THE MANAGEMENT OF
POST-TERM PREGNANCY

Learning Objectives

After completing this program, the physician should be better able to:

1. Recognize the risks to both mother and fetus of continuing pregnancy beyond 40 weeks’ gestation.

2. Discuss the risks and benefits of induction of labor.

3. Devise a clear and rational plan for the management of post-term pregnancy.
Introduction
The timely onset of labor and delivery is an important determinant of perinatal outcome. Both preterm and post-term births are associated with higher rates of perinatal morbidity and mortality than pregnancies delivering at term. Post-term (prolonged) pregnancy refers to a pregnancy that has extended to or beyond a gestational age of 42.0 weeks (294 days) from the first day of the last menstrual period [1,2]. Accurate pregnancy dating is critical to the diagnosis [1,2]. The term postdates is poorly defined and should be avoided.

Incidence
The incidence of post-term pregnancy depends upon the patient population, including such factors as the percentage of primigravid women, women with pregnancy complications, the prevalence of ultrasound assessment of gestational age, and the frequency of spontaneous preterm birth. Local practice patterns such as the rates of scheduled cesarean delivery and routine labor induction also will affect the overall incidence of post-term birth. In the United States, approximately 10% (range 3-14%) of all singleton pregnancies continue beyond 42 weeks of gestation and 4% (2-7%) continue beyond 43 completed weeks in the absence of obstetric intervention [1-3].

The lowest incidence of post-term pregnancy is reported in studies using routine sonography for confirmation of gestational age. Errors in determination of gestational age using clinical criteria (such as last menstrual period, uterine size, or auscultation of fetal heart beat) contribute to inaccurate diagnosis and subsequent management of prolonged pregnancy. For example, a meta-analysis found reduced rates of induction of labor for post-term pregnancy (OR 0.61) among women who underwent sonographic gestational age assessment in early pregnancy (<24 weeks) [4]. Early routine ultrasound examination appeared to enable better gestational age assessment, thus avoiding erroneous labelling of a pregnancy as post-term.

Risk factors
The majority of post-term pregnancies have no known cause. Primiparity and prior post-term pregnancy are the most common identifiable risk factors for prolongation of pregnancy [1,2,5]. Genetic predisposition may also play a role. In one study, if the parturients mother had a prolonged pregnancy at delivery of her daughter the risk of prolonged pregnancy in the daughter was moderately raised (RR = 1.3) [6]. If the parturients previous pregnancy had been prolonged, post-term pregnancy in the subsequent birth was increased two to three-fold. However, these cases accounted for only a small proportion of prolonged pregnancies in the population. Rarely, post-term pregnancy may be associated with placental sulfatase deficiency or fetal anencephaly (in the absence of polyhydramnios) [2].

Morbidity and mortality
Post-term pregnancy is associated with both fetal and maternal risks [7-10].

(a) **Fetal risks** — Perinatal mortality (stillbirths plus early neonatal deaths) at ≥42 weeks’ gestation is twice that at term (4-7 versus 2-3 per 1,000 deliveries) and increases fourfold at 43 weeks and five to seven-fold at 44 weeks [10,11]. Fetoplacental insufficiency, asphyxia (with and without meconium), intrauterine infection, and anencephaly all contribute to the excess perinatal deaths, although post-term anencephaly is essentially nonexistent with modern obstetrical care [12]. Post-term infants are larger than term infants, with a higher incidence of macrosomia (defined as EFW ≥4,500 g) (2.5-10% versus
Complications associated with fetal macrosomia include prolonged labor, cephalopelvic disproportion, and shoulder dystocia with resultant risks of orthopedic or neurologic injury. Approximately 20-40% of post-term fetuses have "fetal dysmaturity (postmaturity) syndrome", which describes infants with characteristics of chronic intrauterine growth restriction from uteroplacental insufficiency [15-17]. These pregnancies are at increased risk of umbilical cord compression from oligohydramnios, non-reassuring fetal antepartum or intrapartum assessment, meconium aspiration, short-term neonatal complications (hypoglycemia, seizures, respiratory insufficiency), and long-term neurologic sequelae.

(b) Maternal risks — Maternal risks of prolonged pregnancy include 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 [18-22]. The latter is associated with higher risks of complications such as endometritis, hemorrhage, and thromboembolic disease.

Management

The components of preparation for and management of post-term pregnancy include accurate gestational age assessment in early pregnancy, antenatal fetal surveillance, and initiating delivery if spontaneous labor does not occur in a timely fashion. These are discussed in further detail below.

(a) Accurate gestational age assessment — An accurately estimated date of delivery should be calculated early in pregnancy. This may be based upon a known last menstrual period in women with regular, normal menstrual cycles and confirmatory uterine sizing. Uncertainty in historical or physical dating parameters should prompt ultrasound assessment of gestational age. As discussed above, some studies suggest that routine early ultrasound examination would lower the number of pregnancies judged to be post-term and therefore minimize unnecessary intervention [4]. However, this practice has not been recommended as a standard of prenatal care in the United States [23,24].

(b) Antenatal fetal surveillance — Post-term pregnancy is a universally accepted indication for antenatal fetal monitoring [2,25]. However, the efficacy of this approach has not been validated by prospective randomized trials. Options for evaluating fetal well-being include nonstress testing with amniotic fluid volume assessment, the biophysical profile (BPP) or modified BPP, the oxytocin challenge test, or a combination of these modalities; no single method has been shown to be superior [2,26]. The American College of Obstetricians and Gynecologists (ACOG) has recommended that antepartum fetal surveillance be initiated by 42 weeks of gestation, without a specific recommendation regarding type of test or frequency [2]. Many investigators would advise twice weekly testing with some evaluation of amniotic fluid volume [25]. Doppler ultrasonography has no benefit in monitoring the post-term fetus and is not recommended for this indication [25,27]. There is insufficient evidence to show that initiating antenatal surveillance at 40 to 42 weeks of gestation improves pregnancy outcome or confers any benefit to the fetus [1,2]. Therefore, testing should begin at 42.0 weeks of gestation. If testing cannot be scheduled for 42.0 weeks, it is preferable (medicolegally) to perform the first test a few days earlier rather than a few days later.

(c) Timing of delivery — Delivery is typically recommended when the risks to the fetus by continuing the pregnancy are greater than those faced by the neonate after birth. High-risk patients should not be allowed to progress into the post-term period because in these pregnancies the balance appears to shift in favor of delivery at around 38-39 weeks of gestation. Management of low-risk pregnancies is more controversial. Since delivery cannot always be brought about readily, maternal risks and considerations are more apt to confound this decision. Factors that need to be considered include:

• Results of antepartum fetal assessment
• Favorability of the cervix
• Gestational age
• Maternal preference, after discussion of the risks, benefits, and alternatives to expectant management with antepartum monitoring versus labor induction
• Contraindications to induction of labor

**Antepartum assessment** — Delivery should be effected immediately if there is evidence of fetal compromise or oligohydramnios [28,29]. Oligohydramnios may result from fetoplacental insufficiency and may predispose to umbilical cord compression, thus leading to intermittent fetal hypoxemia, meconium passage, or meconium aspiration. Frequent assessment appears important because amniotic fluid can become drastically reduced within 24-48 hours [30]. However, a consistent definition of low amniotic fluid volume in the post-term pregnancy has not been established. Options include largest vertical fluid pocket ≥2-3 cm in depth, amniotic fluid index <5, and a product of length x width x depth of the largest pocket <60 [29,31,32].

**Favorable cervix** — Labor is generally induced in post-term pregnancies in which the cervix is favorable, as the risk of failed induction and subsequent cesarean delivery is low. There is not enough evidence to determine whether labor induction or expectant management yields a better outcome. Intuitively, however, the risk of unexplained intrauterine fetal demise (which in one large series was one in 926 at 40 weeks, one in 826 at 41 weeks, one in 769 at 42 weeks, and one in 633 at 43 weeks) disappears after a fetus is delivered [33]. Therefore, induction of labor appears indicated when the risk of the induction to the mother and/or fetus outweigh the potential risks of continuing the pregnancy.

**Unfavorable cervix** — Both expectant management and labor induction are associated with low complication rates in low-risk post-term gravida. However, there appears to be a small advantage to labor induction at 41 weeks of gestation 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, lower fetal and maternal morbidity, a shorter hospital stay, lower medical cost, and possibly a lower rate of cesarean delivery in the general obstetric population [2,34-36]. The largest trial of routine post-term induction compared to expectant management randomly assigned 3,407 low-risk women with uncomplicated singleton pregnancies at 41 weeks’ gestation to induction of labor (with or without cervical ripening agents) within four days of randomization or expectant management until 44 weeks [37]. Elective induction resulted in a lower cesarean delivery rate (21.2 versus 24.5 percent), primarily related to fewer surgeries performed for non-reassuring fetal tracings. A subsequent cost analysis of these data reported a policy of routine labor induction resulted in lower costs compared to expectant management ($2,939 and $3,132, respectively) [38]. In addition, a meta-analysis of 19 trials of routine versus selective induction of labor in post-term patients found that routine induction after 41 weeks was associated with a lower rate of perinatal mortality (OR, 0.2; 95% CI, 0.06 to 0.70) and no increase in the cesarean birth rate (OR, 1.02; 95% CI, 0.75 to 1.38) [26]. These findings suggest that routine induction at 41 weeks gestation has fetal benefit without incurring additional maternal risks due to a higher rate of cesarean delivery [39]. However, this conclusion has not been universally accepted [19].

**Gestational age** — Although post-term pregnancy is defined as a pregnancy of 42 or more weeks of gestation, the two large multicenter randomized studies of management of prolonged pregnancy reported favorable outcomes with routine induction as early as 41 weeks of gestation [37,40]. ACOG no longer describes any specific upper limit of gestational age for expectantly managed pregnancies [2]. Many physicians now induce labor between weeks 41 and 42 weeks and virtually all do not allow pregnancy to extend beyond 43.0 weeks of gestation.
Contraindications to induction of labor — Before recommending induction of labor, obstetric care providers should be certain that there are no contraindications to such an intervention. Several such contraindications are described, and are summarized below:

### Contraindications for Induction of Labor

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<td>Absolute cephalopelvic disproportion (such as women with pelvic deformities)</td>
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### Intrapartum management

The post-term fetus is at higher risk of intrapartum fetal heart rate abnormalities and passage of meconium [7]. For this reason, most authors recommend continuous electronic fetal monitoring in labor for these pregnancies. Spontaneous or induced fetal heart rate accelerations are a reliable sign of a non-acidotic fetus [41].

### Prognosis

At 1 and 2 years of age, the general intelligence quotient, physical milestones, and frequency of intercurrent illnesses is the same for normal term infants and those from prolonged pregnancies [16].

### Recommendations

The risks of routine induction (cesarean delivery) in the era of cervical ripening agents is lower than previously reported. The risk of fetal death is also low, but not zero, with expectantly managed, carefully monitored pregnancies. For these reasons, I favor a policy of routine induction at 41 weeks of gestation.
References
Low-risk post-term pregnancy

40-0/7 weeks  
50%

Discuss IOL, √ cervix  
(No fetal surveillance)

Labor

41-0/7 weeks  
30%

Expectant management

Discuss IOL  
Document re: IOL  
Fetal surveillance

42-0/7 weeks  
10%

IOL per ACOG

43-0/7 weeks  
4%

↑ infant mortality

Induction of labor

Success

Failed IOL

Cesarean

D/C home