clinical features and diagnosis in neonates \$\geq 35\$ weeks gestation"](#), section on 'Maternal risk factors'.)

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See ["Society guideline links: Prelabor rupture of](#)

membranes".)

SUMMARY AND RECOMMENDATIONS

- **Definition** – Prelabor rupture of the membranes (PROM) refers to rupture of the fetal membranes prior to the onset of labor or regular uterine contractions. It occurs in 8 percent of pregnancies at term. (See ['Introduction'](#) above.)
- **Evaluation** – The initial evaluation of all term pregnancies in which PROM is suspected should include confirmation of membrane rupture and assessment of maternal and fetal well-being. The need for group B streptococcal chemoprophylaxis should also be determined. (See ['Initial evaluation'](#) above and ['Group B streptococcus colonization'](#) above.)
- **Management**
 - We suggest prompt induction of labor in patients with term PROM (**Grade 2C**). Compared with expectant management, induction of labor is associated with a reduction in maternal and neonatal infection and lower treatment costs, with no increase in cesarean birth. (See ['Active or expectant management?'](#) above.)
 - We suggest induction with [oxytocin](#) (**Grade 2B**). Oxytocin is as effective as prostaglandins, is easier to titrate, and may be less expensive, depending on the preparation. Data supporting the safety of balloon catheter use for cervical ripening in PROM are sparse. (See ['Active management \(preferred approach\)'](#) above.)

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