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Timing of induction of labor

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ABSTRACT

Determining the optimal timing for induction of labor is critical in minimizing the risks to maternal and fetal health. While data are available to guide us in some clinical situations, such as hypertension and diabetes, many gaps in knowledge still exist in others, including cholestasis of pregnancy, fetal anomalies, and placental abruption. This review of the currently available literature assesses the risks and benefits of preterm and early term induction in a wide variety of maternal and fetal conditions.

Introduction

Induction of labor is considered when risks to maternal or fetal health outweigh the risks of an early delivery. However, it is difficult to calculate these risks with precision. Many factors must be weighed, including gestational age, severity of the condition, potential for impending maternal or fetal complications, and cervical exam.

From the fetal perspective, iatrogenic preterm and early term deliveries have been associated with increased neonatal and long-term developmental complications, while expectant management introduces the risks of stillbirth, infectious complications in pregnancies with cervical dilation or rupture of membranes, and worsening hypoxia in pregnancies at risk for placental dysfunction. From the maternal perspective, induction of labor in the setting of an unfavorable cervix is associated with longer labors, risks of endometritis, postpartum atony and hemorrhage, and potentially an increased risk of cesarean deliveries.

After almost 20 years of steadily increasing rates of induction of labor, aggressive educational campaigns by the American College of Obstetricians and Gynecologists (ACOG), Society for Maternal–Fetal Medicine (SMFM), March of Dimes, and many state health departments have led to small declines in the overall rates of induction (from 23.8% in 2010 to 23.3% in 2012) with significantly larger declines in the rates of induction in the late-preterm period (34–36 6/7 weeks' gestation) and the early term period (37–38 6/7 weeks' gestation)[1] (Fig.).

Although elective deliveries before 39 weeks are becoming rare, there are both maternal and fetal indications that should lead to earlier delivery. In an effort to elucidate the current state of the evidence behind these indications, the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) and SMFM held a workshop in February 2011 titled "Timing of Indicated Late-Preterm and Early Term Births." This workshop reviewed available evidence and gaps in the literature needed to guide management in many clinical situations. Combining the results of this workshop with subsequent data, we present the current recommendations for timing of induction of labor in a wide variety of clinical situations.

Timing of induction of labor for maternal and obstetric indications

There is evidence that timely induction of labor can improve maternal and fetal outcomes for many maternal conditions.

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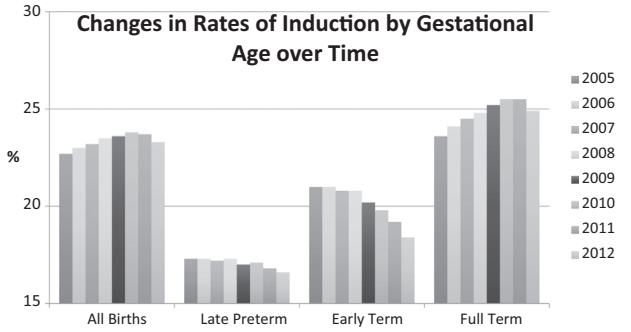

Fig. – Recent declines in induction of labor by gestational age. Hyattsville, MD: National Center for Health Statistics, 2014. (Adapted with permission from Osterman and Martin[1].)

Specifically, hypertension and diabetes have been studied extensively while less evidence exists for cholestasis of pregnancy. Induction for premature and preterm premature rupture of membranes will be discussed in "Labor induction in the patient with preterm premature rupture of membranes", in this issue.

Chronic hypertension

The diagnosis of chronic hypertension either antedates pregnancy or is made prior to 20 weeks' gestation. Approximately 1–5% of pregnancies are complicated by chronic hypertension, and the prevalence is expected to rise in the future with advancing maternal age and increased rates of maternal obesity.[2–4] Chronic hypertension is associated with maternal morbidities like superimposed preeclampsia, stroke, and cesarean delivery in addition to adverse pregnancy outcomes including iatrogenic preterm birth, low birth weight, and fetal demise.[2,5] There is evidence that the risk of adverse pregnancy outcomes is higher in women with increased severity of chronic hypertension.[6]

No randomized controlled trials exist to guide decision making for the timing of delivery in women with chronic hypertension. A cohort study of women with chronic hypertension found that delivery at 38–39 weeks' gestation was optimal for balancing fetal and neonatal risks.[7] ACOG and SMFM suggest delivery at 38–39 weeks for women with chronic hypertension not requiring medication, 37–39 weeks for women controlled with medication, and 36–37 weeks for women with uncontrolled hypertension.[8] These recommendations are somewhat extrapolated from data in women with gestational hypertension as discussed below.[9] The timing of delivery will also be influenced by the development of complications, including fetal growth restriction and superimposed preeclampsia.

Gestational hypertension

Gestational hypertension is diagnosed after 20 weeks of gestation. This diagnosis involves elevated blood pressure in the absence of proteinuria.[10] Gestational hypertension is the most common cause of hypertension of pregnancy with a reported incidence ranging from 2% to 17%.[11,12] Pregnancy outcomes in women with gestational hypertension are comparable to those in the general population unless they have severely elevated blood pressures.[11,12] Severe gestational hypertension is associated with preterm birth, placental abruption, and small for gestational age infants.[12] Up to 46% of women with gestational hypertension will develop preeclampsia.[13]

Given the high risk of progression to preeclampsia, induction of labor is recommended for gestational hypertension. However, the optimal timing of delivery remains controversial. A randomized controlled trial in women with either gestational hypertension or preeclampsia without severe features found that induction of labor at 37 weeks' gestation was associated with a significant decrease in composite maternal morbidity.[9] Barton et al.[14] found increased neonatal complications among women with gestational hypertension who delivered at 34–36 weeks' gestation. A retrospective cohort study from the Consortium on Safe Labor in women with gestational hypertension found the lowest risk of maternal morbidity and mortality with induction of labor at 38 weeks. Conversely, the lowest risk of neonatal morbidity occurred with induction of labor at 39 weeks.[15] ACOG and SMFM suggest delivery at 37–38 weeks for women with gestational hypertension.[8]

Preeclampsia

Preeclampsia is a diagnosis made after 20 weeks' gestation that includes the development of hypertension and either proteinuria or end-organ dysfunction.[10] It occurs in approximately 3–5% of all pregnancies.[16,17] Preeclampsia is considered to have severe features when women develop severe hypertension or evidence of end-organ dysfunction. Eclampsia occurs when women with preeclampsia experience a grand mal seizure.[10] Preeclampsia and eclampsia are some of the leading causes of maternal mortality worldwide.[18] Preeclampsia is also associated with placental abruption, acute kidney injury, cerebral hemorrhage, hepatic failure, pulmonary edema, fetal growth restriction, preterm birth, and increased neonatal morbidity and mortality.[18]

The management of preeclampsia without severe features was investigated in a randomized controlled trial in combination with gestational hypertension as mentioned above.[9] This study found a significant decrease in composite maternal morbidity with induction of labor at 37 weeks as compared with expectant management. There was no difference in neonatal outcomes between the 2 groups.[9] No randomized trials have been performed in women with preeclampsia without severe features at less than 37 weeks' gestation. Habli et al.[19] compared neonatal outcomes in pregnancies complicated by preeclampsia or gestational hypertension and in normal pregnancies undergoing induction of labor at 35–36 weeks. They found higher rates of NICU admission, longer neonatal hospitalization, and increased risk of neonatal respiratory distress syndrome. ACOG and SMFM recommend induction of labor for preeclampsia without severe features at 37 weeks' gestation.[8]

The management of preeclampsia with severe features has been studied in 4 randomized controlled trials comparing induction of labor prior to 34 weeks' gestation with expectant