INDUCTION OF LABOR

Induction of Labor: Cervical Ripening

SUMMARY: Cervical ripening is used to facilitate the process of cervical softening, thinning, and dilating in order to reduce the time from induction start to delivery in women requiring induction of labor with an unfavorable cervix.

Rationale: The goal of induction of labor is vaginal delivery. Cervical ripening is recommended for patients with an unfavorable cervix. The modified Bishop score (Table) should be used to evaluate the cervix prior to induction. An unfavorable cervix has generally been defined as a Bishop score of 6 or less. If the total score is more than 8, the probability of vaginal delivery after labor induction is similar to that after spontaneous labor.

Table 1. Bishop Scoring System

<table>
<thead>
<tr>
<th>Score</th>
<th>Dilation (cm)</th>
<th>Position of Cervix</th>
<th>Effacement (%)</th>
<th>Station*</th>
<th>Cervical Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Closed</td>
<td>Posterior</td>
<td>0-30</td>
<td>-3</td>
<td>Firm</td>
</tr>
<tr>
<td>1</td>
<td>1-2</td>
<td>Midposition</td>
<td>40-50</td>
<td>-2</td>
<td>Medium</td>
</tr>
<tr>
<td>2</td>
<td>3-4</td>
<td>Anterior</td>
<td>60-70</td>
<td>-1, 0</td>
<td>Soft</td>
</tr>
<tr>
<td>3</td>
<td>5-6</td>
<td>—</td>
<td>80</td>
<td>+1, +2</td>
<td>—</td>
</tr>
</tbody>
</table>

*Station reflects a -3 to +3 scale.

As part of the induction process, cervical ripening is used to facilitate the process of cervical softening, thinning, and dilating in order to reduce the time from induction start to delivery. In most randomized controlled trials, cervical ripening has been shown to increase the rate of delivery within 24 hours (i.e. to reduce the time from administration of the ripening agent until delivery) without significantly altering cesarean delivery rates. Thus, the goal of cervical ripening is to decrease the induction to delivery time and not to decrease the risk of cesarean. Patients undergoing cervical ripening have been shown to have a significantly longer labor course (both latent and early active phases) compared with those with a spontaneous onset of labor. Several agents are available for cervical ripening (described below).

The indications for and potential risks and/or benefits of labor induction should be carefully considered.

Eligible patients: Any patient undergoing induction of labor for a viable pregnancy from the late 2nd trimester through the late term period with a Bishop score of 6 or less. The indications and contraindications for cervical ripening are similar to those for labor induction, but also include additional cautions. For more information, see the Toolbox document entitled “Induction of Labor: Oxytocin Administration and Amniotomy.”
Additional contraindications to misoprostol (Cytotec®):

- Utilization with other prostaglandins
- Known hypersensitivity to prostaglandins
- Clinical suspicion for or evidence of fetal distress
- Prior cesarean

Additional contraindications to dinoprostone vaginal insert (Cervidil®):

- Utilization with other prostaglandins
- Known hypersensitivity to prostaglandins
- Clinical suspicion for or evidence of fetal distress
- Prior cesarean
- Multipara with 6 or more previous term pregnancies

Technique:

- The optimal length of time for cervical ripening is not established. Limiting cervical ripening time to 12 hours in recommended, regardless of agent, in order to avoid an iatrogenic increase in the time from administration of the first ripening agent until delivery, which would counteract the only consistently demonstrated benefit of cervical ripening (i.e., interval from administration of ripening agent to delivery of less than 24 hours).

- Following are the techniques for administration of commonly used ripening agents:

  o **Misoprostol (Cytotec®)**
    - One quarter of an unscored 100-mcg tablet (i.e. approximately 25 mcg) can be administered intravaginally every 3-4 hours. Subsequent doses may be held if contractions are more than 3 in 10 minutes and lasting 45 seconds or more.
    - Misoprostol may be given concurrently with a cervical ripening balloon.
    - Oxytocin should not be administered less than 4 hours after the last misoprostol dose.
    - The managing physician or certified nurse midwife should be notified if there are abnormal maternal vital signs, non-reassuring fetal heart rate pattern, or tachysystole (>5 contractions in 10 minutes, averaged over a 30 minute window).

  o **Dinoprostone vaginal insert (Cervidil®)**
    - One insert (10mg of dinoprostone) placed vaginally. Per the manufacturer’s package insert, dinoprostone is released at approximately 0.3mg/ hour over a 12-hour period.
    - Remove the insert with the onset of active labor or at 12 hours after insertion.
    - Oxytocin should not be administered with the dinoprostone insert in place. Waiting 30-60 minutes after removal before starting oxytocin is likely sufficient.
- The managing physician or certified nurse midwife should be notified and the dinoprostone vaginal insert removed if there are abnormal maternal vital signs, non-reassuring fetal heart rate pattern, or tachysystole (>5 contractions in 10 minutes, averaged over a 30 minute window).

  - **Cook® Cervical Ripening Balloon**
    - Device is placed into the cervix and advanced until both balloons have entered the cervical canal. Per manufacturer instructions, the uterine balloon is filled with 40 mL of normal saline using a 20 mL Luer-lock syringe through the red Check-Flo valve marked “U”. Once inflated, the device is pulled back until the uterine balloon is against the internal cervical os. The vaginal balloon is filled with 20 mL of normal saline using the green Check-Flo valve marked “V”. Once properly placed, each balloon can be filled in turn, in 20 mL increments until each balloon contains a maximum 80 mL of fluid.
    - Proximal end of the catheter may be taped to the patient’s thigh.
    - Remove the device with spontaneous expulsion or at 12 hours per manufacturer’s guidelines.
    - The device is removed by deflating both balloons.
    - May be given concurrently with either misoprostol (per protocol) or oxytocin (see separate Toolbox document entitled “Induction of Labor: Oxytocin Administration and Amniotomy”).

**Special Considerations:**

- **Misoprostol (Cytotec®)**
  - Although misoprostol currently is approved by the U.S. Food and Drug Administration (FDA) for the prevention of peptic ulcers, the FDA in 2002 approved a new label on the use of misoprostol during pregnancy for cervical ripening and for the induction of labor.\(^1\)
  - Buccal or sublingual misoprostol for cervical ripening is currently not recommended by ACOG until further studies supporting safety are available.
  - The majority of adverse maternal and fetal outcomes associated with misoprostol therapy result from the use of doses greater than 25 mcg (i.e., ≥50 mcg) and should be reserved for specific situations (e.g., fetal demise).
  - Misoprostol may be used in the presence of ruptured membranes.

- **Dinoprostone vaginal insert (Cervidil®)\(^4\)**
  - The commercially available dinoprostone vaginal insert costs significantly more than misoprostol with no consistently demonstrated benefit.
  - Claims regarding reversal of uterine hyperstimulation with removal of the dinoprostone vaginal insert can be found in the Cervidil package insert from the manufacturer; however, there are no independent, peer reviewed publications supporting that claim.
• **Cook® Cervical Ripening Balloon**
  
  o The manufacturer recommends removal of the device after ruptured membranes.

**References:**


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Keywords: Cervical ripening, induction of labor, cervidil, dinoprostone, cytotec, misoprostol, cervical ripening balloon, Bishop score