INFORMED CHOICE for
PRELABOR RUPTURE OF MEMBRANES AT TERM

What is it?
Spontaneous rupture of the amniotic membranes before the onset of labor occurs in about 8% of term pregnancies. Approximately 60% to 80% of women with prelabor rupture of membranes (PROM) at term will enter spontaneous labor within 24 hours, while 3% to 4% of women with PROM do not begin labor for seven days after rupture of membranes (Kappy, Cetrulo, Knuppel, Ingardia, Sbarra, Scerbo, et al., 1982).

Many aspects of the management of prelabor rupture of membranes are controversial. The practice to consistently provide information about the options of expectant management verses immediate induction of labor to women with term PROM, and to involve them in the decision-making process is congruent with midwifery hallmarks and philosophy of care. In addition, it is explicitly supported by Cochrane reviewers and the Term PROM researchers.

The risk of maternal and neonatal infections increases following rupture of the membranes, but the etiology of infection following prelabor rupture of membranes can be difficult to ascertain because pre-existing infection can cause prelabor rupture. If it is determined that an infection is present, transfer to a hospital would be warranted.

The primary clinical decision related to prelabor rupture of membranes at term is whether or not to induce labor in an effort to reduce perinatal infection risk. Practice patterns vary considerably, and certainty regarding optimal management remains elusive. Studies in the 1960s documented an increased incidence of perinatal infection in women with PROM (Lanier, Scarbouragh, Fillinim & Baker, 1965; Bryans, 1965; Gunn, Mishell & Morton, 1970; Shubeck, Benson, Clark, Berendes, Weiss & Deutschberger, 1966; Taylor, Morgan & Bruns, 1961; and Naeye, 1977). These studies found an increase in maternal and perinatal infection and perinatal mortality in women who had rupture of membranes greater than 24 hours. The recommendation for immediate labor induction and a management goal of birth within 24 hours of rupture were based on these early investigations. These studies have limited relevance today. Many of these studies did not use standardized criteria for determining perinatal infection, and they lacked randomization. In addition, they included women with both term and preterm gestations. Preterm newborns are more likely to acquire infection and have greater morbidity when compared to term newborns; therefore, the true incidence of neonatal morbidity following 24 hours of PROM in women at term is less than noted in these studies. Finally, it is important to remember that antibiotics effective for the treatment of anaerobic microorganisms were not available in the 1960s; because of this, both maternal and neonatal infection were associated with significant morbidity. Contemporary advances such as screening for group B streptococcus, the treatment of infection, fetal surveillance, and neonatal care have significantly improved outcomes.

Subsequent PROM research in the 1970s and 1980s evaluated management options. Comparisons of immediate induction and expectant management in women with PROM at term found no difference in maternal and neonatal infection rates between the two management options. There was a significantly higher rate of cesarean sections in women who were induced. The contrast with the earlier studies and concerns about rising cesarean section rates prompted many clinicians to consider a less aggressive management approach to term PROM.

A number of additional prospective studies comparing induction and expectant management followed (Guise & Duff, 1992; Natale, Milne, Campbell, Potts, Webster & Halinda, 1994; Shalev, Peleg, Eliyahu & Nahum, 1995; Grant, Serle, Mahmood, Sarmandal & Conway, 1992; Wagner, Chin, Peters, Drexler & Newman, 1989; Marshal, 1993; Alcalay, Hourvitz, Reichman, Luski, Quint, Barkai et al, 1996; and Chua, Arulkumaran, Sailesh, Selamat, Ratnam, 1995). Results of these studies

updated May, 2014
vary considerably regarding rates of neonatal and maternal infection and cesarean section rates. These differences and significant inconsistencies in treatment protocols and research methodologies make it difficult to draw conclusions about the best management. In an effort to address these issues, the large International Multicentre Term Prelabor Rupture of Membranes Study (the TERMPROM study) was conducted between 1992 and 1995, the largest study focusing on the management of PROM to date.

Findings of this landmark study were strengthened by its large, multicenter, randomized sample. However, findings were also limited by several factors, most importantly that all women in the study had digital vaginal examinations at the time of PROM diagnosis, exposing women to a significant risk factor for infection. Logistic regression analysis determined that number of vaginal examinations was most predictive for the development of chorioamnionitis. Of the women who had $\leq 3$ vaginal examinations, 2% had clinical chorioamnionitis, whereas the incidence of chorioamnionitis increased to 20% in women who had more than 8 vaginal examinations during labor. The women in the oxytocin induction group had the lowest rate of infection and the fewest vaginal examinations.

The authors calculated that to avoid one case of chorioamnionitis, 50 women with PROM would need to be induced. There was no difference in rates of neonatal infection between groups; however, neonates from the expectant management group were more likely to be admitted to the NICU. This effect was only significant when prostaglandin and oxytocin results were pooled. No difference was found in rates of infection between planned and expectant management of PROM at term in trials where a strict protocol of avoiding digital exams was enforced ($n = 1951$).

The Cochrane collaboration subsequently published a review of the management options for women with term PROM that concluded that the differences in outcomes between induction and expectant management are not substantial, and women should be informed of risks and benefits of each option to make an informed choice (Dare, Middleton, Crowther, Flendady & Varatharaju, 2006).

Why do membranes rupture prior to labor?
It is theorized that preterm prelabor rupture of membranes is associated with a different pathological mechanism than prelabor rupture at term. More recent studies suggest the membranes simply weakened prior to labor, while other proposed mechanisms include an overabundance of amniotic fluid (polyhydramnios) or multiple fetuses. Small case controlled studies have repeatedly found that PROM at different gestations appears to have different origins. It has been surmised that women with PROM who do not go into spontaneous labor after a long latent period may have deficient prostaglandin production or prostanoid biosynthesis pathways (Enkin, Keirse, Neilson, Crowther, Duley, Hodnett, & Hofmey, 2000).

Twenty-six percent of women who had PROM with their second pregnancy, had PROM in their previous pregnancy. This same study found a positive correlation between smoking and PROM (Gosselink, Ekwo, Moawad, & Long, 1993 & Naeye, 1982). Other evidence has demonstrated no relevance to urinary tract infections, chorioamnionitis, chlamydial or gonorrheal infections and lower respiratory infections to PROM (Ontario Midwives, 2010).

What are signs of infection in my uterus (chorioamnionitis)?
Signs and symptoms of chorioamnionitis includes maternal fever >101 degrees, uterine tenderness, maternal or fetal tachycardia and foul smelling or purulent amniotic fluid. Clinical chorioamnionitis complicates approximately 1% of all pregnancies. The incidence of chorioamnionitis in women with PROM is estimated to be 6% to 10%.

**What are the risks to my baby?**
Fetal complications of PROM include cord prolapse, cord compression and neonatal infection. Prolapsed cord occurs in approximately 0.3% to 0.6% of all pregnancies and the risk is only slightly increased with PROM. The incidence of cord prolapse is 0.3% to 1.7% in pregnancies with PROM at all gestations, but is of greater concern with PPROM.

Rupture of membranes is associated with an increased risk of neonatal infection, as bacteria may ascend into the uterine cavity once the barrier of the membranes is no longer present. The incidence of neonatal infection for women with PROM is approximately 2% to 2.8% (Hannah, Ohlsson, Wang, Matlow, Foster, Willan, et al., 1997). Clinical presentation of neonatal sepsis varies and includes: diminished spontaneous activity, less vigorous sucking, apnea, bradycardia, temperature instability, respiratory distress, vomiting, diarrhea, abdominal distention, jitteriness, seizures and jaundice. Diagnosis is clinical and usually based on culture results.

**What approach do the nurse-midwives of Believe Midwifery Services, LLC take in managing PROM?**
All clients are asked to call the on-call nurse-midwife with any indication that their amniotic bag has ruptured. The midwife will assess on the phone if the rupture seems evident or inconclusive. If evident, she will ask the time of suspected rupture, the color of the amniotic fluid, the smell and amount of fluid, and whether or not the fluid continues to leak. She will also inquire about your baby. Is s/he moving in a consistent pattern? Your midwife will then determine the management plan based on whether you are a carrier of GBS or not, your contraction pattern, presence of bleeding, and whether the fetus is known to be head down or breech. Your midwife will also encourage you to read this informed consent again, so you will be prepared with any questions in the event labor does not commence for twenty-four hours.

If it is unclear whether your amniotic sac has ruptured or not, your midwife will either ask that you be seen in the clinic or send a nurse to your home for an assessment of both mother and the baby. Fetal well-being screening during these visits is an additional fee per your homebirth agreement, and any medications that might be required.

After twenty-four hours of no progression, your midwife will discuss with you the option to continue with expectant management, inducing labor at home, or transferring to the hospital for induction. A registered nurse or midwife will provide an in-person assessment each day, either in the clinic or your home, as part of the maternity package fee.

One important component of the management provided by the nurse-midwives at Believe Midwifery Services, LLC is the complete avoidance of vaginal exams after the rupture of membranes, until birth is imminent or unless doing so would change the management plan. Numerous studies have identified the number of digital vaginal examinations as a risk factor for perinatal infection. The timing of the first digital examination may also be significant.

*updated May, 2014*
What are my options?
Clients are encouraged to utilize optimal fetal positioning exercises and chiropractic care. Clients are also responsible for monitoring signs of infections, and notifying the midwife with any concerns. These signs include:
- new onset meconium,
- frank vaginal bleeding,
- maternal fever above 101,
- foul-smelling amniotic fluid,
- uterine tenderness, and
- decreased fetal movement.

Clients more than 37 weeks pregnant and ruptured more than twenty-four hours are offered the option of expectant management in the absence of abnormal findings or induction of labor. Clients are also extended the right to revisit their management plan and choose induction of labor if they no longer desire expectant management. It should be understood that induction of labor at home is controversial and fewer induction options are far more limiting than in the hospital. Your nurse-midwife will discuss these options with you and assist you with determining the safest and most satisfying options for your individual circumstance.

In collaboration with your nurse-midwife, alternative options for induction may prove helpful. Nipple stimulation, homeopathic black and blue cohosh every fifteen to thirty minutes may be helpful, or herbal black and blue cohosh. Alternatively, cotton root bark can be tried every fifteen to thirty minutes.

How long can my water be broken before I am at risk?
There is no definitive length of the latent period at which the risks of PROM become significantly increased, although studies do indicate risk factors for infection as gradually increasing with duration of rupture. The most important single predictive factor for chorioamnionitis was multiple vaginal exams. The long-held belief that infection sharply increases after twenty-four hours is unfounded and unsupported in evidence. The Term PROM study did not show any difference in the overall rate of neonatal infection between the induction or expectant management groups.

Management decisions in effort to ensure birth prior to 24 hours have not proven to decrease infection, but has been associated with a higher cesarean section rate in women with term PROM. The Ontario Midwives (2010) support expectant management for up to 96 hours before IOL. There is no specific reason to induce at this point, but also no evidence to quantify any potential increase in risks to mother and baby beyond this point.

What are my risks?
Maternal colonization of GBS adds another layer of complexity to the management of women with term PROM, and the reason the nurse-midwives of Believe Midwifery Services, LLC are strong advocates of screening prenatally. Colonization with GBS is a known risk factor for neonatal and maternal infection. GBS and PROM together may have a synergistic affect.

In the Term PROM study, the GBS protocol was inconsistent and in most cases, a culture was not obtained prior to delivery. In addition, the majority of women who were GBS-positive did not receive antibiotic prophylaxis; therefore, this study does not provide guidance.

updated May, 2014
A positive GBS culture is often thought to indicate immediate induction in women who have term PROM, but this recommendation is not specified in the GBS guidelines from the Centers for Disease Control and Prevention (CDC). The CDC guidelines simply state, “At the time of...rupture of membranes, intrapartum chemoprophylaxis should be given to all pregnant women identified as GBS carriers.” Neither the ACNM Clinical Bulletin nor the ACOG Committee Opinion on GBS prevention offer specific recommendations regarding management of term PROM in GBS-positive women beyond the recommendation that antibiotic prophylaxis should be offered.

Gaps in research exist regarding the most effective approach to preventing early onset GBS disease in infants born to GBS carriers who experience term PROM. Consistent with the midwifery model of care, your nurse-midwife will discuss antibiotic options with each couple and assist in making the best decision for your family. However, each couple should be aware that the community standard is early treatment and immediate induction in the presence of GBS colonization.

References: