MANAGEMENT OF RUPTURED MEMBRANES AT TERM

Randall J. Morgan MD MBA
Clinical Professor University of Kansas Medical School
I am

A. OB GYN physician with > 4 years experience
B. OB GYN physician with ≤ 4 years experience
C. PG-4
D. PG-3
E. PG-2
F. PG-1
G. Medical student
H. Nurse
Milestone Reporting

This document presents milestones designed for programs to use in semi-annual review of resident performance and reporting to the ACGME. Milestones are knowledge, skills, attitudes, and other attributes for each of the ACGME competencies organized in a developmental framework from less to more advanced. They are descriptors and targets for resident performance as a resident moves from entry into residency through graduation. In the initial years of implementation, the Review Committee will examine milestone performance data for each program’s residents as one element in the Next Accreditation System (NAS) to determine whether residents overall are progressing.

For each period, review and reporting will involve selecting milestone levels that best describe each resident’s current performance and attributes. Milestones are arranged into numbered levels. Tracking from Level 1 to Level 5 is synonymous with moving from novice to expert. These levels do not correspond with post-graduate year of education.

Selection of a level implies that the resident substantially demonstrates the milestones in that level, as well as those in lower levels (see the diagram on page v).

**Level 1:** The resident demonstrates milestones expected of an incoming resident.

**Level 2:** The resident is advancing and demonstrates additional milestones, but is not yet performing at a mid-residency level.

**Level 3:** The resident continues to advance and demonstrate additional milestones, consistently including the majority of milestones targeted for residency.

**Level 4:** The resident has advanced so that he or she now substantially demonstrates the milestones targeted for residency. This level is designed as the graduation target.

**Level 5:** The resident has advanced beyond performance targets set for residency and is demonstrating “aspirational” goals which might describe the performance of someone who has been in practice for several years. It is expected that only a few exceptional residents will reach this level.
<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrates basic knowledge of routine/uncomplicated intrapartum obstetrical care including, conduct of normal labor</td>
<td>Provides intrapartum obstetrical care for women with uncomplicated pregnancies (e.g., identification of fetal lie, interpretation of fetal heart rate monitoring, and tocodynamometry)</td>
<td>Manages abnormal labor</td>
<td>Provides care for women with complex intrapartum complications and conditions</td>
<td>Applies innovative approaches to complex and atypical intrapartum conditions and implements treatment plans based on emerging evidence</td>
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<tr>
<td>Differentiates between normal and abnormal labor</td>
<td>Manages intrapartum complications (e.g., cord prolapse, placental abruption)</td>
<td></td>
<td>Identifies indications for consultation, referral, and/or transfer of care for patients with intrapartum complications</td>
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<tr>
<td>Recognizes intrapartum complications (e.g., chorioamnionitis, shoulder dystocia)</td>
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<td></td>
<td>Effectively supervises and educates lower-level residents in intrapartum care</td>
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<td></td>
<td>Collaborates and provides consultation to other members of the health care team in intrapartum care</td>
<td></td>
</tr>
</tbody>
</table>
Residents who reach milestone 1 are able to recognize term labor, term ruptured membranes and manage term normal labor with or without ruptured membranes.

A. True  
B. False
Residents who reach milestone 2 (for term pregnancies) are able to distinguish labor from uterine contractions without labor, premature rupture of membranes from rupture of membranes in labor and distinguish normal from abnormal labor.

A. True
B. False
Residents who reach milestone 3 are able to manage term & preterm premature rupture membranes, manage term and preterm labor, manage abnormal term labor, manage preterm labor, initiate and manage augmentations of labor, initiate and manage inductions of labor.

A. True
B. False
Residents who reach milestone 4 are able to teach and supervise medical students/residents regarding recognition of PROM, SROM, normal labor, preterm labor, abnormal labor, augmentation of labor and induction of labor.

A. True
B. False
25 yr old G1P0 37 3/7 weeks arrives at 08:00. loss of fluid at 05:00. She is not contracting. 2 cm, 50% effaced, -3, vtx, gross pooling, nitrazine+, fern+. Your assessment is:

A. Premature rupture of membranes without labor
B. Premature rupture of membranes with labor
C. Spontaneous rupture of membranes without labor
D. Spontaneous rupture of membranes with labor
25 yr old G1P0 37 3/7 weeks arrives at 08:00 contracting every 3-5 minutes. loss of fluid at 05:00. She started contracting at 07:00. 2 cm, 50% effaced, -3, vtx, gross pooling, nitrazine+, fern+. Your assessment is:

A. Premature rupture of membranes not in labor
B. Premature rupture of membranes in labor
C. Spontaneous rupture of membranes not in labor
D. Spontaneous rupture of membranes in labor
25 yr old G1P0 37 3/7 weeks arrives at 08:00 contracting every 3-5 minutes. Loss of fluid at 05:00. She started contracting at 07:00. Today she is 2 cm, 100% effaced, -3, vtx, gross pooling, nitrazine+, fern+, Yesterday she was 1 cm 0% effaced -3. Your assessment is:

A. Premature rupture of membranes not in labor
B. Premature rupture of membranes in labor
C. Spontaneous rupture of membranes not in labor
D. Spontaneous rupture of membranes in labor
25 yr old G1P0 37 3/7 weeks arrives at 08:00 contracting every 3-5 minutes. Loss of fluid at 05:00. She started contracting at 07:00. Today she is 2 cm, 100% effaced, -3, vtx, gross pooling, nitrazine+, fern+, Yesterday she was 1 cm 0% effaced -3. She began labor:

A. Before 05:00
B. 5:00
C. 07:00
D. 08:00
25 yr old G1P0 37 3/7 weeks arrives at 08:00 contracting every 3-5 minutes. Loss of fluid at 05:00. She started contracting at 01:00. Today she is 2 cm, 100% effaced, -3, vtx, gross pooling, nitrazine +, fern+, Yesterday she was 1 cm 0% effaced -3. Your assessment is:

A. Premature rupture of membranes not in labor
B. Premature rupture of membranes in labor
C. Spontaneous rupture of membranes not in labor
D. Spontaneous rupture of membranes in labor
25 yr old G1P0 37 3/7 weeks arrives at 08:00 contracting every 3-5 minutes. Loss of fluid at 05:00. She started contracting at 01:00. Today she is 2 cm, 100% effaced, -3, vtx, gross pooling, nitrazine +, fern+. Yesterday she was 1 cm 0% effaced -3. She began labor:

A. Before 1:00
B. 5:00
C. 8:30 when you checked her and she was 2 cm
25 yr old G1P0 37 3/7 weeks arrives at 08:00 contracting every 3 minutes. Loss of fluid at 05:00. She started contracting at 01:00. Today she is 6 cm, 100% effaced, 0 station, vtx, gross pooling, nitrazine +, fern+, Yesterday she was 1 cm 0% effaced -3. Your assessment is:

A. Premature rupture of membranes not in labor
B. Premature rupture of membranes in labor
C. Spontaneous rupture of membranes not in labor
D. Spontaneous rupture of membranes in labor
25 yr old G1P0 37 3/7 weeks arrives at 08:00 contracting every 3 minutes. Loss of fluid at 05:00. She started contracting at 01:00. Today she is 6 cm, 100% effaced, 0 station, vtx, gross pooling, nitrazine +, fern+, Yesterday she was 1 cm 0% effaced -3. She began labor:

A. Before 01:00
B. 1:00
C. 5:00
D. 08:30 when you checked her and she was 6 cm
25 yr old G1P0 28 3/7 weeks arrives at 08:00. Loss of fluid at 05:00. She is not contracting. 2 cm, 0% effaced, -3, vtx, gross pooling, nitrazine+, fern+, Amnisure+. Your assessment is:

A. Preterm Premature rupture of membranes without labor
B. Preterm Premature rupture of membranes with labor
C. Spontaneous rupture of membranes without labor
D. Spontaneous rupture of membranes in premature labor
25 yr old G1P0 28 3/7 weeks arrives at 08:00 contracting every 3-5 minutes. loss of fluid at 05:00. She started contracting at 07:00. 2 cm, 50% effaced, -3, vtx, gross pooling, nitrazine +, fern+, Amnisure+.

Your assessment is:

A. Preterm Premature rupture of membranes not in labor
B. Preterm Premature rupture of membranes in preterm labor
C. Spontaneous rupture of membranes not in labor
D. Spontaneous rupture of membranes in preterm labor
25 yr old G1P0 28 3/7 weeks arrives at 08:00 contracting every 3-5 minutes. Loss of fluid at 05:00. She started contracting at 07:00. Today she is 2 cm, 100% effaced, -3, vtx, gross pooling, nitrazine +, fern+, Amnisure+ Yesterday she was 1 cm 0% effaced -3. Your assessment is:

A. Preterm Premature rupture of membranes not in labor
B. Premature rupture of membranes in preterm labor
C. Spontaneous rupture of membranes not in labor
D. Spontaneous rupture of membranes in preterm labor
25 yr old G1P0 28 3/7 weeks arrives at 08:00 contracting every 3-5 minutes. loss of fluid at 05:00. She started contracting at 01:00. today she is 2 cm, 100% effaced, -3, vtx, gross pooling, nitrazine+, fern+, Amnisure+ Yesterday she was 1 cm 0% effaced -3. Your assessment is:

A. Preterm Premature rupture of membranes not in labor
B. Preterm Premature rupture of membranes in preterm labor
C. Spontaneous rupture of membranes not in labor
D. Spontaneous rupture of membranes in preterm labor
25 yr old G1P0 28 3/7 weeks arrives at 08:00 contracting every 3 minutes. Loss of fluid at 05:00. She started contracting at 01:00. Today she is 4 cm, 100% effaced, 0 station, vtx, gross pooling, nitrazine +, fern+, Yesterday she was 1 cm 0% effaced -3. Your assessment is:

A. Preterm Premature rupture of membranes not in labor
B. Preterm Premature rupture of membranes in preterm labor
C. Spontaneous rupture of membranes not in labor
D. Spontaneous rupture of membranes in preterm labor
25 yr old G1P0 28 3/7 weeks arrives at 08:00 contracting every 3 minutes. Loss of fluid at 05:00. She started contracting at 01:00. Today she is 4 cm, 100% effaced, 0 station, vtx, gross pooling, nitrazine +, fern+, Yesterday she was 1 cm 0% effaced -3. She began labor:

A. Before 01:00
B. 01:00
C. 05:00
D. 08:30 when you checked her at 4 cm
25 yr old G1P0 28 3/7 weeks arrives at 08:00 contracting every 3 minutes. Loss of fluid at 05:00. She started contracting at 01:00. Today she is 6 cm, 100% effaced, 0 station, vtx, gross pooling, nitrazine +, fern+, Yesterday she was 1 cm 0% effaced -3. Your assessment is:

A. Preterm Premature rupture of membranes not in labor
B. Preterm Premature rupture of membranes in preterm labor
C. Spontaneous rupture of membranes not in labor
D. Spontaneous rupture of membranes in preterm labor
25 yr old G1P0 28 3/7 weeks arrives at 08:00 contracting every 3 minutes. Loss of fluid at 05:00. She started contracting at 01:00. Today she is 6 cm, 100% effaced, 0 station, vtx, gross pooling, nitrazine +, fern+, Yesterday she was 1 cm 0% effaced -3. She began labor at:

A. Before 01:00
B. 1:00
C. 05:00
D. 08:30 when you checked her at 6 cm
25 yr old G1P0 28 3/7 weeks arrives at 08:00. loss of fluid at 05:00. She is not contracting. 2 cm, 0% effaced, -3, vtx, gross pooling, nitrazine +, fern+, Amnisure+. You give steroids, MgSO4 and plan:

A. Expectant management
B. If not in labor within 6 hours induce labor with oxytocin
C. If not 3 cm within 2 hours augment with oxytocin
D. Augment labor at admission
E. Induce labor with oxytocin at admission
F. Ripen cervix with misoprostol and then induce labor
G. Foley bulb followed by oxytocin induction
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A. Expectant management
B. If not in labor within 6 hours induce labor with oxytocin
C. If not 3 cm within 2 hours augment with oxytocin
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A. Expectant management

B. If not 7cm within 2 hours induce labor with oxytocin

C. If not 7 cm within 2 hours augment with oxytocin

D. Augment labor

E. Induce labor with oxytocin

F. Ripen cervix with misoprostol and then induce labor
Goals and objectives

1. Participants will be able to distinguish premature rupture of the membranes from spontaneous rupture of membranes in labor.
   • 2. Participants will be able to discuss labor recognition and discriminate labor from uterine contractions.
   • 3. Participants will be able to articulate differences between labor induction vs labor augmentation.
   • 4. Participants will be able to chart labor, PROM, SROM, induction and augmentation.
   • 5. Participants will be able to discuss how to manage premature rupture of the membranes at term. (I found no authoritarian treatise regarding timing of labor augmentation for ruptured membranes in term latent labor).
   • I have no conflicts of interest.
What is labor?
What is labor? (virtually none of the studies described labor in the articles)

- One method is

- 1. palpable uterine contractions every 3 minutes and cervical dilation $\geq 3$cm

- 2. uterine contraction that result in cervical dilation in 2 hours

- 3. ruptured membranes and palpable uterine contractions every 3 minutes

- Mancuso OB GYN Apr 2004 p.653
Is it reasonable to expect residents who reach milestone 2 to discriminate between ruptured membranes in labor vs premature rupture of membranes?

ie. Should residents who reach milestone 2 be able to recognize labor?
Premature rupture of membranes

- Rupture of membranes before the onset of labor.
- 8% of pregnancies
- Generally followed by prompt onset of spontaneous labor and delivery.
- Expectant management of PROM (Hannah NEJ 1996;334:1005-10)
  - 1/2 delivered within 5 hours
  - 95% delivered within 28 hours

Spontaneous rupture of membranes

- Rupture of membranes spontaneously vs artificial or surgical.
- Presence or absence of labor does not determine if membranes rupture is spontaneous or artificial.
ACOG Oct 2016

• Level B (ACOG Practice Bulletin No. 172, Oct 2016 and
  • “For women with PROM at 37 0/7 weeks of gestation or more, if spontaneous labor does not occur near the time of presentation in those who do not have contraindications to labor, labor should be induced.”

Cochrane Library Jan 2017

• “There is low quality evidence to suggest that planned early birth (with induction methods such as oxytocin or prostaglandins) reduces the risk of maternal infectious morbidity compared with expectant management for PROM at 37 weeks gestation or later, without an apparent increase in cesarean section….and neonatal infection may be reduced.”
ACOG Dec 2016

• Level B (ACOG Practice Bulletin No. 172, Oct 2016 “Premature rupture of membranes”
  • Induction reduced time from admission to delivery
  • Decreased chorioamnionitis, endometritis, NICU admission
  • Did not increase cesarean

Cochrane Library Jan 2017

• Planned early birth vs expectant management (waiting) for prelabour rupture of membranes at term (37 weeks or more)
  • Chorioamnionitis/endometritis RR 0.49 95% CI 0.33-0.72
  • Definite or probable neonatal sepsis RR 0.73 95% CI 0.58-0.92
Figure 4. Funnel plot of comparison: Planned early birth versus expectant management (subgroups: method of induction), outcome: 1.7 Maternal infectious morbidity (chorioamnionitis, endometritis and/or pyrexia).
Figure 6. Funnel plot of comparison: Planned early birth versus expectant management (subgroups: method of induction), outcome: 1.6 Definite or probable early-onset neonatal sepsis.
ACOG Dec 2016

- Level B (ACOG Practice Bulletin No. 172, Oct 2016 “Premature rupture of membranes”

  - if spontaneous labor does not occur near the time of presentation
    labor should be induced.

Cochrane Library Jan 2017

- Planned early birth vs expectant management (waiting) for prelabour rupture of membranes at term (37 weeks or more)

- What does planned early mean vs expectant management (waiting)
ACOG Dec 2016

- Level B (ACOG Practice Bulletin No. 172, Oct 2016 “Premature rupture of membranes”

  - if spontaneous labor does not occur near the time of presentation ..labor should be induced..

  - What do these statements mean?

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- Planned early birth vs expectant management (waiting) for prelabour rupture of membranes at term (37 weeks or more) was found to reduce maternal infection and possible neonatal infection

  - What does planned early mean vs expectant management (waiting)?

  - When should you start induction?
ACOG Dec 2016

- Level B (ACOG Practice Bulletin No. 172, Oct 2016 “Premature rupture of membranes”
  - ..if spontaneous labor does not occur “near the time of presentation”
    ..labor should be induced..
    requires us to be able to recognize labor and differentiate between induction/augmentation

Cochrane Library Jan 2017

- Planned early birth vs expectant management (waiting) for prelabour rupture of membranes at term (37 weeks or more)
  - What does “planned early” mean vs “expectant management (waiting)”?
    - Expectant management of PROM (Hannah NEJ 1996;334:1005-10)
      - 1/2 delivered within 5 hours of PROM
      - 95% delivered within 28 hours
Fig. 2. Average labor curves by parity in singleton term pregnancies with spontaneous onset of labor, vaginal delivery, and normal neonatal outcomes. P0, nulliparous women; P1, women of parity 1; P2+, women of parity 2 or higher. Zhang. Contemporary Labor Patterns. Obstet Gynecol 2010.
Fig. 3. The 95th percentiles of cumulative duration of labor from admission among singleton term nulliparous women with spontaneous onset of labor, vaginal delivery, and normal neonatal outcomes. Zhang. Contemporary Labor Patterns. Obstet Gynecol 2010.
ACOG Dec 2016

- Level B (ACOG Practice Bulletin No. 172, Oct 2016 “Premature rupture of membranes”
  - “induction of labor with prostaglandins has been shown to be equally effective for labor induction compared with oxytocin but is associated with higher rates of chorioamnionitis”
  - Hannah NEJ 1996,334:1005-10
  - Insufficient evidence for or against foley bulb

Cochrane Library Jan 2017

- “There is low quality evidence to suggest that planned early birth (with induction methods such as oxytocin or prostaglandins) reduces the risk of maternal infectious morbidity compared with expectant management for PROM at 37 weeks gestation or later, without an apparent increase in cesarean section….and neonatal infection may be reduced.”
ACOG PROM Oct 2016

• …Insufficient evidence for or against foley bulb…
25 yr old G1P0 37 3/7 weeks arrives at 08:00. loss of fluid at 05:00. She is not contracting. 2 cm, 50% effaced, -3, vtx, gross pooling, nitrazine+, fern+. Your assessment is:

A. Expectant management
B. If not in labor within 6 hours induce labor with oxytocin
C. If not 3 cm within 2 hours augment with oxytocin
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A. If not 7cm within 2 hours induce labor with oxytocin
B. If not 7 cm within 2 hours augment with oxytocin
C. Augment labor
D. Induce labor with oxytocin
E. Ripen cervix with misoprostol and then induce labor
Debrief of premature rupture of membranes

1. What surprised you?
2. What puzzles you
3. What other information do you need to help your patients receive the best care, outcomes and your facility is recognized as a best place to give birth and be born?
Data Element Name: Labor
Collected For: PC-01.
Definition: Documentation by the clinician that the patient was in labor
Suggested Data Collection Question: Is there documentation by the clinician that the patient was in labor?

Format: Length: 1
Type: Alphanumeric
Occurs: 1

Allowable Values:

Y (Yes) There is documentation by the clinician that the patient was in labor.
N (No) There is no documentation by the clinician that the patient was in labor OR unable to determine from medical record documentation.

Notes for Abstraction: A clinician is defined as a physician, certified nurse midwife (CNM), advanced practice nurse/physician assistant (APN/PA) or registered nurse (RN).

Suggested Data Sources:

• History and physical
• Nursing notes
• Physician progress notes

Additional Notes:

<table>
<thead>
<tr>
<th>Inclusion</th>
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<tbody>
<tr>
<td>Active Labor</td>
<td>Prodromal Labor</td>
</tr>
<tr>
<td>Spontaneous Labor</td>
<td></td>
</tr>
</tbody>
</table>

Guidelines for Abstraction:
ICD-10 codes for premature rupture of membranes

- **O42.10** Premature rupture of membranes, onset of labor more than 24 hours following rupture, unspecified weeks of gestation

- **O42.111** Preterm premature rupture of membranes, onset of labor more than 24 hours following rupture, first trimester

- **O42.112** Preterm premature rupture of membranes, onset of labor more than 24 hours following rupture, second trimester

- **O42.113** Preterm premature rupture of membranes, onset of labor more than 24 hours following rupture, third trimester

- **O42.12** Full-term premature rupture of membranes, onset of labor more than 24 hours following rupture

- **O42.00** Premature rupture of membranes, onset of labor within 24 hours of rupture, unspecified weeks of gestation

- **O42.011** Preterm premature rupture of membranes, onset of labor within 24 hours of rupture, first trimester

- Preterm premature rupture of membranes, onset of labor within 24 hours of rupture, second trimester

- **O42.013** Preterm premature rupture of membranes, onset of labor within 24 hours of rupture, third trimester

- **O42.02** Full-term premature rupture of membranes, onset of labor within 24 hours of rupture