

Induction and augmentation of labor

By:

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INTRODUCTION



Definition:

- ❖ Induction of labor means initiation of uterine contractions (after the period of viability) by any method (medical, surgical, or combine) for the purpose of vaginal delivery.
- or
- ❖ Induction of labor refers to techniques for stimulating uterine contractions to accomplish delivery prior to the spontaneous onset of such contractions.

Induced labor tends to be **longer** than spontaneous labor.

Should not be routine due to increasing unfavorable maternal outcome

Giving the consent from the patient



PREVALENCE



The overall frequency of labor induction almost **tripled** in the United States, rising from 9.5 percent in 1990 to 27.1 percent in 2018.

INDICATIONS AND CONTRAINDICATIONS

Continuing the pregnancy versus delivery is influenced:

- ❖ by the gestational age and severity of the maternal/fetal condition and can rarely be determined with precision.
- ❖ Induction is generally preferred when there are no contraindications to labor and vaginal birth, given the increased maternal risks associated with cesarean delivery.

INDICATIONS AND CONTRAINDICATIONS

Common conditions where induction is often medically/obstetrically indicated include:

1. Postterm pregnancy
2. Prelabor rupture of membranes
3. **Hypertensive disorders**- Preeclampsia; eclampsia; HELLP syndrome (hemolysis, elevated liver enzymes, low platelets); gestational hypertension; chronic hypertension.
4. Fetal demise
5. Diabetes
6. Fetal growth restriction
7. Chorioamnionitis
8. Abruptio placentae
9. Oligohydramnios
10. Intrahepatic cholestasis of pregnancy
11. Alloimmunization with fetal anemia
12. Twins

Contraindications



- 1- Prior classical or other high-risk cesarean incision
- 2- Prior uterine rupture
- 3- Prior transmural uterine incision entering the uterine cavity
- 4- Active genital herpes infection
- 5- Placenta previa or vasa previa
- 6- Transverse fetal lie
- 7- Invasive cervical cancer
- 8- Category III fetal heart rate tracing,
- 9- Severe Hydrocephaly
- 10- Significant macrosomia

Methods of induction of labor:

❖ Induction of labor have three method:

1. Medical Method.
2. Surgical Method
3. Combined Method.

❖ Medical induction:

1. Oxytocin
2. Prostaglandins PGE2, PGE1.
3. Dinoprostone

Advantages of elective induction at ≥ 39 weeks

- Reduction in cesarean delivery
- Reduction in other adverse neonatal and maternal outcomes (eg, preeclampsia)
- Reduction in macrosomia (and its consequences)
- Reduction in stillbirth
- Ability to control the time of delivery when this could be important (eg, women with a history of rapid labor or who live far from the hospital and thus risk of out-of-hospital delivery)

Preinduction assessment and patient preparation

- Review the basis for the estimate of **gestational age**, given that gestational age is a factor that is considered in timing of induction.
- Determine **fetal presentation**.
- Estimate **fetal weight**, given risks associated with being small or large for gestational age.
- Perform a **cervical examination** to decide whether a cervical ripening agent is indicated.
- Review the **fetal heart rate pattern** to confirm that the use of ripening agents or [oxytocin](#) is not contraindicated.
- Review the patient's pregnancy and medical history for risk factors for problems that may develop during labor and delivery (eg, past history of shoulder dystocia or postpartum hemorrhage).

Preinduction assessment and patient preparation

Patient preparation and laboratory tests are generally the **same** as in women in spontaneous labor.

In addition to standard preparation, the indications for and alternatives to induction, planned **drugs and procedures** including side effects and **complications**, and the possibility of cesarean delivery should be discussed.

ASSESSING THE CHANCE OF A SUCCESSFUL INDUCTION

Clinical assessment: cervical and noncervical factors:

A favorable cervix : duration of induction and higher likelihood of vaginal delivery whereas the converse is true when the cervix is unfavorable.

Noncervical factors :

- Maternal **younger age**
- **Multiparity**
- **Ruptured membranes**
- **Lower body mass index** (less than 30)
- **Taller** height
- Lower estimated **fetal weight** (less than 3500 g)
- **Absence of comorbidities** associated with placental insufficiency (eg, preeclampsia)
- **Higher gestational age** also was associated with vaginal delivery: Women <34 weeks of gestation were less likely to deliver vaginally than those ≥34 weeks of gestation.

Bishop score



The Bishop score is the cervical assessment system most commonly used in clinical practice in the United States.

Score ≤ 3  unfavorable

Score ≥ 6  favorable

Score 4 and 5 are in gray zone.

BISHOPS SCORE IN INDUCTION

- Used to determine favorability / ripening of cervix in vaginal examination.

→
If high score Cervix favorable.
Associated with an easier shorter induction.

→
If low score Cervix unfavourable.
Induction takes more longer period & more likely to fail.
May ends in a emergency LSCS.

score	0	1	2	3
Dilation of cervix	0	1 or 2	3 or 4	5 or more
Consistency of cervix	firm	medium	soft	-
Length of cervical canal	>2	2_1	1_0.5	<0.5
Position of cervix	posterior	central	anterior	-
Station of presenting part	-3	-2	-1 or 0	Below spines

Preinduction cervical ripening of the unfavorable cervix



A ripening process is generally employed prior to administering oxytocin in women with an unfavorable cervix in order to shorten the duration of labor and optimize the chance of vaginal birth.

Procedures to promote cervical ripening, especially administration of prostaglandins, may initiate labor and obviate the need for oxytocin.

Regimen of cervical ripening before induction

Techniques	Agent	Route/Dose	Comments
Pharmacological			
Prostaglandin E ₂	Dinoprostone gel, 0.5 mg (Prepidil)	Cervical 0.5 mg; repeat in 6 hr; permit 3 doses total	1. Shorter I-D times with oxytocin infusion than oxytocin alone
	Dinoprostone insert, 10 mg (Cervidil)	Posterior fornix, 10 mg	1. Insert has shorter I-D times than gel 2. 6–12 hr interval from last insert to oxytocin infusion
Prostaglandin E ₁ ^a	Misoprostol tablet, 100 or 200 µg (Cytotec) ^b	Vaginal, 25 µg; repeat 3–6 hr prn Oral, 50–100 µg; repeat 3–6 hr prn	1. Contractions within 30–60 min 2. Comparable success with oxytocin for ruptured membranes at term and/or favorable cervix 3. Tachysystole common with vaginal doses > 25 µg
Mechanical			
Transcervical 36F Foley catheter	30-mL balloon		1. Improves Bishop scores rapidly 2. 80-mL balloon more effective 3. Combined with oxytocin infusion is superior to PGE ₁ vaginally 4. Results improved with EASI with possible decreased infection rate
Hygroscopic dilators		Laminaria, magnesium sulfate	1. Rapidly improves Bishop score 2. May not shorten I-D times with oxytocin 3. Uncomfortable, requires speculum and placement on an examination table

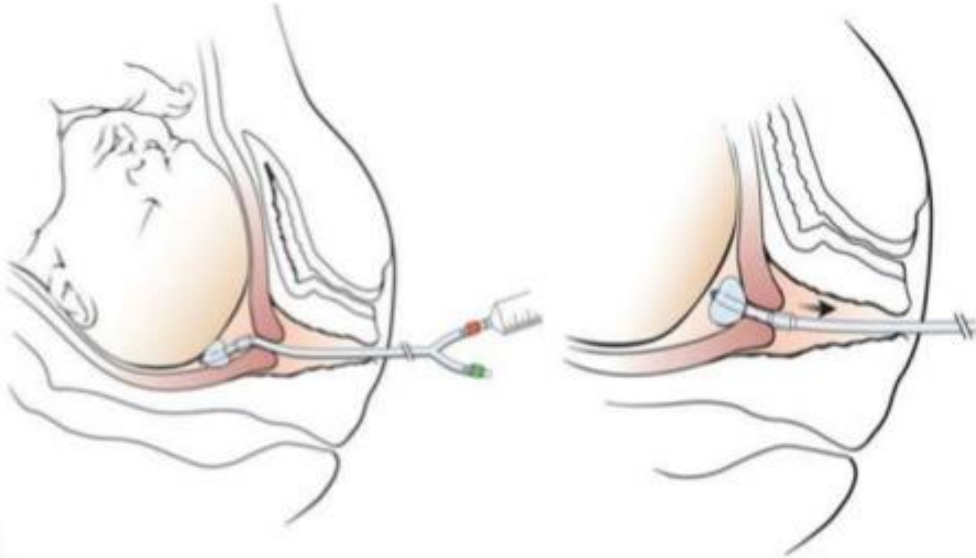
^aOff-label use.

^bTablets must be divided for 25- and 50-µg dose, but drug is evenly dispersed.

EASI = extraamniotic saline infusion at 30–40 mL/hr; I-D = induction-to-delivery.

Cervical ripening - mechanical

- Transcervical balloon catheter:



INDUCTION PROCEDURE

Uterine and fetal heart rate monitoring

- ❖ When oxytocin is administered, continuous monitoring of uterine activity and fetal heart rate (FHR) should be used.

Oxytocin administration

- ❖ Synthetic oxytocin administration is the most common and proven method of labor induction.
- ❖ Oxytocin plus amniotomy and use of vaginal misoprostol →
vaginal delivery within 24 hours

- ❖ At G.A= 20 weeks ———→ uterine contractions.
- ❖ Myometrial responsiveness increases with advancing gestational age until 34 weeks, at which time it levels off until spontaneous labor begins, when it increases rapidly.
- ❖ Oxytocin cannot be administered orally.
- ❖ Half-life: 3 – 6 min.
- ❖ steady-state concentration in blood: 40 min
- ❖ Progress during spontaneous labor is not related to increasing oxytocin concentration.
- ❖ Uterine contractions are not associated with changes in plasma oxytocin concentration.
- ❖ Hypocontractile labor does not appear to be the result of a deficit of oxytocin.

Timing of oxytocin administration

- ❖ 6 to 12 hours after the final dose of dinoprostone gel.
- ❖ 30 minutes after removal of dinoprostone insert.
- ❖ 4 hours after the final misoprostol dose.

Infusion pump

- ❖ Oxytocin is administered intravenously by an infusion pump to allow continuous, precise control of the dose administered.

Dose titration and maintenance

- ❖ The occurrence of adverse effects, such as sustained FHR abnormalities and tachysystole, should lead to a dose reduction until they resolve.

Oxytocine regimens for simulation of labor

Regimen	Starting Dose (mU/min)	Interval (min)	Incremental Increase (mU/min)
Low-dose	0.5–1.5	15–40	1
	2	15	4, 8, 12, 16, 20, 25, 30
High-dose	4	15	4
	4.5	15–30	4.5
	6	20–40 ^a	6 ^b

^aUterine tachysystole is more common with shorter intervals.

^bWith uterine tachysystole and after oxytocin infusion is discontinued, it is restarted at one half the previous dose and then increased at 3 mU/min incremental doses.

Data from Merrill, 1999; Satin, 1992, 1994; Xenakis, 1995.

Side effects



- ❖ Hypotension
- ❖ Tachysystole
- ❖ Hyponatremia

Oxytocin has a similar structure to vasopressin (antidiuretic hormone) and can cross-react with the renal vasopressin receptor.

❑ Symptoms of severe acute hyponatremia:

- ✓ headache
- ✓ drowsiness
- ✓ nausea
- ✓ anorexia
- ✓ unconsciousness
- ✓ potentially irreversible neurologic injury
- ✓ lethargy
- ✓ vomiting
- ✓ grandmal type seizures

Side effect of Amniotomy

- ❖ **Early amniotomy:** artificial R.O.M, soon after successful cervical ripening.
- ❖ **Late amniotomy:** artificial R.O.M after the onset of the active phase.
- ❖ **Complications of amniotomy** (whether "early" or "late") include rupture of a vasa previa and umbilical cord prolapse.

COMPLICATIONS

❖ Tachysystole

➤ > 5 contractions in 10 minutes (averaged over a 30-minute window)

❖ hypersystole/hypertonus

Contraction lasting at least 2 min

Consequences



- ❖ Fetal hypoxemia and acidemia
- ❖ Tachysystole → uterine rupture
- ❖ Common in multigravidas than primigravidas

Management

- ❖ Reducing or discontinue oxytocin even if the FHR is not suggestive of acidemia.

Amniotic fluid embolism

- ❖ Induction appears to be associated with an increased risk of amniotic fluid embolism.

OUTCOME

Labor progress

- ❖ The average duration of the latent phase of labor is longer in induced labor than in spontaneous labor.
- ❖ Once women who have been induced enter active labor (cervical dilation 6 cm), progression appears to be comparable to progression in women with spontaneous active labor.
- ❖ Second stage is similar in induced and spontaneous labors.

Definition of failed induction:

- ❖ Failure to generate regular (eg, every 3 minutes) contractions and cervical change after at least 24 hours of oxytocin administration, with artificial membrane rupture as soon as feasible and safe.
- ❖ Oxytocin generally should be administered for at least 12 hours after membrane rupture before considering the continued presence of the latent phase as an indication for cesarean given the results of two analyses.
- ❖ For parous women, the 12-hour criteria essentially eliminated failed labor induction as an indication for cesarean birth.
- ❖ It is concluded that cesarean should not be performed in the latent phase for an indication of "failed induction" prior to at least 15 hours after oxytocin and rupture of membranes had occurred.

LABOR INDUCTION WITHOUT INITIAL USE OF OXYTOCIN

➤ Amniotomy alone

In women with a favorable cervix, use of amniotomy alone is an option for initiation of labor if the head is well opposed to the cervix.

The combination of amniotomy and intravenous oxytocin administration is more effective.

➤ Prostaglandin E1 or E2

In women with unfavorable cervixes, prostaglandins are a proven method of cervical ripening and may initiate labor as a result of their uterotonic effects.

➤ Membrane stripping

Membrane stripping has not been associated with demonstrable improvements in many clinically important outcomes (eg, lower caesarian rate, better perinatal outcomes).

Nonstandard approaches

There is a paucity of data regarding the safety and/or efficacy of glucocorticoids, castor oil, hyaluronidase, isosorbide mononitrate, acupuncture, evening primrose oil, herbal preparations, breast stimulation, or sexual intercourse for labor induction, and none of these can be recommended as an evidence-based approach to labor induction.

Thank you for your attention