Women and Children's Health Services
CLINICAL CARE GUIDELINE

CERVICAL RIPENING FOR INDUCTION OF LABOR

DATE: APRIL 2021

Key Content Expert: Catalin Buhimschi, MD, MBA and Erin Farah, PhD, CNM

Women and Children's Health Services
CLINICAL CARE GUIDELINE

NO.: OB-I 3.15

APPROVAL DATE: April 20, 2021
EFFECTIVE DATE: April 21, 2021

SUBJECT: Cervical Ripening for Induction of Labor

OBJECTIVE

The goal of this guideline is to review methods of cervical ripening for induction of labor. This practice guideline describes the methods used for cervical ripening using various pharmacologic agents.

DEFINITIONS

Credentialed Practitioner: Physician or other licensed practitioners as defined in the Medical Staff Bylaws. These practitioners include, but are not limited to, attending physicians, dentists, podiatrists, advance practice nurses and physician assistants.
Note: For the purpose of this guideline, "practitioner" will include credentialed practitioners, fellows and residents.

Electronic Health Record (EHR): refers to the structured collection of patient health information stored in an electronic format.

Induction of labor is the artificial stimulation of labor before its spontaneous onset to achieve vaginal delivery

POSITION STATEMENTS

In the United States, 23% of gestational patients with singleton pregnancies experience an induction of labor for medically and non-medically indicated reasons (Osterman MJK, Martin JA, 2014). The goal of induction is to achieve vaginal delivery by stimulating uterine contractions before the spontaneous onset of labor. The benefits of induction must be weighed against the potential maternal or fetal risks (ACOG Practice Bulletin No. 107, 2009).

ACOG guidelines state that gestational patients should be 39 0/7 weeks' gestation or greater before initiating an elective (non-medically indicated) delivery. Maintaining strict adherence to such a guideline has been found to improve neonatal outcomes. Neonatal morbidities that have been associated with early-term delivery include: respiratory distress syndrome; transient tachypnea of the newborn; ventilator use; pneumonia; respiratory failure; neonatal intensive care admission; hypoglycemia; 5-minute Apgar score less than 7; and neonatal mortality (ACOG Committee Opinion No. 765, 2019).

Recent studies showed that induction of labor at 39 weeks in low-risk nulliparous patients did not result in a significantly lower frequency of a composite adverse perinatal outcome, but it did result in a significantly lower frequency of cesarean delivery. (Grobman WA, 2018).

Women and Children's Health Services
CLINICAL CARE GUIDELINE

Given that the state of the cervix is an important predictor of the success of induction, cervical ripening agents may be used to ripen an unfavorable cervix.

PROCEDURE

I. Indications for Induction of Labor (ACOG Committee Opinion No. 765, 2019) (ACOG Practice Bulletin No. 107, 2009)

Cervical ripening is an integral process of labor induction process. Induction of labor and cervical ripening are indicated when the benefits to either the mother or fetus outweigh the risk of continuing pregnancy.

Indications include but are not limited to:

- Prelabor rupture of membranes
- Preeclampsia, eclampsia
- Chorioamnionitis
- Suspected fetal jeopardy (e.g., fetal growth restriction, oligohydramnios, isoimmunization)
- Maternal medical problems (e.g., diabetes mellitus, renal disease, hypertension)
- Fetal demise
- Post-term pregnancy
- Abnormal antepartum testing results

II. Contraindications to Induction of Labor (ACOG Practice Bulletin No. 107, 2009)

Include, but are not limited to:

- Placenta or vasa previa
- Transverse fetal lie
- * Prior classical uterine incision
- Previous myomectomy entering the endometrial cavity
- Active genital herpes infection
- Invasive cervical carcinoma

* Relative contraindication based on gestational age

III. Requirements for Induction of Labor

Prior to induction, the following must be documented in the medical record:

- Indication for delivery
- Review of pregnancy dating
- Estimated fetal weight
- The attending physician on Labor and Delivery has been notified and concurs with the need for induction
- Patient has been counseled regarding the indications for induction, the expected results, and possible adverse effects
- If the gestational age at labor induction is <39 weeks it is mandatory to document the reason for induction.

IV. Cervical Assessment

Accurate assessment of the cervix is essential, because the selection of induction method is typically centered on the cervical status (Penfield CA, 2017). Before starting a labor induction, the practitioner must first assess the cervix to determine whether or not it is ready to start the labor process. Cervical exams performed within 48 hours of induction are acceptable if patient reports no change in uterine activity.

The Bishop score is the most commonly used method to assess the ripeness of the cervix before induction. This system takes into account the position, consistency, effacement, and dilation of the cervix, as well as the station of the presenting fetal part relative to the ischial spines (Penfield CA, 2017).

Bishop Scoring System

Score	Dilation (cm)	Effacement (%)	Station	Consistency	Position of Cervix
0	Closed	0 - 30	-3	Firm	Posterior
1	1-2	40-50	-2	Moderate	Mid
2	3-4	60-70	-1/0	Soft	Anterior
3	>5	>80	+1/+2		

A cervix is termed "favorable" or "ripe" to begin labor when it has softened or thinned out, making it pliable for stretching and subsequent dilation. An unfavorable cervix generally has been defined as a Bishop score of 6 or less and induction starting with ripening agents is indicated (ACOG Practice Bulletin No. 107, 2009). Digital cervical exam is usually done, but is not required particularly in cases of ruptured membranes to decrease the risk of infection (i.e. clinical chorioamnionitis).

Site of initiation of the cervical ripening

If census indicates, cervical ripening may be conducted on the antepartum unit

Nursing Considerations

Upon admission the nurse will review:

1. Indication for induction
2. Review prenatal history
3. Medical and nursing assessment of both maternal and fetal status
4. Review practitioner order
5. Prior to the initiation of an induction, when appropriate, obtain a 20-minute electronic fetal monitor tracing for evaluation
6. Assess and record baseline maternal vital signs [blood pressure, pulse, respiration every 4 hours (if patient is not on oxytocin) and temperature every 4 hours, unless rupture of membrane, then temperature is every 2 hours].
7. Explain the plan of care to the patient
8. Initiate intravenous access with 18 G
9. Draw labs as ordered by practitioner

10. Position the patient to avoid vena cava compression
11. Nurse will provide patient's access to fluids and food

V. Cervical Ripening

Patients with an indication for induction of labor may benefit from cervical ripening agents, particularly those with a low Bishop's score less than 6 (ACOG Practice Bulletin No. 107, 2009). Methods or ripening agents available are (See Addendum 1):

- Misoprostol (PGE1, Cytotec)
- Dinoprostone Vaginal Insert (PGE2, Cervidil)
- Transcervical Extra Amniotic Foley Catheter Insertion (Foley Bulb)
- Extra Amniotic Saline Induction (EASI)

A. Misoprostol: PGE1 (Cytotec)

Misoprostol is more stable and easier to store than dinoprostone, however use for induction of labor represents an off-label use. Misoprostol is significantly less expensive than dinoprostone. Misoprostol has been found to be an effective agent in randomized controlled clinical trials for the induction of labor. Use of misoprostol decreased oxytocin requirements and achieved higher rates of vaginal delivery when compared with placebo, and it has been found to be as effective as dinoprostone in achieving vaginal deliveries. There have been reports of misoprostol being associated with higher incidence of uterine tachysystole.

There have been reports of uterine rupture following misoprostol use in patients with prior C-Section, prior classical or T incision, or other uterine surgery (e.g. myomectomy with penetration of the endometrial cavity). Therefore, Misoprostol is contraindicated in these patients (ACOG Practice Bulletin No. 205, 2019).

When deciding which cervical ripening agent to use, consider the following:

- misoprostol induced tachysystole cannot be reversed easily
- misoprostol may be stored at room temperature
- misoprostol is very inexpensive

Dosage/Procedure:

- See Addendum 1

Key clinical points:

- Doses should not be administered more frequently than every 4 hours
- Misoprostol should not be used if the patient is having contractions every 5 minutes or more frequently
- Misoprostol can be used in patients with prelabor rupture of the membranes
- Be sure misoprostol was indeed placed
- Monitor continuously
- Oxytocin administration may be initiated 4 hours after the last dose of misoprostol, if uterine activity is not adequate

- Some studies suggest vaginal misoprostol is more effective than dinoprostone insert for induction secondary to PROM without increasing the incidence of adverse outcomes (Abraham C, 2014).

B. Dinoprostone (Cervidil)

Cautions/Contraindications

- Caution with ruptured membranes
- Caution with patients with history of previous uterine hypertony, glaucoma, or childhood asthma
- Contraindications
  -Patients already receiving oxytocin. Cervidil may augment the activity of oxytocin.

Dosage/Procedure

- See Addendum 1
- Once cervidil is placed transversely in the posterior fornix immediately after removal from foil package. Insertion does not require sterile conditions. The ribbon end of the Cervidil may extrude distally or may be tucked into the vagina.
- Minimal amount of lubricant may be used. Excess lubricant can prevent optimal swelling and release of dinoprostone.
- Fetal heart rate and uterine activity should be continuously monitored from the time the PGE2 vaginal insert is placed until at least 15 minutes after it is removed. [ACOG, 2004]
- In the event of tachysystole, reversal of the dinoprostone-induced contractions is complete within 15 minutes of removal. If needed, terbutaline may be administered.
- Cervidil should be removed after 12 hours, or with onset of active labor. If needed, oxytocin, may be started after 30 minutes' post removal.

Key clinical points:

- After the dose has been administered you should remain lying down for up to 30 minutes or as directed by the credentialed practitioner.

C. Transcervical Foley Catheter Insertion

An effective method for cervical ripening that can be used with or without oxytocin during the ripening process.

Cautions/contraindications

- Acute mucopurulent cervicitis
- Rupture of membranes

Procedure

- Manual or speculum insertion of an 18-26 gauge Foley catheter is acceptable and

is based on practitioner's preference.

- Following placement, the Foley balloon will be filled with 30mL-80mL of saline
- Correct placement (beyond the internal cervical os) must be verified.
- Tape the Foley to the patient's medial thigh on minimal traction.
- If the balloon is not expelled spontaneously, it should be removed 12 hours after insertion.

Key clinical points:

- At the time of the Foley balloon expulsion expect that the cervix will be 3-4 cm dilated and anticipate that in most cases oxytocin augmentation can be initiated at that point.
- The patient may be started concurrently on oxytocin.

D. Extra-Amniotic Saline Induction (EASI)

Cautions/contraindications

- Acute mucopurulent cervicitis
- Ruptured Membranes
- Infuse 30mL per hour of sterile saline through the Foley catheter.

Procedure

- Same instructions as above for placement of the Foley balloon
- Infuse 30mL/hour of sterile saline
- The patient may be started concurrently on oxytocin.

Women and Children's Health Services
CLINICAL CARE GUIDELINE

Signatures on File

Doreen Norris-Stojak, RN, MS
Associate Chief Nursing Officer
Women, Children & Psychiatric Health Services

Gloria Elam, MD, MPH
Medical Director, Labor & Delivery

Catalin Buhimschi, MD, MBA
Director, Obstetrics Service and Patient Safety
Maternal Fetal Medicine

Mary Stephenson, MD, MSc
Chief of OBGYN Services

Women and Children's Health Services
CLINICAL CARE GUIDELINE

Rescission Date
4/2021

References

Penfield CA, Wing DA. Labor Induction Techniques: Which Is the Best? Obstetrics and Gynecology Clinics of North America. 2017;44:567-582.

Osterman MJK, Martin JA. Recent declines in induction of labor by gestational age. NCHS data brief. 2014:1-8.

ACOG Committee on Practice Bulletins -- Obstetrics. ACOG practice bulletin no. 107: Induction of labor. Obstetrics and Gynecology. 2009;114:386-397.

ACOG Committee Opinion No. 765: Avoidance of Nonmedically Indicated Early-Term Deliveries and Associated Neonatal Morbidities. Obstetrics & Gynecology. 2019;133:e156-e163.

Grobman WA, Rice MM, Reddy UM, et al. Labor Induction versus Expectant Management in Low-Risk Nulliparous Women. The New England Journal of Medicine. 2018;379:513-523.

ACOG Practice Bulletin No. 205: Vaginal Birth After Cesarean Delivery. Obstetrics & Gynecology. 2019;133:e110-e127.

Abraham C, Meirowitz N, Kohn N. Labor Induction for Premature Rupture of Membranes Using Vaginal Misoprostol versus Dinoprostone Vaginal Insert. American Journal of Perinatology. 2014;2013;31:181-186.

Kilpatrick SJ, Esakoff TF. The transcervical Foley balloon. Contemporary OB/GYN. 2013;58:34.

Addendum
Addendum 1: Cervical Ripening Agent/Method Specific Guidelines

Women and Children's Health Services
CLINICAL CARE GUIDELINE

Addendum 1
Cervical Ripening Agent/Method Specific Guidelines

AGENT	INITIAL DOSE	METHOD	REDOSE	EFM	COST	TACHYSYSTOLE	COMMENTS
Misoprostol	25mcg	Vaginally in Posterior Fornix. Limit lubricant	25mcg Q 4hrs Max 4 doses	Continuous	VERY LOW COST	May sweep vagina to attempt removal, otherwise consider administration of terbutaline	Oxytocin no less than 4 hours after last dose ***Not for use with TOLAC**
Misoprostol	25mcg or 50mcg	Oral or Buccal	25mcg Q 4hrs Max 6 doses	Continuous	VERY LOW COST	Consider administration of terbutaline	Oxytocin no less than 4 hours after last dose ***Not for use with TOLAC**
Dinoprostone (Cervidil)	10 mg	Vaginally in Posterior Fornix. Limit lubricant	Remove after 12hrs or with active labor	Continuous	HIGH COST	Remove; Reverses in 15 minutes otherwise consider administration of terbutaline	Oxytocin no less than 30 minutes after removal