

OBSTETRICS

A risk of waiting: the weekly incidence of hypertensive disorders and associated maternal and neonatal morbidity in low-risk term pregnancies

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BACKGROUND: Elective induction of labor (eIOL) prior to 39 weeks' gestation is discouraged because of presumed fetal benefits. However, few data exist on the maternal risks of expectant management. To date, no study has evaluated the maternal risk of developing a hypertensive disorder of pregnancy with expectant management of a low-risk gravid at term.

OBJECTIVE: We sought to evaluate the development of hypertensive disorders in term low-risk expectantly managed patients.

STUDY DESIGN: This is a retrospective cross-sectional study from 19 US hospitals, from 2002 to 2008 (Safe Labor Consortium) including all nonanomalous, cephalic, singleton pregnancies at 37–41 weeks. Women with a history of hypertension, diabetes mellitus, cardiovascular disease, or planned cesarean delivery or from centers with incomplete hypertensive data were excluded. Women with eIOL in each week were compared with women managed expectantly until the next week of gestation or beyond. The primary outcome was the frequency of hypertensive complications.

RESULTS: Of 114,651 low-risk deliveries, 12,772 (11.1%) had eIOL. The cohort was 49.2% nulliparous, 51.1% white, and obese (mean body mass index 30.2 kg/m²). The risk of developing any hypertension in expectantly managed women was 4.1% after 37 weeks, 3.5% after 38 weeks, 3.2% after 39 weeks, and 2.6% after 40 weeks. Compared with eIOL, women with hypertensive disorders had significantly higher rates of cesarean delivery and maternal morbidities (intensive care unit admission or death, third- or fourth-degree lacerations, maternal infections, and bleeding complications) at each week of gestation and the composite neonatal morbidity at 38 and 39 weeks of gestation.

CONCLUSION: For women at low risk expectantly managed at term, there is a risk of developing hypertensive complications for each additional week of pregnancy, with associated increases in maternal and neonatal morbidities.

Key words: elective induction of labor, expectant management, hypertensive disorders of pregnancy

Based on previous studies examining neonatal outcomes and their relationship to gestational age, elective induction of labor (eIOL) prior to 39 weeks' gestation is discouraged because of concerns for neonatal morbidity.^{1,2} However, more recent publications have sought to examine maternal, fetal, and neonatal outcomes by comparing induction at different stages to the real-world obstetric condition of expectant management. These works have shown that expectant management of pregnancies at term is not without risk including, increased fetal deaths, increased cesarean delivery, and neonatal and maternal morbidities.^{3–9} One maternal morbidity of expectant

management about which less has been written is the spectrum of pregnancy-related hypertensive disease and the cumulative risks associated with its occurrence.

Worldwide, hypertension is a leading cause of maternal mortality and is associated with significant obstetric morbidity¹⁰ and fetal death.¹¹ Eclampsia, preeclampsia, and gestational hypertension are unique to pregnancy and are defined by new-onset blood pressure elevation after 20 weeks' gestation.^{12,13} Hypertensive disorders of pregnancy complicate approximately 3–10% of all pregnancies^{10,14–16} and account for 12–16% of maternal deaths in developed countries.¹⁷ The overall incidence of hypertensive disorders in pregnancy has been increasing, partially attributed to the rise in obesity and comorbidities in pregnancy.¹⁸

As we, using this data set,⁶ and others, with vital statistics data sets,^{3–5,7–9} have previously shown, eIOL in women at low risk has been associated with a decreased risk of several obstetric complications including postpartum hemorrhage,³

chorioamnionitis,^{6–8} obstetrical laceration,^{8,9} and operative delivery.^{3,6–9} Because women with eIOL are, at the onset, devoid of hypertensive complications by definition, the elective induction of patients at low risk could also confer a benefit of avoiding the development of obstetric-related hypertensive morbidity and its associated maternal and fetal morbidity/mortality.

To date, no study has evaluated the maternal risk of developing a hypertensive disorder of pregnancy with expectant management of a gravid at low risk at term. Therefore, we sought to describe the incidence of hypertensive disorders of pregnancy in expectantly managed pregnant women at low risk at term.

Materials and Methods

Study population

We selected our study cohort from the database of the Consortium on Safe Labor, a study conducted by the Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health.¹⁹ In brief, this was a retrospective, cross-sectional

Cite this article as: Gibson KS, Waters TP, Bailit JL. A risk of waiting: the weekly incidence of hypertensive disorders and associated maternal and neonatal morbidity in low-risk term pregnancies. *Am J Obstet Gynecol* 2016;214:389.e1–12.

0002-9378/\$36.00

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<http://dx.doi.org/10.1016/j.ajog.2015.09.095>

study involving deliveries from 2002 through 2008 from 12 clinical centers and 19 hospitals representing 9 American College of Obstetricians and Gynecologists (ACOG) districts. The population was then standardized by assigning a weight to each subject using ACOG district, maternal race/ethnicity, parity, and plurality based on 2004 national data.^{19,20} Institutional review board approval was obtained for this analysis.

The Figure presents the flow diagram for our cohort selection, as originally described in the paper by Gibson et al⁶ comparing expectantly managed term pregnancies with electively induced deliveries. Briefly, from the initial data set of all deliveries ($n = 233,736$), we limited the group to singleton term pregnancies of 37 to 42 weeks' gestational age in vertex presentation ($n = 155,848$) in the Consortium on Safe Labor Dataset.

To limit confounding, we excluded all those with a prior uterine scar or planned (elective) cesarean delivery ($n = 136,014$). We also excluded those with fetal anomalies, women who had more than 1 pregnancy within the data set (the first was retained), or chronic maternal conditions that may lead to indicated delivery, including diabetes mellitus, chronic hypertension, cardiovascular disease, placental previa, or human immunodeficiency virus—positive status. Finally, we removed the 2 centers with more than 5% missing data for hypertensive outcomes ($n = 114,651$). All women who developed a hypertensive complication of pregnancy were included in the final cohort of low-risk pregnancies in the expectant management group.

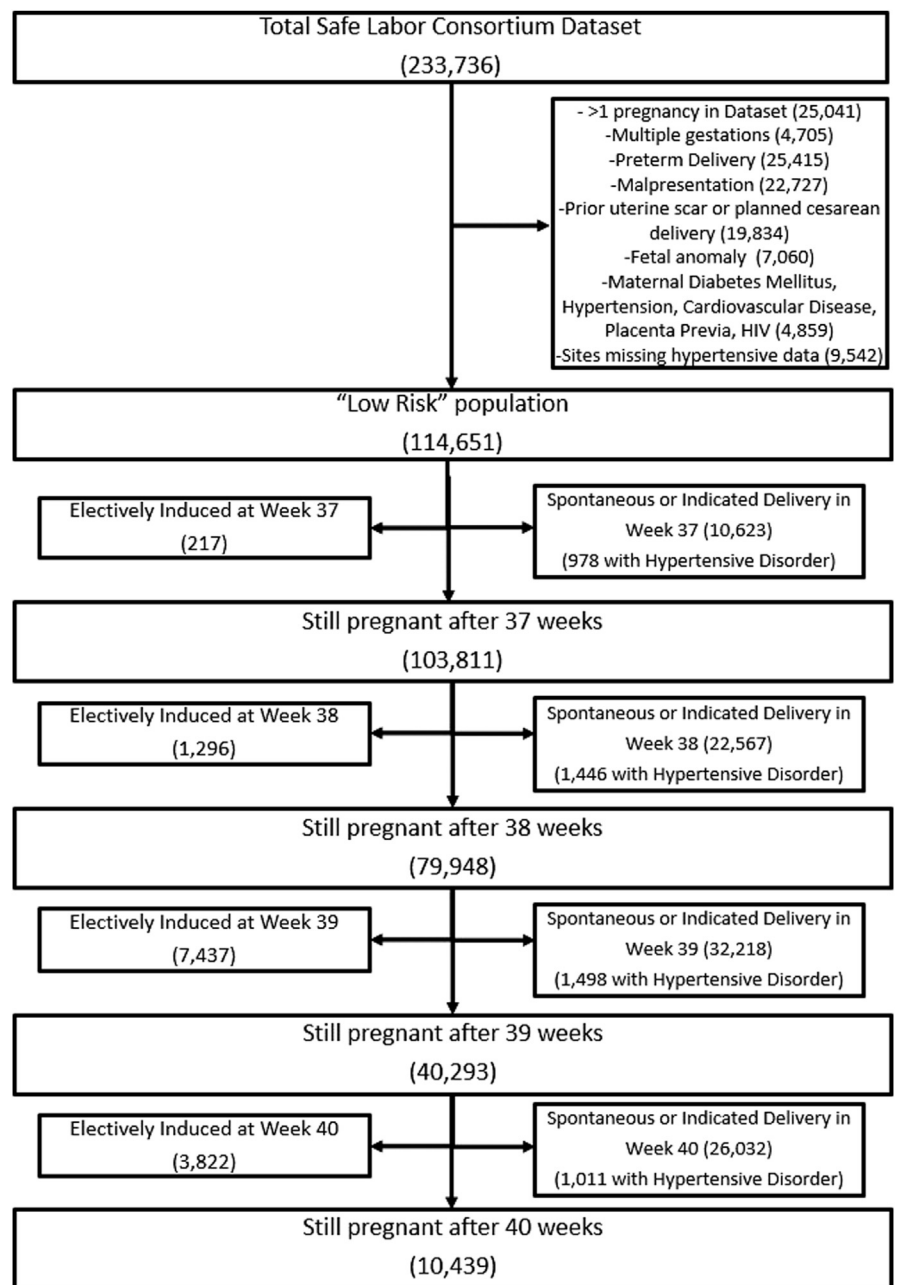
As previously described, we then identified women with elective induction of labors.^{6,21} A predefined variable indicated whether a women had an induction of labor and did not include those receiving only labor augmentation or with less than 2 vaginal examinations. Inductions categorized as elective had no other indications for induction provided with no obstetric, fetal, or maternal conditions complicating the pregnancy.

Study outcomes

Subjects were divided by week of gestational age at delivery (Figure). Given the

FIGURE

Flow diagram of cohort selection and distribution of subjects by week of pregnancy



The selection of our low-risk term cohort and the distribution of our final cohort into those electively induced or expectantly managed by week of pregnancy.

HIV, human immunodeficiency virus.

Gibson et al. Weekly incidence of hypertensive disorders in low-risk term pregnancies. *Am J Obstet Gynecol* 2016.

limitations of pregnancy dating and the size of our data set, we chose to evaluate gestational age by week rather than day. Those with an induction of labor coded as elective were the cases of eIOL at each

week of gestation. Those not electively induced and who delivered after that week of gestation were considered to be expectantly managed in that week of gestation.

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