

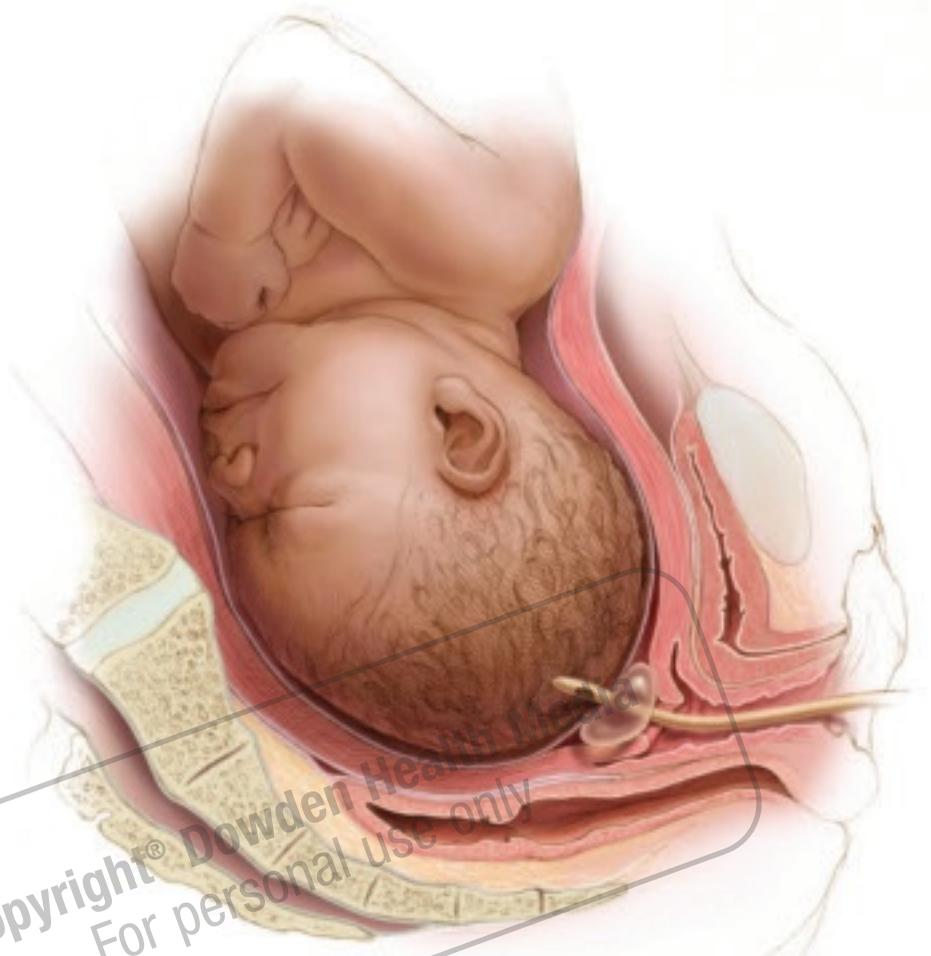
**Judith Chung, MD**

Clinical Instructor of  
Obstetrics and Gynecology  
Division of Maternal-Fetal Medicine  
Department of Obstetrics  
and Gynecology  
University of California, Irvine

**Deborah A. Wing, MD**

Associate Professor of Clinical  
Obstetrics and Gynecology  
Division Director of  
Maternal-Fetal Medicine  
Department of Obstetrics  
and Gynecology  
University of California, Irvine

The transcervical Foley catheter  
is especially beneficial when the  
patient needs cervical ripening but  
is contracting too frequently for safe  
administration of prostaglandins



**Q&A**

**What would you do?**

**CASE 1**  
Primigravida  
at 42 weeks  
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Mild preeclampsia  
at 37 weeks  
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Membrane sweeping  
and group B strep:  
A litigious combination?

**OB DILEMMAS**

**Is this induction necessary?**

3 cases, 3 evidence-based choices

**T**ypically labor is induced when the benefits of expeditious delivery outweigh those of continuing pregnancy, although elective inductions are on the rise.<sup>1,2</sup> Labor induction is not without consequence, however, most notably the increased risk of cesarean delivery. And once the decision is made to induce labor,

the best means may not be entirely clear, particularly when there are so many choices available.

We present 3 scenarios and our recommendations for each. In each case, we cite the supporting evidence to date on the critical questions that lead to an appropriate decision.

**Using the Bishop scoring system to predict likelihood of successful labor induction**

A score of less than 5 is considered unfavorable

CONDITION	0	1	2	3
Dilation (cm)	Closed	1–2	3–4	≥5
Effacement (%)	0–30	40–50	60–70	≥80
Station	-3	-2	-1,0	+1,+2
Consistency	Firm	Medium	Soft	—
Position	Posterior	Midposition	Anterior	—

Source: Bishop EH.<sup>4</sup> Reprinted by permission

IMAGE: KIMBERLY MARTENS

## CASE 1 Primigravida at 42 weeks

**G.C. is a 24-year-old gravida 1 para 0 at 42 0/7 weeks' gestation**, according to her last menstrual period and an ultrasound at 18 weeks. She has had twice-weekly fetal testing since 41 weeks' gestation, with adequate amniotic fluid noted and reassuring results. A non-stress test today was reactive, and the amniotic fluid index is 10.2. Her cervix is closed, firm, and 50% effaced. The fetus is at -3 station and vertex. Estimated fetal weight is 3,500 g. What are the options?

### Critical questions Is she postterm?

Yes. Because the perinatal mortality rate for postterm pregnancies (defined as 42 or more weeks<sup>3</sup>) is twice that of term gestations, there is evidence to support labor induction after 41 completed weeks. Induction would appear to be justified in this woman's case.

### Is her Bishop score less than 5?

Yes. This patient has an "unfavorable" cervix, according to her Bishop score of 1. (A score of less than 5 is considered unfavorable.) The Bishop scoring system is now generally used to predict the likelihood of successful labor induction, although it was originally used to prevent iatrogenic prematurity in women undergoing elective induction of labor. It is based on clinical findings at the cervical examination: degree of cervical dilation, effacement, consistency, and the position and station of the fetal presenting part.<sup>4,5</sup>

### Is she nulliparous?

Yes. Elective induction should be strongly discouraged in nulliparous patients. Among nulliparous women, an unfavorable Bishop score is associated with almost twice the risk of cesarean delivery when labor is induced rather than spontaneous.<sup>6</sup> However, if induction is indicated, cervical ripening may help. Cervical ripening prepares the cervix by promoting dilation and effacement,<sup>7</sup> using pharmacologic or mechanical means.

### Our recommendations

Although G.C. is nulliparous with an unfa-

vorable cervical examination, her gestational age of 42 weeks provides reason to proceed with induction of labor.

### Prostaglandins for cervical ripening

These agents dissolve collagen bundles and increase the submucosal water content of the cervix.<sup>8</sup>

**Off-label but evidence-based.** Our prostaglandin of choice is misoprostol (Cytotec), a synthetic prostaglandin E1 analog. Although its use for this purpose is off-label,<sup>9</sup> an extensive body of literature attests its safety and efficacy for cervical ripening, provided it is properly administered.<sup>10</sup> Misoprostol appears to be more effective than prostaglandin E<sub>2</sub> at achieving vaginal delivery within 24 hours.<sup>11</sup>

Misoprostol is also cheaper and requires no special handling, in contrast to prostaglandin E<sub>2</sub>.<sup>9,12</sup>

**Caveats.** Uterine hyperstimulation and meconium-stained amniotic fluid appear to be more common with misoprostol, although these risks can be minimized by using a dose of 25 µg (1/4 of a 100-µg tablet) at an interval of 3 to 6 hours, with oxytocin given no later than 4 hours after the last dose of misoprostol.<sup>11</sup>

Prostaglandin administration is associated with increased risk of uterine rupture in women with a prior cesarean delivery or other uterine surgery (**SEE CASE 2**).<sup>13-16</sup> Thus misoprostol and other prostaglandins should be avoided in these women.

Administer prostaglandins in or close to the labor and delivery unit, and where uterine activity and fetal heart rate can be continuously monitored.<sup>1</sup> The patient should remain supine for 30 minutes.

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### FAST TRACK

**Elective induction should be strongly discouraged in nulliparous women**

### **Mechanical means of cervical ripening**

The 16F Foley catheter is placed transcervically into the extra-amniotic space. The balloon is then inflated with 30 mL of saline and pulled back so that it rests against the internal cervical os.

**Low cost.** This method of cervical ripening is low in cost and carries less risk of hyperstimulation.<sup>17</sup> Thus, it is especially beneficial when the patient needs cervical ripening but is contracting too frequently for safe administration of prostaglandins.

**Limitations.** In some women it is impossible to place the catheter into the cervical canal because of discomfort or unfavorable position or consistency of the cervix. Also, the catheter may increase the risk of infection or cause disruption of a low-lying placenta.

### **Combined pharmacologic and mechanical methods?**

Although the combination would appear

to have greater potential for success, it has not proven to be more effective.<sup>7</sup>

Sequential cervical ripening on an outpatient basis also has been suggested, but further studies are needed before it can be recommended.<sup>18</sup> ■

#### **CASE 1 OUTCOME**

After G.C. is counseled about the risks of postterm pregnancy, as well as the risk of cesarean delivery with induction of labor, she decides to proceed with labor induction. Cervical ripening with misoprostol is begun. After 2 doses, the patient is dilated 4 cm, and oxytocin is initiated along with artificial rupture of membranes. Labor ultimately arrests at 7 cm dilation, and a healthy male infant is delivered by cesarean.

## **CASE 2 Mild preeclampsia at 37 weeks**

**M.A. is a 35-year-old gravida 4 para 2012**, who complains of a headache at 37 5/7 weeks' gestation. Her blood pressure is 157/97, and she has 1+ proteinuria on dipstick urinalysis. Her laboratory tests are unremarkable, including normal serum creatinine, liver function tests, and platelets.

The fetus appears to be appropriately grown with normal amniotic fluid. Antepartum fetal heart rate testing is reactive and reassuring. The patient is having intermittent, mild uterine contractions, and her cervix is dilated 3 cm. She is given acetaminophen for the headache, which brings relief.

You diagnose mild preeclampsia at term, for which induction of labor is clearly indicated. However, M.A.'s pregnancy history is notable for a term vaginal delivery followed by a low transverse cesarean section for a term breech infant after a failed external cephalic version. She strongly desires vaginal delivery.

Do you accede to her wish for a trial of labor?

### **Critical questions**

#### **Is her pregnancy history favorable?**

No. This patient's previous deliveries have a bearing on the current pregnancy.<sup>15</sup> Specifically, the patient should have had no more than 1 low transverse cesarean deliv-

ery, no other uterine scars, no previous uterine rupture, and she should have a clinically adequate pelvis.

#### **Are facilities and staff adequate?**

Obviously the answer to this question is

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### **FAST TRACK**

**Do not induce labor in a woman who has had more than 1 low transverse cesarean delivery**

unique to the site. It is necessary to have immediate availability of the obstetrician throughout active labor, and to have adequate personnel to perform an emergency cesarean if necessary.

### **If these criteria are met, is induction of labor appropriate?**

Perhaps. Recent data suggest that women with a uterine scar who undergo induction with prostaglandins have a risk of uterine rupture 5 times that of women who enter spontaneous labor (24.5 per 1,000 versus 5.2 per 1,000).<sup>16</sup> For this reason, do not use prostaglandins for labor induction in women with viable gestations who have a prior low transverse incision.

**Oxytocin.** Augmentation of labor with oxytocin does not appear to increase the risk of rupture, compared with spontaneous labor.<sup>14</sup> Induction of labor with oxytocin has been associated with a slightly higher risk of uterine rupture, compared with spontaneous labor, although both types of labor have a rupture rate under 1%.<sup>14</sup>

### **Our recommendations**

If M.A. still desires a trial of labor after she has been counseled about the risks and benefits of vaginal birth after cesarean delivery, induction should be considered. She has a reasonable likelihood of success, because she has given birth vaginally in the past, her previous cesarean delivery was for a nonrecurring indication (breech presentation), and she does not require any cervical ripening agents, as this has occurred naturally.<sup>15</sup>

### **Amniotomy may help reduce time to delivery**

One option for induction of labor is amniotomy with oxytocin augmentation as needed. Amniotomy, or the artificial rupture of membranes, has been shown to be an effective method of labor induction in women with a favorable cervix.<sup>19</sup>

The combination of amniotomy and oxytocin administration is particularly effective, resulting in a shorter induction to

delivery time, compared with women undergoing oxytocin induction alone.<sup>20</sup>

### **Sweeping or stripping the fetal membranes**

Digital separation of the chorioamniotic membrane from the walls of the cervix and lower uterine segment during sterile vaginal examination could also be incorporated into M.A.'s induction process.<sup>21</sup>

Membrane sweeping causes the release of endogenous prostaglandins and can lead to labor without the need for induction agents or amniotomy. Although membrane sweeping is generally performed without admission to the hospital, M.A. would require hospitalization because of her diagnosis of preeclampsia.

### **If the cervix is unfavorable**

If this patient had an unfavorable cervix, would induction of labor be contraindicated? Certainly the use of prostaglandins for preinduction cervical ripening would be contraindicated, given the existing evidence, although use of a transcervical Foley catheter would be acceptable.<sup>13-16</sup> Published studies suggest that transcervical Foley catheter induction does not appreciably increase the risk of uterine rupture, although these studies have relatively small sample sizes and are not randomized.<sup>22,23</sup>

Although transcervical Foley catheter induction is often begun on an outpatient basis, it should probably be limited to hospital use in a woman with a previous uterine scar.<sup>24</sup> ■

### **CASE 2 OUTCOME**

M.A. receives magnesium sulfate for seizure prophylaxis. Labor is successfully induced with membrane sweeping and subsequent amniotomy. Labor is augmented with oxytocin, with continuous fetal heart rate and uterine activity monitoring throughout labor. She successfully delivers a healthy female infant.

### **FAST TRACK**

**Membrane sweeping causes the release of endogenous prostaglandins and can lead to labor without further induction**

**SEE ALSO** Page 74  
**Membrane sweeping and group B strep:**  
 A litigious combination?

CONTINUED

## CASE 3 Preeclampsia remote from term

**L.A. is a 19-year-old gravida 1 para 0** who was hospitalized with preeclampsia at 28 weeks' gestation. At that time, she was given betamethasone and monitored on inpatient bed rest. At 30 1/7 weeks' gestation, she begins complaining of a headache. Her blood pressure is 168/110, and she has 2+ proteinuria on a dipstick. Her platelet count is 110,000, serum creatinine is 1.0, and she has slightly elevated liver transaminases in the 40s. Her cervix is closed, long, high, firm, and posterior. What are your choices?

### Critical questions

#### Does preeclampsia rule out induction?

No. In a woman with severe preeclampsia remote from term, labor induction is not contraindicated.<sup>25-27</sup> In fact, it may be a particularly reasonable option in a patient who is stable. Even eclampsia is not a contraindication to labor induction. However, rapidly evolving disease may preclude a prolonged labor induction, because delivery is the key to resolution of preeclampsia.

#### Are any clinical features in her favor?

Yes. The best predictors of success are a favorable Bishop score and a gestational age greater than 28 weeks.<sup>25-27</sup>

### Our recommendations

Although L.A.'s Bishop score is unfavorable, her relatively stable clinical status and her gestational age suggest that labor induction should not be ruled out.

### Preinduction cervical ripening

If cervical ripening is necessary, the transcervical Foley catheter may be the best choice, particularly among pregnancies affected by intrauterine growth restriction, as hyperstimulation is unlikely to occur with this method. ■

### CASE 3 OUTCOME

L.A. undergoes cervical ripening with the transcervical Foley catheter and subsequent amniotomy and oxytocin infusion. She is given magnesium sulfate for seizure prophylaxis throughout the cervical ripening and induction processes, and her clinical status is closely monitored, including blood pressure, urine output, and laboratory values. Her platelet count, serum creatinine, and liver transaminases remain stable, and she has a successful vaginal delivery.

Dr. Chung reports no financial relationship with any company whose products are mentioned in this article. Dr. Wing is a Principal Investigator and Consultant with Cytokine PharmaSciences in the development of the misoprostol vaginal insert.

### FAST TRACK

**Success is more likely with a Bishop score  $\geq 5$  and gestational age  $> 28$  weeks**

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