

# ACOG PRACTICE BULLETIN

CLINICAL MANAGEMENT GUIDELINES FOR  
OBSTETRICIAN–GYNECOLOGISTS  
NUMBER 55, SEPTEMBER 2004

(Replaces Practice Pattern Number 6, October 1997)

## Management of Postterm Pregnancy

This Practice Bulletin was developed by the ACOG Committee on Practice Bulletins—Obstetrics with the assistance of Errol R. Norwitz, MD, PhD and Julian N. Robinson, MD. The information is designed to aid practitioners in making decisions about appropriate obstetric and gynecologic care. These guidelines should not be construed as dictating an exclusive course of treatment or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to the institution or type of practice.

*Postterm pregnancy, by definition, refers to a pregnancy that has extended to or beyond 42 weeks of gestation (294 days, or estimated date of delivery [EDD] +14 days). Accurate pregnancy dating is critical to the diagnosis. The term “postdates” is poorly defined and should be avoided. Although some cases of postterm pregnancy likely result from an inability to accurately define the EDD, many cases result from a true prolongation of gestation. The reported frequency of postterm pregnancy is approximately 7% (1).*

*Accurate assessment of gestational age and diagnosis of postterm gestation, as well as recognition and management of risk factors, may reduce the risk of adverse sequelae. Antenatal surveillance and induction of labor are 2 widely used strategies that theoretically may decrease the risk of an adverse fetal outcome; maternal risk factors for postterm pregnancy also should be considered. The purpose of this document is to examine the evidence and provide recommendations about these 2 management strategies.*

### Background

#### **Etiologic Factors**

The most frequent cause of an apparently prolonged gestation is an error in dating (2, 3). When postterm pregnancy truly exists, the cause usually is unknown. Primiparity and prior postterm pregnancy are the most common identifiable risk factors for prolongation of pregnancy (4, 5). Rarely, postterm pregnancy may be associated with placental sulfatase deficiency or fetal anencephaly. Male sex also has been associated with prolongation of pregnancy (6). Genetic predisposition may play a role in prolonging pregnancy (5, 7).



## Assessment of Gestational Age

Accurate pregnancy dating is important for minimizing the false diagnosis of postterm pregnancy. The EDD is most reliably and accurately determined early in pregnancy. It may be determined on the basis of the known last menstrual period in women with regular, normal menstrual cycles.

Inconsistencies or concern about the accuracy of the estimated gestational age requires further assessment with ultrasonography. Useful measurements include the crown–rump length of the fetus during the first trimester and the biparietal diameter or head circumference and femur length during the second trimester. Because of the normal variations in size of infants in the third trimester, dating the pregnancy at that time is less reliable ( $\pm 21$  days). Although recent data have highlighted the accuracy of first trimester ultrasonography, the variation by ultrasonography generally is  $\pm 7$  days up to 20 weeks of gestation,  $\pm 14$  days between 20 and 30 weeks of gestation, and  $\pm 21$  days beyond 30 weeks of gestation. If the estimated gestational age by a patient's last menstrual period differs from the ultrasound estimate by more than these accepted variations, the ultrasound estimate of gestational age should be used instead of the patient's menstrual cycle estimate.

## Risks to the Fetus

Postterm pregnancy is associated with significant risks to the fetus. The perinatal mortality rate (stillbirths plus early neonatal deaths) at greater than 42 weeks of gestation is twice that at term (4–7 deaths versus 2–3 deaths per 1,000 deliveries) and increases 6-fold and higher at 43 weeks of gestation and beyond (8–10). Uteroplacental insufficiency, meconium aspiration, and intrauterine infection contribute to the increased rate of perinatal deaths (11). Postterm pregnancy also is an independent risk factor for low umbilical artery pH levels at delivery and low 5-minute Apgar scores (12). For these reasons, the trend has been toward delivery by 41 completed weeks of gestation (42 weeks, 294 days, EDD +14 days).

Although postterm infants are larger than term infants and have a higher incidence of fetal macrosomia (2.5–10% versus 0.8–1%) (13, 14), no evidence supports inducing labor as a preventive measure in such cases. Complications associated with fetal macrosomia include prolonged labor, cephalopelvic disproportion, and shoulder dystocia with resultant risks of orthopedic or neurologic injury.

Approximately 20% of postterm fetuses have dysmaturity syndrome, which refers to infants with characteristics resembling chronic intrauterine growth restriction from uteroplacental insufficiency (15, 16). These pregnancies are at increased risk of umbilical cord compres-

sion from oligohydramnios, meconium aspiration, and short-term neonatal complications (such as hypoglycemia, seizures, and respiratory insufficiency) and have an increased incidence of nonreassuring fetal testing, both antepartum and intrapartum (17). Whether such infants also are at risk of long-term neurologic sequelae is not clear. In a large, prospective, follow-up study of children at ages 1 and 2 years, the general intelligence quotient, physical milestones, and frequency of intercurrent illnesses were not significantly different between normal infants born at term and those born postterm (18).

Fetuses born postterm also are at increased risk of death within the first year of life (10, 19, 20). Although some of these infant deaths clearly result from peripartum complications (such as meconium aspiration syndrome), most have no known cause.

## Risks to the Pregnant Woman

Postterm pregnancy also is associated with significant risks to the pregnant woman, including an increase in labor dystocia (9–12% versus 2–7% at term), an increase in severe perineal injury related to macrosomia (3.3% versus 2.6% at term), and a doubling in the rate of cesarean delivery (21–23). Cesarean delivery is associated with higher risks of complications, such as endometritis, hemorrhage, and thromboembolic disease. Finally, postterm pregnancy can be a source of substantial anxiety for the pregnant woman.

## Clinical Considerations and Recommendations

### ► *Are there interventions that decrease the rate of postterm pregnancy?*

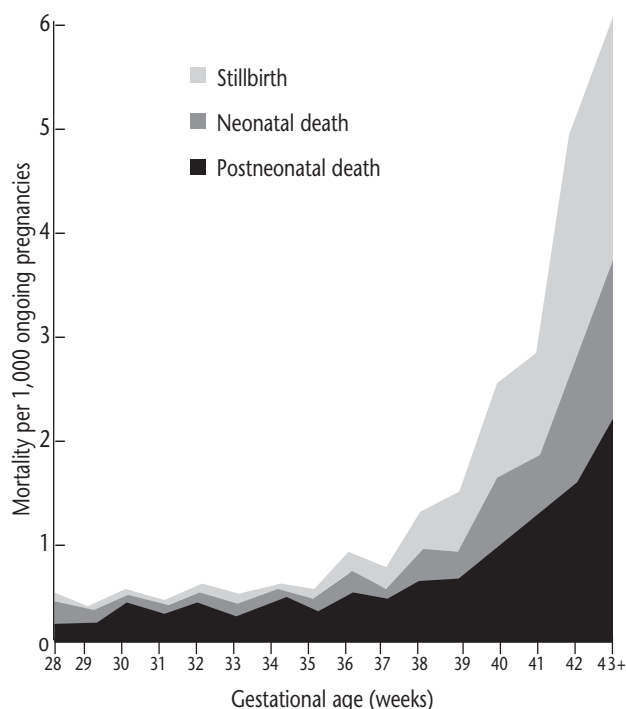
Accurate dating on the basis of ultrasonography performed early in pregnancy can reduce the incidence of pregnancies diagnosed as postterm (odds ratio [OR], 0.68; 95% confidence interval [CI], 0.57–0.82) (2) and thereby minimize unnecessary intervention (3, 24). However, routine early ultrasonography has not been recommended as a standard of prenatal care in the United States. Breast and nipple stimulation at term have not been shown to affect the incidence of postterm pregnancy (2). The data regarding sweeping of the membranes at term to reduce postterm pregnancy are conflicting: some studies show a benefit (25, 26), whereas others have found no difference in the incidence of postterm pregnancy (27).

### ► *When should antepartum fetal testing begin?*

Because of ethical and medicolegal considerations, no studies have included postterm patients who were not

monitored; it is unlikely that any future studies will include an unmonitored control group. The published studies are of insufficient power to demonstrate a benefit of monitoring. However, there is no evidence that antenatal fetal monitoring adversely affects patients experiencing postterm pregnancy. Data suggest a gradual increase in perinatal morbidity and mortality during this period (Fig. 1) (10). Therefore, despite evidence that it does not decrease perinatal mortality, antenatal fetal surveillance for postterm pregnancies has become a common practice on the basis of universal acceptance.

Patients who have passed their EDD but who have not yet reached 42 weeks of gestation constitute another group for whom antenatal fetal surveillance has been proposed. Some studies report a greater complication rate among women giving birth during the latter half of this 2-week period (21–23, 28, 29). However, no randomized controlled trial has demonstrated an improvement in perinatal outcome attributable to fetal surveillance between 40 and 42 weeks of gestation (30). Despite the lack of evidence demonstrating a beneficial effect, antenatal fetal surveillance often is performed during this period. To further complicate matters, in most studies of postterm pregnancies, women are recruited and fetal monitoring initiated before 42 weeks of gestation



**Figure 1.** Perinatal mortality per 1,000 ongoing pregnancies. (Reproduced from BJOG Volume 105, Hilder L, Costeloe K, Thilaganathan B, Prolonged pregnancy: evaluating gestation-specific risks of fetal and infant mortality, 169–73, 1998, with the permission of the Royal College of Obstetricians and Gynaecologists.)

(31–36). Finally, there is insufficient evidence to indicate whether routine antenatal surveillance of low-risk patients between 40 and 42 weeks of gestation improves perinatal outcome (2, 28).

► ***What form of antenatal surveillance should be performed, and how frequently should a postterm patient be reevaluated?***

The literature is inconsistent regarding both the type and frequency of antenatal surveillance among postterm patients (2, 31–42). Options for evaluating fetal well-being include nonstress testing, biophysical profile (BPP) or modified BPP (nonstress test plus amniotic fluid volume estimation), contraction stress testing, and a combination of these modalities, but practices vary widely. No single method has been shown to be superior (2). Assessment of amniotic fluid volume appears to be important. Delivery should be effected if there is evidence of fetal compromise or oligohydramnios (43, 44). Adverse pregnancy outcome (nonreassuring fetal heart rate tracing, neonatal intensive care unit admission, low Apgar score) is more common when oligohydramnios is present (45–47). However, a consistent definition of low amniotic fluid volume in the postterm pregnancy has not been established. Options include 1) no vertical fluid pocket that is measurable and more than 2–3 cm in depth or 2) amniotic fluid index less than 5 (43, 48). Of note, Doppler velocimetry has no proven benefit in monitoring the postterm fetus and is not recommended for this indication (49, 50). Although no firm recommendation can be made on the basis of published research regarding the frequency of antenatal surveillance among postterm patients, many practitioners use twice-weekly testing.

► ***For a postterm patient with a favorable cervix, does the evidence support labor induction or expectant management?***

Management of low-risk postterm pregnancy is controversial. Because delivery cannot always be brought about readily, maternal risks and considerations may complicate this decision. Factors to consider include gestational age; results of antepartum fetal testing; the condition of the cervix; and maternal preference after discussion of the risks, benefits, and alternatives to expectant management with antepartum monitoring versus labor induction.

Many studies of postterm pregnancies comparing outcomes of labor induction with those of expectant management excluded women with favorable cervixes (33–36, 39–41). Moreover, when women allocated to expectant management experienced a change in cervical status, expectant management ceased and labor induction was initiated (32, 33, 36, 37, 40). In studies on post-

term pregnancy in which women with favorable cervixes were managed expectantly, there was no indication that expectant management had a deleterious effect on the outcome, but results were not stratified according to the condition of the cervix (31, 32, 38, 42, 51, 52).

For women who are experiencing postterm pregnancies and have favorable cervixes, data are insufficient to determine whether labor induction or expectant management yields a better outcome. However, labor generally is induced in postterm pregnancies in which the cervix is favorable because the risk of failed induction and subsequent cesarean delivery is low.

► ***For a postterm patient with an unfavorable cervix, does the evidence support labor induction or expectant management?***

Both expectant management and labor induction are associated with low complication rates and good perinatal outcomes in low-risk postterm women with unfavorable cervixes (24–36, 39, 40). However, there appears to be a small advantage to labor induction using cervical ripening agents, when indicated, regardless of parity or method of induction. The introduction of preinduction cervical maturation has resulted in fewer failed and serial inductions, reduced fetal and maternal morbidity, reduced medical cost, and possibly a reduced rate of cesarean delivery in the general obstetric population (2, 35, 36, 53–55).

Although postterm pregnancy is defined as a pregnancy of 42 weeks or more of gestation, several large multicenter randomized studies of management of pregnancy beyond 40 weeks of gestation reported favorable outcomes with routine induction as early as the beginning of 41 weeks of gestation (2, 35, 36). The largest study to date randomly assigned 3,407 low-risk women with uncomplicated singleton pregnancies at 41 weeks of gestation to labor induction (with or without cervical ripening agents) within 4 days of randomization or expectant management until 44 weeks of gestation (35). Elective induction resulted in a lower cesarean delivery rate (21.2% versus 24.5%), primarily related to fewer surgeries performed for nonreassuring fetal heart rate tracings. However, the authors could not identify a particular cause related to postterm pregnancy status. Patient satisfaction was significantly higher in women randomly assigned to labor induction.

A meta-analysis of 19 trials of routine versus selective labor induction in postterm patients found that routine induction after 41 weeks of gestation was associated with a lower rate of perinatal mortality (OR, 0.2; 95% CI, 0.06–0.7) and no increase in the cesarean delivery rate (OR, 1.02; 95% CI, 0.75–1.38) (2). Routine labor induction also had no effect on the instrumental delivery rate, use of analgesia, or incidence of fetal heart rate abnor-

mality. The risk of meconium-stained amniotic fluid was reduced, but the risks of meconium aspiration syndrome and neonatal seizures were unaffected (2). The actual risk of stillbirth during the 41st week of gestation is estimated at 1.04–1.27 per 1,000 undelivered women, compared with 1.55–3.1 per 1,000 women at or beyond 42 weeks of gestation (56). Taken together, these data suggest that routine induction at 41 weeks of gestation has fetal benefit without incurring the additional maternal risks of a higher rate of cesarean delivery (2, 20).

This conclusion has not been universally accepted. Smaller studies report mixed results regarding cesarean delivery rates; some show an increase (33, 38), and others show no difference in the cesarean delivery rate (31, 34, 36, 37, 39, 40). Two studies reported an increase in cesarean delivery rates only among certain subgroups of patients (eg, high-risk groups) (32, 42).

► ***What is the role of prostaglandin preparations in managing a postterm pregnancy?***

Prostaglandin (PG) is a valuable tool for improving cervical ripeness and inducing labor. Several placebo-controlled clinical trials have reported significant changes in Bishop scores, shorter durations of labor, lower maximum doses of oxytocin, and a reduced incidence of cesarean delivery among postterm patients who received PGE<sub>2</sub> gel (57–59). In contrast, a National Institute of Child Health and Human Development study reported no reduction in the cesarean delivery rate or the induction-to-delivery interval among postterm patients who were randomized to receive PGE<sub>2</sub> gel as compared with those receiving placebo, although the gel was more effective in initiating persistent contractions in nulliparous women (36). Both PGE<sub>2</sub> (dinoprostone) (31, 33, 35, 36, 42, 59–62) and PGE<sub>1</sub> (misoprostol) preparations (63–65) have been used for labor induction in postterm pregnancies.

Although multiple studies have used PG to induce labor in postterm pregnancies, no standardized dose or dosing interval has been established. Overall, the medications were well tolerated with few reported side effects. Higher doses of PG (especially PGE<sub>1</sub>) have been associated with an increased risk of uterine tachysystole and hyperstimulation leading to nonreassuring fetal testing results (55, 66). As such, lower doses are preferable. When PG is used, fetal heart rate monitoring should be done routinely to assess fetal well-being because of the risk of uterine hyperstimulation.

► ***Is there a role for vaginal birth after cesarean delivery in the management of postterm pregnancy?***

Vaginal birth after cesarean delivery (VBAC) has been promoted as a reasonable alternative to elective repeat

cesarean delivery for some women. The risk of uterine rupture does not appear to increase substantially after 40 weeks of gestation (67, 68), but the risk appears to be increased with labor induction with PG or pitocin regardless of gestational age (68, 69). In a population-based, retrospective cohort analysis, the risk of uterine rupture with VBAC was 1.6 per 1,000 women with repeat cesarean delivery without labor, 5.2 per 1,000 women with spontaneous onset of labor, 7.7 per 1,000 women whose labor was induced without PG, and 24.5 per 1,000 women who underwent a PG induction of labor (69). There is limited evidence on the efficacy or safety of VBAC after 42 weeks of gestation. As such, no firm recommendation can be made.

## Summary of Recommendations

*The following recommendations are based on good and consistent scientific evidence (Level A):*

- ▶ Women with postterm gestations who have unfavorable cervixes can either undergo labor induction or be managed expectantly.
- ▶ Prostaglandin can be used in postterm pregnancies to promote cervical ripening and induce labor.
- ▶ Delivery should be effected if there is evidence of fetal compromise or oligohydramnios.

*The following recommendations are based primarily on consensus and expert opinion (Level C):*

- ▶ Despite a lack of evidence that monitoring improves perinatal outcome, it is reasonable to initiate antenatal surveillance of postterm pregnancies between 41 weeks (287 days; EDD +7 days) and 42 weeks (294 days; EDD +14 days) of gestation because of evidence that perinatal morbidity and mortality increase as gestational age advances.
- ▶ Many practitioners use twice-weekly testing with some evaluation of amniotic fluid volume beginning at 41 weeks of gestation. A nonstress test and amniotic fluid volume assessment (a modified BPP) should be adequate.
- ▶ Many authorities recommend prompt delivery in a postterm patient with a favorable cervix and no other complications.

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The MEDLINE database, the Cochrane Library, and ACOG's own internal resources and documents were used to conduct a literature search to locate relevant articles published between January 1985 and April 2004. The search was restricted to articles published in the English language. Priority was given to articles reporting results of original research, although review articles and commentaries also were consulted. Abstracts of research presented at symposia and scientific conferences were not considered adequate for inclusion in this document. Guidelines published by organizations or institutions such as the National Institutes of Health and the American College of Obstetricians and Gynecologists were reviewed, and additional studies were located by reviewing bibliographies of identified articles. When reliable research was not available, expert opinions from obstetrician-gynecologists were used.

Studies were reviewed and evaluated for quality according to the method outlined by the U.S. Preventive Services Task Force:

- I Evidence obtained from at least 1 properly designed randomized controlled trial.
- II-1 Evidence obtained from well-designed controlled trials without randomization.
- II-2 Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than 1 center or research group.
- II-3 Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments also could be regarded as this type of evidence.
- III Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

Based on the highest level of evidence found in the data, recommendations are provided and graded according to the following categories:

Level A—Recommendations are based on good and consistent scientific evidence.

Level B—Recommendations are based on limited or inconsistent scientific evidence.

Level C—Recommendations are based primarily on consensus and expert opinion.

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Management of postterm pregnancy. ACOG Practice Bulletin No. 55. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2004;104:639-46.