MASTER CLASS

Induction of Labor

E. ALBERT REECE, M.D., PH.D., M.B.A.

The timing of parturition remains a conundrum in obstetric medicine in that the majority of pregnancies will go to term and enter labor spontaneously, whereas another portion will go post term and often require induction, and still others will enter labor prematurely.

The concept of labor induction, therefore, has become very important in obstetric management, especially in addressing pregnancies that either go post term or pregnancies that require induction because of medical complications in the mother.

Increasingly, however, patients are apt to have labor induced for their own convenience, for personal reasons, for the convenience of the physician, and sometimes for all of these reasons.

This increasingly utilized social option ushers in a whole new perspective on the issue of induction, and the question is raised about whether or not the elective induction of labor brings with it added risk and more complications.

It is for this reason that we decided to develop a Master Class feature on this topic. It gives us the important opportunity to examine and consider the pros and cons of labor induction, the timing of labor induction, and the advisability of the various conditions under which induction can and does occur.

This month's guest professor is Dr. William F. Rayburn, professor and chairman of the department of ob.gyn. at the University of New Mexico, Albuquerque. Dr. Rayburn is a maternal and fetal medicine specialist with a national reputation in this area.

DR. REECE, *who specializes in maternal-fetal medicine, is Vice President for Medical Affairs, University of Maryland, and the John Z. and Akiko K. Bowers Distinguished Professor and Dean, School of Medicine. He is the medical editor of this column.*

Elective, Marginal Inductions on the Rise

WILLIAM F. RAYBURN, M.D.

The goal of an induction of labor is to achieve a vaginal delivery by stimulating uterine contractions before the spontaneous onset of labor. Generally, labor induction has merit as a therapeutic option when the benefits of expeditious delivery outweigh the risks of continuing the pregnancy. We must also, however, weigh the benefits of induction against the potential maternal or fetal risks associated with the procedure.

The American College of Obstetricians and Gynecologists (ACOG) has described examples of commonly accepted indications, contraindications, and clinical conditions requiring special attention for an induction of labor. (See box p. 37.) We must remember that indications for labor induction are often not absolute and need to take maternal and fetal conditions, gestational age, and cervical status into account. Many contraindications are the same as those for either spontaneous labor or vaginal delivery; several obstetric conditions are not contraindications, but do necessitate special attention.

In 1988, the National Center for Health Statistics began requiring hospitals to indicate on birth certificates whether labor was induced or not. This requirement has provided us with remarkable insight into labor induction rates—insight that should cause us to pause, to reflect on available data and our own practices, and to demand that the issue receive more widespread attention.

Over a 10-year period beginning in 1989, the rate of labor induction doubled from about 9% to almost 19% of live births. (See chart.) The trend steadily continued into the new millennium, to the point where, in 2003, nearly 23% of all births involved induction of labor. Clearly, labor induction is one of the most common procedures in obstetrics.

Examining the Increase

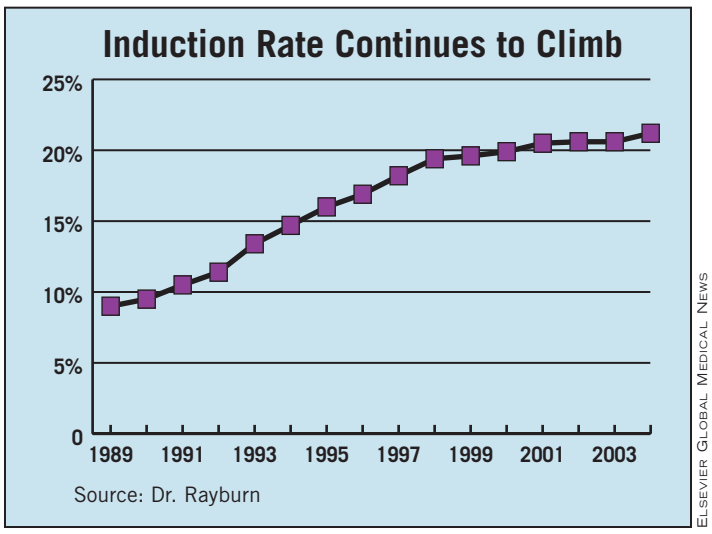
The reasons for this significant increase over just 15 years relate to the availability of FDA-approved cervical ripening agents; to both the patient's desire and the physician's convenience; to the acceptance of added risks of cesarean delivery; and to increases in marginal or elective inductions for term pregnancies, especially those past 40 weeks. Inductions in which the reason is not evidence based now account for at least half of all term inductions, or up to 10% of all deliveries. The increase in medically indicated inductions was slower than the overall increase, suggesting that inductions for marginal or elective reasons have risen more rapidly.

Also contributing to the rising rate in inductions is our increasing success with cervical ripening and the fact that, in the current era of ultrasound availability and a more accurate dating of gestational age, we have had to worry less about iatrogenic prematurity.

When considering labor induction, we can view "elective" and "marginal" indications as being very similar, or we can differentiate the two, with "elective" meaning there is no plausible medical or obstetric reason for the induction, and "marginal" referring to cases in which obstetricians face or suspect problems but have no data to suggest that the benefits of labor induction outweigh the risks. I believe it is valuable to consider the terms separately as we attempt to understand the changes in induction rates.

Marginal indications include gestational hypertension; unexplained and mild fetal-growth restriction; idiopathic decreased amniotic fluid (which does not pose substantial danger unless it is accompanied by a recognized complication, such as hypertension or a small-for-gestational-age baby); and a pregnancy beyond 40 weeks. Prospective studies to recommend induction for these and other marginal indications are limited in size or design, or are nonexistent.

There is some rationale behind induction for suspected fetal macrosomia in nondiabetic pregnancies. Theoretically, eliminating further fetal growth should reduce the risks of shoulder dystocia and perhaps of cesarean delivery. However, there is no evidence-based justification for labor induction in these patients. Studies have shown, in fact, that the procedure approximately doubles the cesarean delivery risk, does not reduce neonatal morbidity, and does not appear to reduce the risk of shoulder dystocia.



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There is also no published evidence to support the induction of labor for preterm mild preeclampsia, prior shoulder dystocia, and prior cephalopelvic disproportion.

ACOG weighed into the issue by approving "logistic reasons" for labor induction, such as a risk of rapid labor, a patient's unacceptable distance from the hospital, and psychosocial indications. This has left ob.gyns. with a substantial amount of latitude. For instance, one could argue that "psychosocial" reasons could include alleviating the concerns of a mother who previously had a stillborn infant, or alleviating the anxiety of a woman whose spouse is scheduled for deployment to Iraq before the delivery date.

In analyzing the increased rate of labor inductions, we can simply and easily make our own justifications for elective and marginal inductions—we are making our patients happy, for one thing—and put on the back burner the lack of evidence favoring non–medically indicated induction. No matter how appealing our justifications might be, however, we cannot ignore the paucity of published data on benefits, nor can we ignore the data that do exist on the risks of labor induction.

Appreciating the Risks

Studies have shown that induced labor is associated with an increase in epidurals, with the greatest risk of uterine rupture in patients with a scarred uterus, with perhaps an increase in instrumental vaginal deliveries, and with an increase in cesarean deliveries, particularly among nulliparas undergoing an induction with an unfavorable cervix.

Investigators of a large study published in 2005 found a 1.5-fold greater risk of diagnosing a nonreassuring fetal heart rate pattern, a twofold increase in the need for epidural anesthesia, and a 1.5-fold increased risk of having a cesarean delivery among women who had elective inductions of labor compared with women who had spontaneous labor.

The risks of oxytocin use are principally dose related. Excess or undesired uterine hyperstimulation and subsequent fetal heart rate decelerations ("hyperstimulation syndrome") are the most common side effects. In addition, hyperstimulation is associated with a greater risk of abruptio placentae or uterine rupture. There does not appear to be a significant increase in adverse fetal outcomes from uterine tachysystole.

Uterine hyperstimulation is an adverse effect that is also dose-dependent for prostaglandins (misoprostol, dinoprostone) used as cervical-ripening agents. The potential risks associated with amniotomy include prolapse of the umbilical cord, chorioamnionitis, significant umbilical cord compression, and rupture of vasa previa. With close monitoring and proper precaution, these hazards are fortunately uncommon.

Even if no additional risks are found with elective and marginal indications, it is important to consider issues related to personnel and cost. In addition to increasing the primary cesarean rate—and even a small additional risk of cesarean delivery for nulliparous women who have their labor induced translates into a significantly larger number of cesarean deliveries nationally—labor that is induced requires more one-on-one care and thus more nurses or nursing time.

It also independently leads to significantly longer time in labor and delivery, as well as a prolonged maternal length of

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hospital stay. Investigators have demonstrated significant differences in the admission-to-delivery times and in-hospital costs between patients who have vaginal deliveries after induced labor as compared with those who have spontaneous labor, as well as with patients who have cesarean deliveries in both scenarios.

Other studies have shown that labor inductions can overload the labor and delivery departments of some hospitals during "popular" midweek times. Downstream, labor induction also leads to an excess number of vaginal births after cesarean (VBAC) or repeat cesarean procedures. I am convinced, moreover, that litigation will be a concern in the future, especially with our armamentarium of cervical ripening agents. When there is a negative outcome after induction, I believe we can anticipate an allegation of unnecessary induction due to the lack of a medical indication.

The frequency of elective inductions and inductions for marginal indications appears to be higher in community hospitals than at university hospitals. A study that my colleagues and I published in 2000 found that 5% of all labor inductions at a university hospital were elective or not medically indicated using the ACOG criteria. At two community hospitals, on the other hand, 44% and 57% of inductions were for elective reasons.

Physicians in academic settings—particularly those involved in clinical trials to assess the effectiveness of therapies for labor induction—are more likely to use the Bishop scoring system. The Bishop score, first described in 1964, is based on cervical dilation, effacement, consistency, and position, as well as on fetal station. Although the scale isn't used much outside of academia, the principles should be consistently and universally applied, particularly the assessment of dilation and cervical consistency.

Planning the Future

Investigators have looked and will continue to look for predictors of success and ideal conditions for labor induction, but at this point in time the only known conditions are a favorable cervix and a patient who has had a previous vaginal delivery. Multiparous women at term generally present with a more favorable cervix.

Right now, roughly half of women who have their labor induced—or roughly 10% of the overall pregnancy population—have an unfavorable cervix. Cesarean rates are high for nulliparas who undergo an induction with an unfavorable cervix. This is a picture that needs widespread attention and an awareness of the desirability of evidence-based decisions.

Obstetricians must construct consistent and evidence-based protocols for cervical ripening; formally evaluate physician and patient satisfaction with induction; and design and lead clinical trials to provide answers on the value of marginal indications.

In the meantime, labor induction rates for hospitals and physicians should be monitored, and patients should be educated about the risks of induction so that they can participate in decision making and be better able to balance concerns and benefits. It is quite possible that written consent may become a standard of care before any induction is undertaken.

Until we do so, we should be aware that we may be complicating the uncomplicated. ■

Indications and Contraindications

Indications
- Abruptio placentae
- Chorioamnionitis
- Fetal demise
- Pregnancy-induced hypertension
- Premature rupture of membranes
- Postterm pregnancy
- Maternal medical conditions (such as diabetes mellitus, renal disease, chronic pulmonary disease, chronic hypertension)
- Fetal compromise (such as severe fetal growth restriction, isoimmunization)
- Preeclampsia, eclampsia

Contraindications
- Vasa previa or complete placenta previa
- Transverse fetal lie
- Umbilical cord prolapse
- Previous transfundal uterine surgery

Special Attention
- One or more previous low-transverse cesarean deliveries
- Breech presentation
- Maternal heart disease
- Multifetal pregnancy
- Polyhydramnios
- Presenting part above the pelvic inlet
- Severe hypertension
- Abnormal fetal heart rate patterns not necessitating emergent delivery

Source: Adapted from ACOG Practice Bulletin No. 10, "Induction of Labor" (Nov. 1999).