Delivery at Term
When, How, and Why

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KEYWORDS

• Term • Induction of labor • Cesarean delivery • Antepartum stillbirth

KEY POINTS

- The optimal timing of delivery for the baby is 39 weeks, avoiding the morbidity associated with early term birth and reducing the risk of antepartum stillbirth.
- There is compelling evidence that among high-risk pregnancies and in settings where cesarean rates are high (>20%), induction of labor at 37 to 40 weeks does not, as previously thought, result in a further increased risk of cesarean delivery.
- The only advantage to planned cesarean delivery over induction of labor is the avoidance of the morbidity associated with emergency cesarean delivery; controversy exists on the other reported benefits.
- There is a growing number of well-conducted randomized controlled trials that provide some support for induction of labor shortly before term for a variety of indications (hypertensive disorders, gestational diabetes, suspected growth restriction, macrosomia, and advanced maternal age).

INTRODUCTION

A young, healthy primiparous woman attends your antenatal clinic requesting delivery at 39 weeks. There is no indication for delivery before 41 weeks' gestation. How do you counsel her? What is the optimal timing (when), method (how), and reason (why) for delivery at term? In this article, the authors aim to provide you with a summary of the relevant information to help you counsel this woman and help her to reach an informed decision about her care. When should we offer delivery? What gestation represents the optimal timing for delivery at term? As with all decisions in maternity care, optimal timing may be different for the mother than the baby and a balance must be sought. The authors examine how the timing of delivery across the gestational

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weeks (37–42 weeks) may influence the risk of complications for the mother and for the baby.

OPTIMAL DELIVERY TIMING

Baby

Antepartum risks

Risk of antepartum stillbirth Stillbirth accounts for two-thirds of perinatal deaths, and early neonatal deaths account for 33%.[1] Intrapartum causes of stillbirth account for just 8.8% of all stillbirths. Excluding intrapartum causes, antepartum stillbirth accounts for 61% of all perinatal deaths.[1] Twenty-eight percent of antepartum stillbirths are unexplained.[1] Antepartum stillbirth is by far the most common cause of perinatal death at term.[2] Six percent of stillbirths are due to congenital abnormalities, and 35% of stillbirths occur at 37 to 42 weeks (the most common gestation for stillbirths to occur). Term, singleton, normally formed, antepartum stillbirth (ie, potentially preventable stillbirths) made up one-third of all stillbirths (1039 [32%] out of 3286) in the United Kingdom in 2013.

Choosing the correct denominator The risk of perinatal death at gestational ages near term is often expressed as the number of all perinatal deaths at each week divided by the total number of births. However, near term a baby cannot be stillborn once it has been delivered. Thus, the risk of remaining undelivered at each gestational age is better expressed as the risk per 100 babies undelivered at that time point, termed the *perinatal risk index*. Although the perinatal mortality rate is lowest at 41 weeks, the gestational age associated with the lowest cumulative risk of perinatal death is 38 weeks.[2]

Neonatal risks

Risk of respiratory morbidity Most elective cesarean deliveries are performed at or after $39^{0/7}$ weeks' gestation.[3] The timing of this is advised because the risk of neonatal respiratory morbidity decreases with advancing gestation until $40^{0/7}$ weeks. The risk of respiratory morbidity in infants delivered by elective cesarean at $37^{0/7}$ weeks is 4-fold higher than infants delivered at 40 weeks, 3-fold higher compared with those delivered at 38 weeks, and 2-fold higher than those delivered at 39 weeks. The risk of developing neonatal respiratory symptoms for babies born by vaginal delivery decreases from a probability of 0.07 at 37 weeks to 0.04 at 39 weeks and thereafter plateaus.[4] Thus, induction of labor at 39 weeks is the optimal balance between the risk of respiratory morbidity for the neonate and the risk of antepartum stillbirth for the fetus.

Hyperbilirubinaemia There have been reports of an association between the use of oxytocin in labor and neonatal hyperbilirubinaemia.[5] However, it is difficult to disentangle possible confounding by the earlier gestational age of babies who were delivered following induction of labor. Although Cochrane reviews of high versus low doses of oxytocin[6] and early versus late use[7] do not report jaundice, at least one trial showed no effect.[8] Gestational age of less than 38 weeks is a risk factor for the development of significant hyperbilirubinaemia.[9] In an observational study comparing outcomes for low-risk singleton term newborns by gestational age, delivery at less than 38 weeks was an independent risk factor for the development of unexplained jaundice (odds ratio [OR] = 2.1, 95% confidence interval [CI] 1.7–2.5).[10] The DAME trial, a randomized controlled trial (RCT) of induction of labor at 37 to 38 weeks' gestation versus expectant management for suspected large-for-gestational-age babies, found higher rates of hyperbilirubinaemia requiring phototherapy in the induction group compared with the expectantly managed group.[11]

Other neonatal outcomes Gestational age less than 38 weeks is also an independent risk factor for the development of neonatal hypoglycemia (OR = 2.5, 95% CI 1.5–4.3).[10] Perhaps unsurprisingly given the increased risk of respiratory morbidity, jaundice, and hypoglycemia associated with delivery at 37 weeks' gestation, the rates of admission to neonatal intensive care are also inversely proportional to delivery gestational age.[12]

Observational studies have also suggested an increased risk of neonatal encephalopathy in children with cerebral palsy associated with delivery at 41 weeks or greater versus less than 41 weeks.[13]

Thus, the current data suggest that 39 weeks' gestation is the optimal gestational age for delivery for the baby, as it avoids the morbidity associated with early term birth and reduces the risk of antepartum stillbirth post term.

Maternal

Risk of cesarean delivery

Observational data suggest that induction of labor results in an increased risk of cesarean delivery.[14–16] For example, in England from 2010 to 2011, cesarean rates were 11% among women who labored spontaneously and 23% among those who were induced. Rates of operative vaginal delivery followed similar trends (12% and 17%, respectively).[17] However, there is significant confounding by delivery indication, as the reasons for induction (eg, postdates pregnancy, fetal growth restriction, reduced fetal movements) are also established risk factors for operative delivery. When observational studies choose the correct comparison group (ie, induction of labor vs expectant management), studies have shown no difference in cesarean delivery rates at term,[18] irrespective of whether delivery occurs during the early or late-term time period.

Randomized trials of induction near term provide unbiased evidence. There have now been at least 38 such trials and at least 3 systematic reviews.[19–21] These data show that induction of labor at term is not associated with an elevated rate of cesarean or instrumental delivery (**Table 1**). Despite the compelling evidence, this remains a contentious issue among health care professionals and women. Many of the trials included in the systematic reviews are for induction in postdate pregnancies or high-risk groups (eg, hypertensive disorders) rather than low-risk women. The ARRIVE trial, an RCT of induction of labor at 39 weeks versus expectant

Table 1
Rates of cesarean delivery and instrumental delivery in prospective randomized studies and systematic reviews of induction of labor at term

Study	Gestational Age (y)	Cesarean Delivery		Instrumental Delivery	
		OR/RR	95% CI	OR/RR	95% CI
Wood et al,[20] 2013	37–42	0.83	0.76, 0.92	1.09	0.98, 1.22
Saccone & Berghella,[21] 2015	39–40	1.25	0.75, 2.08	1.22	0.83, 1.81
Stock et al,[18] 2012	37	1.02	0.89, 1.17	0.93	0.81, 1.06
	38	1.03	0.94, 1.13	0.95	0.87, 1.04
	39	1.08	1.00, 1.16	0.98	0.91, 1.05
	40	0.83	0.79, 0.88	0.85	0.82, 0.89
	41	0.66	0.63, 0.69	0.78	0.74, 0.81
Mishanina et al,[19] 2014	37–41	0.87	0.82–0.92	Not applicable	Not applicable

Abbreviation: RR, relative risk.

management for over 6000 low-risk nulliparous women has shown that induction of labor is associated with a significant reduction in cesarean delivery (18% vs 22%, RR 0.84, 95% CI 0.76 - 0.93).[22]

Are there other maternal risks you can mention briefly? They are discussed briefly later but are worth mentioning here in this context, such as the risk of preeclampsia and so forth, which increases at term, and whether or not expectant management versus a plan to outright deliver at 39 weeks might be associated with an elevated risk for preeclampsia, eclampsia, and so forth.

HOW SHOULD WE DELIVER?

Now that the authors have considered when to deliver at term, they explore the mode of delivery. The choice that exists is not elective cesarean versus vaginal birth. It is elective cesarean versus *trial* of vaginal birth, as the latter may or may not succeed. A planned trial of vaginal birth is accomplished either by induction of labor or expectant management (ie, waiting until the spontaneous onset of labor or until the development of a medical problem that mandated induction). First, the authors explore the risks of induction of labor itself (not the method used).

Induction of Labor

The authors have already examined induction of labor versus expectant management in terms of risk of cesarean delivery, but induction of labor is associated with other potential complications for the mother and her fetus. Risks to the mother during induction include failed induction, cord prolapse during amniotomy due to a poorly engaged presenting part, maternal pain, placental abruption due to rapid decompression of the uterine cavity at amniotomy, and uterine hyperstimulation. Fortunately, these complications are uncommon.

Cord prolapse

Umbilical cord prolapse complicates 1.25 to 2.1 per 1000 deliveries.[23,24] In one retrospective study of 57 cases over a 10-year period, cord prolapse occurred with amniotomy in 42% of cases.[23] However, does amniotomy increase the risk of cord prolapse? A retrospective case control study of 37 patients of intrapartum umbilical cord prolapse and 74 matched control patients with intact membranes found that the use of amniotomy in patients who had a cord prolapse was similar between groups.[25] A larger retrospective case control study in which 80 patients of umbilical cord prolapse were matched with 800 controls found that amniotomy was not associated with umbilical cord prolapse; in contrast, there was a 9-fold increased risk of umbilical cord prolapse associated with spontaneous rupture of membranes.[26] Umbilical cord prolapse is associated with significant morbidity to both the mother and the fetus, as emergent cesarean delivery is indicated as soon as possible after detection.

Uterine hyperstimulation

Uterine hyperstimulation is generally defined as more than 5 contractions in 10 minutes or contractions lasting more than 2 minutes. This complication arises in approximately 1% to 5% of cases whereby pharmacologic agents are used to induce labor[27] and may also occur in spontaneous labor. It may occur with or without fetal heart rate changes. During uterine contractions, blood flow to the intervillous space (where oxygen exchange between the mother and the fetus occurs) is interrupted.[28] Between contractions, in the relaxation phase, blood flow, and, thus, oxygen exchange, is restored. If the interval between contractions is reduced, or if the duration of the contractions increase, then a critical point may be reached whereby fetal hypoxemia

ensues. Simpson and James[28] found that uterine hyperstimulation was associated with significant fetal oxygen desaturation and nonreassuring fetal heart rate changes.

Maternal pain

There is evidence that induced labor is more painful than spontaneous labor. UK data on analgesia in labor reveal that women who deliver vaginally who have an induced labor are more than twice as likely to request epidural anesthesia as women in spontaneous labor (21% vs 8%[17]). One small study (n = 61) by Capogna and colleagues[29] found that the minimum effective analgesic dosage of sufentanil (a synthetic opioid) given via an epidural for women with an induced labor was 1.3 times greater than in women with a spontaneous onset of labor ($P = .0014$). In the authors' RCT of 195 primiparous women aged 35 years or older comparing labor induction at 39 weeks of gestation versus expectant management, they observed a higher rate of epidural usage in women in the induction arm (35%) than the expectant management arm (29%), though this failed to reach statistical significance ($P = .11$).[30]

Labor duration

It is difficult to perform meaningful comparisons of the duration of labor between induced and spontaneous labor even in randomized trials. Women undergoing induction of labor have a clear time of onset (eg, the time of insertion of prostaglandin, a balloon catheter, or amniotomy). In contrast, the time of onset for women in spontaneous labor is difficult to define. In a large retrospective observational study of low-risk women comparing approximately 10,000 women who labored spontaneously with 1000 women who underwent labor induction for no apparent medical indication, induction was not associated with a prolonged labor. However, induction was associated with a longer admission-to-delivery interval and the maternal total length of stay was 0.34 days longer with induction compared with spontaneous labor ($P \leq .0001$).[14] Findings were similar in a retrospective study of 2681 low-risk multiparous women, whereby women who were induced had a significantly shorter labor than those who labored spontaneously (99 minutes vs 161 minutes, $P \leq .001$).[31]

MODE OF DELIVERY

Cesarean Delivery

To avoid these complications of induction of labor, should we offer elective cesarean delivery? In 2013, the National Institute for Health and Clinical Excellence introduced new guidance on maternal requests for cesarean delivery stating that "if after discussion and offer of support, a vaginal birth is still not an acceptable option, offer a planned [cesarean section] CS."[32] Rates of cesarean delivery performed primarily for maternal request vary by country. In the United Kingdom in 2001, 7% of all cesareans were elective for maternal request.[33] Although there is a paucity of data in the literature to know whether these rates have recently increased, overall cesarean delivery rates in the United Kingdom have remained stable (2012 25.5%, 2015 26.5%). It is imperative that the comparison groups are carefully examined when evaluating observational data on vaginal delivery versus planned cesarean. The best comparison is planned cesarean delivery versus planned vaginal delivery (ie, an intention-to-treat approach). Some women in the planned vaginal delivery group will deliver by unplanned cesarean delivery.

Benefits to cesarean delivery

Avoidance of perineal trauma An elective cesarean delivery avoids the risk of perineal trauma associated with vaginal delivery. Perineal trauma of varying degrees occurs in 85% of women who give birth vaginally in the United Kingdom. Obstetric anal

sphincter injury, composed of third- and fourth-degree tears, is diagnosed in 3.0% of primiparous women and 0.8% of multiparous women following a vaginal delivery, though its true incidence is likely to be 11.0%.[34] One randomized study with clear unbiased data (the Twin Birth study) had no cases (0%) of obstetric anal sphincter injury in the planned cesarean delivery group and 4 cases (0.3%) in the planned vaginal delivery group.[35]

Reduction in urinary and fecal incontinence and pelvic organ prolapse There is less certainty when it comes to the matter of long-term urogynecologic outcomes, including urinary and fecal incontinence and pelvic organ prolapse.[34] In the case of stress urinary incontinence, any protection offered by a planned cesarean delivery is reduced by advancing age, multiple cesarean deliveries (no protection if $\geq$3), cesarean deliveries performed in labor and future vaginal births. Even women with all deliveries by cesarean delivery are not immune to developing these complications. Vaginal delivery may lead to an impairment in anal function in 2 ways: obstetric anal sphincter injury and pudendal neuropathy. This latter mechanism may explain why, although planned cesarean delivery has been shown to be protective against obstetric anal sphincter injury,[36] it may not be completely protective against anal dysfunction. In a questionnaire study of 1336 women aged 40 to 60 years, there was no association between vaginal delivery (as opposed to cesarean delivery) and self-reporting of symptoms of anal dysfunction.[37]

The Term Breech Trial found lower rates of urinary incontinence at 3 months post partum among women in the planned cesarean delivery group (36 of 798 women in the cesarean group [4.5%] and 58 out of 797 women in the planned vaginal delivery [7.3%]; relative risk [RR] 0.62; 95% CI 0.41–0.93),[38] but at 2 years post partum, the rates of urinary incontinence were not significantly different between groups (81 of 457 women in the cesarean group [17.8%] and 100 of 460 women in the planned vaginal delivery [21.8%]; RR 0.81; 95% CI 0.63–1.06).[39] The Term Breech Trial found no significant difference in self-reported rates of fecal or flatus incontinence between groups at 3 months or 2 years.[38,39] Thus, there is insufficient evidence to recommend a planned cesarean delivery to reduce the risk of stress urinary incontinence.

A large observational study looking at the risk factors for pelvic organ prolapse found that parity was the most significant independent risk factor and the risk increases with each successive baby (**Fig. 1**).[40]

Although parity has a significant role in the risk of pelvic organ prolapse, is planned cesarean delivery protective? A large questionnaire study of more than 4000 women measured self-reported pelvic organ prolapse and found there was no significant

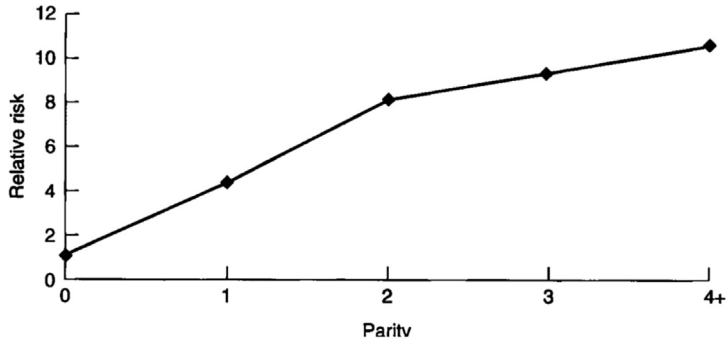

Fig. 1. Relationship between risk of pelvic organ prolapse and parity.

difference in the rate of prolapse between nulliparous women and parous women who had delivered by cesarean. However, the risk was increased in parous women who had delivered vaginally. When comparing parous women who had delivered by cesarean versus parous women who had delivered vaginally, the adjusted OR (aOR) was 1.82 (CI 1.04–3.19). When comparing parous women who had delivered vaginally versus nulliparous women, the aOR was 3.21 (CI 1.96–5.26). The findings were similar in another large questionnaire study of 2000 women, whereby the OR increased with increasing numbers of vaginal births (cesarean only OR 1.6 [0.4–6.4], 1 vaginal birth OR 2.8 [1.1–7.2], 2 vaginal births OR 4.1 [1.8–9.5], 3 or more vaginal births OR 5.3 [2.3–12.5]). From the observational data, there seems to be an association between vaginal delivery and self-reporting of pelvic organ prolapse.

Risks of cesarean delivery

Cesarean delivery constitutes major abdominal surgery and carries both short- and long-term risks, summarized in **Table 2**.

Lilford and colleagues[41] explored the risks of maternal mortality associated with vaginal delivery, elective cesarean, and emergency cesarean excluding women with medical or life-threatening antenatal complications. They found that the risk of maternal mortality for cesarean versus vaginal delivery was 5:1 and emergency cesarean versus elective cesarean was 1.5:1. The main reason vaginal delivery is safer than cesarean delivery is not the comparison between the first cesarean delivery and first vaginal birth but the exponential increase in risks associated with subsequent cesarean deliveries summarized with the phrase “the first cut is not the deepest.”

Placenta previa and the morbidly adherent placenta The maternal and neonatal morbidity and mortality associated with placenta previa and placenta accrete are considerable. Rates of both conditions are increasing because of the increasing cesarean delivery rate and increasing maternal age. This increase is because the placenta is less likely to migrate upward with the development of the lower uterine segment if there is a scar in it. Placenta previa is associated with an increased risk of major obstetric hemorrhage (≥1000 mL blood loss; OR 13.1, 95% CI 7.47–23.0),[42] massive obstetric hemorrhage (≥1500 mL blood loss) (21%),[43] need for blood

Table 2
Summary of short- and longer-term risks of cesarean delivery versus vaginal delivery

Studies Suggest May be Reduced by Vaginal Delivery	Studies Give Conflicting Evidence	Studies Suggest No Difference	Studies Suggest May be Reduced by Cesarean Delivery
• Length of maternal hospital stay • Peripartum hysterectomy due to postpartum hemorrhage • Cardiac arrest	• Maternal death • Deep vein thrombosis • Blood transfusion • Infection • Hysterectomy • Anesthetic complications	• Perineal and abdominal pain at 4 mo post partum • Injury to urinary tract • Injury to cervix • Iatrogenic surgical injury • Pulmonary embolism • Wound infection • Intraoperative trauma • Uterine trauma • Assisted ventilation or intubation • Acute renal failure	• Perineal and abdominal pain during birth and at 3 d post partum • Vaginal trauma • Early postpartum hemorrhage • Obstetric shock

transfusion, and need for peripartum hysterectomy (11%). The risks with placenta accreta are profound. Women with the placenta accrete spectrum are at high risk for an indicated preterm delivery, which most commonly occurs by planned cesarean hysterectomy, and are at risk for major or massive obstetric hemorrhage, urologic (bladder, ureteral) injury, and other complications. Risks of placenta accrete spectrum increase exponentially with the number of prior cesarean deliveries and are highest among women with multiple prior cesarean deliveries and placenta previa.

Uterine scar dehiscence or rupture Uterine rupture is associated with maternal and perinatal morbidity and mortality. A landmark observational study by Landon and colleagues[44] examined the maternal and perinatal outcomes of vaginal birth after cesarean delivery versus elective repeat cesarean delivery and showed that the risk of uterine rupture associated with vaginal birth after one cesarean delivery was 0.7%. Twelve babies whose mothers had a trial of vaginal birth developed hypoxic ischemic encephalopathy (0.08%); of those 12 cases, 7 were associated with uterine rupture. Thirty-five women (0.2%) had a hysterectomy (5 cases were performed for irreparable rupture), and 3 women (0.02%) died (of which no cases were associated with uterine rupture). In a large observational study of 159 cases of uterine rupture in the United Kingdom from 2009 to 10, 2 women (1.3%) died and 18 perinatal deaths associated with uterine rupture occurred (12.0%).[45]

Antepartum stillbirth in subsequent pregnancy There is an association between cesarean delivery in the first pregnancy and unexplained antepartum stillbirth in the second pregnancy. Smith and colleagues[46] found that the risk of unexplained antepartum stillbirth at 39 weeks' or greater gestation was 1.1 per 1000 women who had had a previous cesarean delivery versus 0.5 per 1000 women in those who had delivered vaginally. The investigators postulate this association may be due to impaired uterine vasculature due to previous surgery, abnormal placentation, and subsequent uteroplacental dysfunction.

WHY SHOULD WE DELIVER?

Specific Indications for Delivery at Term

Reduced fetal movements and stillbirth prevention

Raised awareness of reduced fetal movements is one of the 4 key elements of the Saving Babies Lives care bundle implemented across the United Kingdom to try to reduce antepartum stillbirths.[47] In the confidential inquiry into term antepartum stillbirths, in just less than half of a random sample of stillbirths reviewed by an expert panel women reported decreased fetal movement.[48] In a third of those stillbirths, a major failure of care was identified; in the remaining cases, there were also lesser deficiencies in care identified. In a retrospective cohort study in New Zealand comparing fetal movement data from women with late stillbirth with women with ongoing pregnancies at the same gestational age as the stillbirth had occurred, decreased fetal movement was associated with an increased risk of late stillbirth (aOR 2.37, 95% CI 1.29–4.35).[49] The results of this study must be interpreted with caution, as the study is limited by recall bias. Although the association between decreased and antepartum stillbirth is clear, complaints of reduced fetal movements are common and subjective; it is uncertain how to differentiate pathologic decreased movements from a more transient situation. One Norwegian quality-improvement study implemented a policy of (1) providing written information about reduced fetal movements, (2) an invitation to monitor fetal movement, and (3) a guideline for health professionals on the management of reduced fetal movement across 14 hospitals.[50] They found a reduction in

the stillbirth rate among women with reduced fetal movement during the intervention (4.2% versus 2.4%; OR 0.51 95%, CI 0.32–0.81) and an overall reduction in the stillbirth rate in the whole study population 3.0 per 1000 versus 2.0 per 1000 (OR 0.67, 95% CI 0.48–0.93). What is remarkable was that this was achieved with a reduction in the number of inductions of labor and no change in the rate of cesarean deliveries.

Hypertensive disorders

Hypertensive disorders in pregnancy are common and cause considerable maternal and fetal morbidity and mortality. The Hypertension and Preeclampsia Intervention Trial At Term (HYPITAT), an RCT of induction of labor within 48 hours versus expectant management for women with pregnancy-induced hypertension or mild preeclampsia between 36^{+0} and 41^{+0} weeks found that induction of labor was associated with a reduction in the primary outcome (a composite of poor maternal outcomes).[51] These investigators concluded that induction of labor should be advised at 37 weeks' gestation for women with pregnancy-induced hypertension or mild preeclampsia. However, it is notable that the only individual component of the composite that was statistically significantly increased in the control group versus the induction group was the occurrence of severe hypertension and subsequent need for antihypertensive medication, though the study was likely underpowered to detect less common individual outcomes, such as eclampsia.

Gestational diabetes

The association between pregestational diabetes and stillbirth is widely known.[52] The perinatal mortality rate for women with preexisting diabetes (type 1 or 2) is 32 per 1000, compared with 9 per 1000 in the general population. The guidelines from the United Kingdom National Institute for Health and Care Excellence and the American College of Obstetricians and Gynecologists both recommend that pregnant women with pregestational diabetes be offered medically indicated delivery from 38 weeks.[53] Notably, however, in a retrospective audit of 25 cases of stillbirth in women with type I diabetes mellitus in Denmark, the median gestational age at the time the stillbirth was diagnosed was 35 weeks.[54]

Advanced maternal age

The average age at childbirth in industrialized nations has been steadily increasing for about 30 years.[55] Between 1996 and 2006, births to women older than 35 years have increased from 12% to 20% of all births. In the same year, 5.6% of live births were to nulliparous women older than 35 years.[56] Women older than 35 years are at a higher risk of antepartum and intrapartum stillbirths and neonatal deaths, hypertensive disease, gestational diabetes, placenta previa, and placental abruption.[1,55,57] Further, they are at an increased risk of preterm labor and of bearing macrosomic (>3999 g) or low-birth-weight infants (<2500 g). The women themselves typically think that their age puts their infant at increased risk.[57] Unsurprisingly, they have higher rates of obstetric intervention.

The cesarean delivery rate for nulliparous women older than 35 years in the United Kingdom is 38% and 50% in women older than 40 years.[57] In nulliparous women, the relationship between maternal age and delivery by emergency cesarean is linear.[58]

Stillbirth is an important risk to mitigate among women 35 years old or older because older women are relatively less likely to have future pregnancies. Induction at or before term may be beneficial because 38 weeks is the gestational age of delivery associated with the lowest cumulative risk of perinatal death.[2] Nulliparous women have a higher risk of stillbirth than multiparous women for all maternal age groups.[59,60] It is recognized by obstetricians that older women reach the 41- to 42-week stillbirth

risk at which induction is currently offered to all women[27,61] at earlier gestational ages[59]; but as discussed, stillbirth risk is only one risk to consider.

Some obstetricians induce older pregnant women at the due date (40 weeks) (39% women aged 40–44 years, 58% women aged more than 45 years); but of those who do not, one-third are reluctant to offer it for fear of increasing the risk of cesarean despite thinking it will improve perinatal outcomes.[30] The authors conducted an RCT of 619 primiparous women 35 years old or older. Women were randomly assigned to labor induction at 39^{+0} to 39^{+6} weeks' gestation or to expectant management. The primary outcome was cesarean delivery. In an intention-to-treat analysis, there were no significant between-group differences in the percentage of women who underwent a cesarean delivery (98 of 304 women in the induction group [32%] and 103 of 314 women in the expectant-management group [33%]; RR 0.99; 95% CI 0.87–1.14) or in the percentage of women who had a vaginal delivery with the use of forceps or vacuum (115 of 304 women [38%] and 104 of 314 women [33%], respectively; RR 1.30; 95% CI 0.96–1.77). There were no maternal or infant deaths and no significant between-group differences in the women's experience of childbirth or in the frequency of adverse maternal or neonatal outcomes.

In conclusion, the optimal timing of delivery for the baby is 39 weeks, avoiding the morbidity associated with early term birth and reducing the risk of antepartum stillbirth.

There is compelling evidence that among high-risk pregnancies and in settings where cesarean rates are high (>20%), induction of labor at 37 to 40 weeks does not, as previously thought, result in a further increased risk of cesarean delivery. The only advantage to planned cesarean delivery over induction of labor is the avoidance of the morbidity associated with emergency cesarean delivery; controversy exists on the other reported benefits. There is a growing number of well-conducted RCTs that provide some support for induction of labor shortly before term for a variety of indications (hypertensive disorders, gestational diabetes, suspected growth restriction, macrosomia, and advanced maternal age).

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