

When is VBAC appropriate?

➡ Vaginal birth after cesarean carries little risk for mother or infant—provided it is successful. Here's what the literature says about when you can offer this option.

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At first glance, the issue of vaginal birth after cesarean delivery (VBAC) appears to boil down to a simple question: Should I attempt it, or shouldn't I?

On deeper inspection, the decision becomes extremely complex, and the evidence can be confusing.

Both planned elective repeat cesarean and planned VBAC are associated with harms as well as benefits. Most experts would agree that an uncomplicated vaginal delivery poses little risk to mother and baby, and that a planned repeat cesarean delivery at term carries some risk to the mother.

The greatest risks for both mother and baby arise when a trial of labor fails and cesarean delivery becomes necessary for maternal or fetal indications. Risks to the mother are largely operative in nature, and the primary risk to the fetus is uterine rupture. However, maternal and fetal risks cannot be truly separated. Uterine rupture not only compromises the fetus in utero but has

a severe impact on maternal hemodynamic stability, just as a fetal hypoxic ischemic insult secondary to uterine rupture can have lifelong psychological and social consequences for the mother and family.

We are fortunate that serious adverse outcomes of VBAC are rare. Nevertheless, **the only predictable delivery method is planned elective repeat cesarean.** Uncertainty over the likelihood of success of VBAC arises when relative risk is confused with absolute risk.

In this article, I examine the literature on the route of delivery after cesarean to assess the overall safety of a trial of labor in various settings and populations.

Data on VBAC are limited

We lack randomized, controlled trials and valid animal studies that assess fetal and maternal outcomes of elective repeat cesarean versus planned vaginal delivery. The vast majority of studies of VBAC are retrospective or cohort studies, which have inherent potential for bias. Many studies lack a standardized definition of adverse outcomes or lack direct evidence that adverse outcomes are wholly attributable to the trial of labor. No studies compare women who are similar in all characteristics except their mode of delivery.

Nor do we fully understand how women choose a course of action after cesarean delivery—except that the decision is almost always multifactorial. Competing voices—health care provider, family members, friends, media, and a woman's own memory

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HOW TO APPLY THE DATA TO PRACTICE

Clearly, a trial of labor after cesarean delivery can be safe for many women. Successful vaginal delivery is associated with a very low risk of adverse outcomes and may be associated with a lower risk of minor morbidity than is elective repeat cesarean. In fact, the overall success rate for a trial of labor after cesarean is not that different from the success rate for nulliparous women undergoing induction of labor.¹⁹ Even so, patients should understand that operative delivery may be necessary, and the physician and hospital must be prepared for this eventuality in accordance with ACOG guidelines.

As I interpret the data, if a woman has undergone one low transverse cesarean delivery for a nonrecurring condition and a nonmacrosomic fetus, a trial of labor after the spontaneous onset of labor should be strongly encouraged. If she has already delivered vaginally in the past, or had a successful VBAC, she is an even better candidate for a trial of labor. In such a case, labor induction with mechanical cervical ripening or appropriate use of oxytocin, or both, may still be appropriate, but the likelihood of success is lower.

If a woman has a history of more than one cesarean delivery without a vaginal birth, she may be better served by scheduled repeat cesarean delivery. The same holds true for women who have a history of preterm cesarean delivery, a short interpregnancy interval, suspected macrosomia, or an unengaged fetal vertex.

Decision-making about delivery should be shared between the provider and patient, after thorough counseling about the risks and benefits in language the patient can easily comprehend.

It would be best to avoid having to make a decision about VBAC by preventing the initial cesarean delivery.

of her previous delivery—and her emotional state—all contribute to the decision.

How risky is repeat cesarean?

We are all acutely aware of the skyrocketing rate of cesarean delivery, which reaches 35% to 41% in some areas. Most studies indicate that approximately 50% of all cesarean deliveries are repeat cesarean deliveries. Besides the risks associated with the operation itself, planned repeat cesarean has significant downstream implications for the mother and baby—and for society. For example, multiple cesarean deliveries pose an ever greater risk of abnormal placentation and maternal hemorrhage. Cesarean delivery without labor can also heighten the risk of

neonatal respiratory compromise, temperature instability, and slow feeding.¹ Cesarean delivery and its longer attendant hospitalization markedly increase costs throughout an already strapped health care system.

On balance, any cesarean delivery imparts an increased risk of maternal morbidity and mortality, compared with vaginal delivery, as well as an increased risk of complications, such as placenta previa and placenta accreta, in subsequent pregnancies.

What are the risks of a trial of labor?

A prospective, 4-year observational study conducted at 19 academic medical centers under the auspices of the National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network compared the outcomes of 17,898 women undergoing a trial of labor after cesarean delivery with those of 15,801 women having elective repeat cesarean.² Symptomatic uterine rupture occurred in 0.7% of the women attempting a trial of labor, with no occurrences in the elective cesarean group. Blood transfusion and endomyometritis were more common in the group undergoing a trial of labor, and this difference was statistically significant. These findings are in concordance with those of earlier studies.

The two groups in this study were not exactly the same; more women undergoing a trial of labor had had a previous vaginal delivery. Significant adverse maternal outcomes, such as endomyometritis, uterine rupture, hysterectomy, and the need for transfusion, were much more likely in a failed trial of labor than in a successful one.

The same study found a 0.46% risk of hypoxic-ischemic encephalopathy, which was most likely to occur after symptomatic uterine rupture (7 of 12 cases). No cases of hypoxic-ischemic encephalopathy occurred among women undergoing planned cesarean delivery. Multivariate logistic regression analysis determined that the risks of stillbirth, neonatal death, and hypoxic-ischemic encephalopathy in term infants were

increased in the group undergoing a trial of labor, compared with elective repeat cesarean (odds ratio [OR], 2.72; 95% confidence interval [CI], 1.49–4.97).

Can we predict the success of a trial of labor?

Combined success rates from a large number of prospective cohort studies suggest an overall rate of 75.9%. Many clinical characteristics may increase the likelihood of success of a trial of labor after cesarean. In this section, I describe these characteristics and sift the data we have about them.

A history of vaginal delivery ups the odds of success

Women who have delivered vaginally have a much lower risk of rupture during a trial of labor after cesarean than women who have not. Women who have delivered vaginally are also four times more likely to have a successful VBAC. A multicenter, prospective study found a VBAC success rate of 86% among women who had already delivered vaginally, and a success rate of 90% among women who had a history of successful VBAC.³

Many aspects of the cesarean delivery have continuing impact

The type of labor that occurred in the cesarean delivery may help predict subsequent complications and the ultimate success of a trial of labor. For example, induced labor or no labor prior to cesarean delivery is associated with a 2.25-fold risk of uterine rupture in a subsequent trial of labor, compared with a history of spontaneous labor.⁴

In addition, several studies have demonstrated that the indication for the first cesarean delivery has a bearing on the success of a subsequent trial of labor. For example, an indication of shoulder dystocia reduces the success rate of a subsequent trial of labor by one third.²

Even a brief trial of labor before the cesarean may increase the success of a subsequent trial of labor. One study found that cervical dilation to 8 cm or greater was in-

dependently predictive of successful VBAC among women who had a nonrecurring indication for the initial cesarean delivery.⁵

When the cesarean delivery involves a preterm infant, the risk of uterine rupture during a subsequent trial of labor may increase if the infant is at term. Conversely, the risk of uterine rupture is lower when a term cesarean is followed by a preterm trial of labor.⁶

A vertical hysterotomy may preclude VBAC

A previous classical hysterotomy is generally an absolute contraindication for a trial of labor because rupture may occur in as many as 14% of women who have this type of scar.

Low transverse hysterotomy does not appear to confer excess risk during a subsequent trial of labor. Less clear is whether a low vertical hysterotomy poses a risk of rupture. In a 2004 prospective cohort study, the rate of uterine rupture among women who had a transverse hysterotomy scar was 0.7%, compared with 2.0% for a low vertical scar. Any difference in the rate of uterine rupture in retrospective studies may be attributable, at least in part, to the subjective nature of the definition of “low vertical” because there is no precise or objective way to ensure that the vertical hysterotomy did not breach the contractile portion of the uterus (FIGURE).

Are multiple cesareans a contraindication to VBAC?

Experts disagree as to whether more than one previous cesarean delivery before a trial of labor increases the risk of uterine rupture. One retrospective study showed no difference in the rate of rupture between women who had a single previous cesarean and those who had more than one.⁷ A larger prospective study showed a modest increase in the risk of rupture (OR, 1.16) among women who had undergone more than one cesarean—but no decrease in the chance of success.⁸

Most large retrospective and prospective studies include patients who have had more than one previous cesarean delivery, but their numbers remain low; therefore, statistical significance cannot be determined.



It is unclear whether more than one previous cesarean before a trial of labor increases the risk of uterine rupture

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Type of prior hysterotomy influences the VBAC decision



A classical uterine incision is an absolute contraindication to vaginal birth after cesarean (VBAC). A trial of labor is thought to be safe in women who have had a low transverse hysterotomy. The jury is still out on the safety of VBAC in a woman who has had a low vertical incision, however, because of uncertainty over whether the contractile portion of the uterus is involved.

Induction or augmentation of labor may lower odds of success

The likelihood of successful VBAC may be reduced when labor is augmented or induced. The picture is unclear because most studies that have focused on cervical ripening and induction of labor in VBAC are small.

Bujold compared pregnancy outcomes of three groups of women:

- those who underwent cervical ripening via Foley catheter
- those who had amniotomy and oxytocin administration
- those who entered labor spontaneously.

No difference in the rate of uterine rupture was found among the groups. However, the group that underwent cervical ripening had a significantly lower rate of success.⁹

A large case-control study found no increase in the rate of rupture when oxytocin or prostaglandins were administered, but the rate tripled when both were used together.¹⁰

A small, nested, case-control study found an increased risk of uterine rupture only when oxytocin was administered at a rate exceeding 20 mU/mL.¹¹

More than 90% of hysterotomies are transverse

When the obstetric history is incomplete, the clinician may not know what type of hysterotomy was used in the previous cesarean delivery. Most experts believe that VBAC is acceptable when the previous cesarean involved a low transverse hysterotomy. The risk may be much higher with other types of incisions. Today, however, with modern techniques in place, we can assume that more than 90% of hysterotomies are of the low transverse type.

At least one study suggests that the risk of uterine rupture during vaginal birth after cesarean is acceptably low when the type of hysterotomy is unknown. That study explored the effect of augmentation of labor with oxytocin among women who had an unknown scar and found an increased risk of rupture, compared with women who were managed expectantly. However, the overall rate of uterine rupture did not differ from the rate expected when the hysterotomy is known to be of the low transverse type.¹²

VBAC for twins is rare

Because few women carrying twins attempt VBAC, we have little data to guide counseling on success and complication rates. A multicenter, retrospective, cohort study explored delivery outcomes of 25,005 women who had undergone at least one previous cesarean. Of these women, 24,307 had a singleton pregnancy, and 535 were carrying twins. Women who had a twin gestation were 40% less likely to attempt a trial of labor, but those who did had a chance of success and risk of uterine rupture similar to those of women with a singleton gestation. Women carrying twins who underwent a trial of labor had an elevated risk of requiring transfusion, compared with those carrying singletons, but this risk was similar to that of women delivering twins by elective repeat cesarean. In fact, women who delivered twins by repeat cesarean tended to have more maternal morbidity overall than those who had a trial of labor.¹³

A short interpregnancy interval precludes VBAC

Data indicate that a trial of labor after cesarean should be avoided in women who have a brief interpregnancy interval. Several retrospective studies had found an increased risk of uterine rupture, as well as a host of other adverse outcomes, among these women. Using 12 months as a reference point, women who had an interpregnancy interval shorter than 6 months had triple the risk of uterine rupture.¹⁴ Although the mechanism is unknown, rupture is presumably the result of incomplete healing of the hysterotomy.

Macrosomia may not increase the risk of rupture

Women who are thought to have a macrosomic fetus may be encouraged to attempt VBAC, if they so desire. Macrosomia is a minor risk factor for failure of a trial of labor, but it does not necessarily increase the risk of uterine rupture.¹⁵

Elkousy examined VBAC success rates by birth weight, indication for the previous cesarean delivery, and pregnancy history.

Does VBAC have a future?

Physician and hospital attitudes toward vaginal birth after cesarean delivery (VBAC) may be a major determinant of its frequency and success. Many forces oppose women who desire a trial of labor after cesarean. Hospitals and insurers make it increasingly difficult to offer a trial of labor, and strict interpretation of ACOG's guidelines requiring personnel to be "immediately available" during a trial of labor has caused many smaller and isolated hospitals to stop offering this option. The number of women who attempt VBAC has plummeted.²⁰

Two recent surveys by ACOG indicate that an alarming number of providers have stopped offering VBAC because of a lack of insurance and fear of legal liability. As providers offer a trial of labor less and less, skills decline, and so does mentorship of younger physicians.

The NIH weighs in

In March 2010, the National Institutes of Health (NIH) convened a consensus development conference on the topic of VBAC. A panel of health professionals and public representatives reviewed the medical literature and produced a consensus statement. Their conclusion:

Given the available evidence, [a trial of labor] is a reasonable option for many pregnant women with a prior low transverse uterine incision. The data reviewed in this report show that both [a trial of labor] and elective repeat cesarean for a pregnant woman with a prior transverse uterine incision have important risks and benefits and that these risks and benefits differ for the woman and her fetus.

The panel's goal was to help women who have a history of cesarean delivery make an informed, evidence-based decision about the subsequent mode of delivery. The panel also acknowledged the general lack of high-quality evidence to confidently quantify the risks and benefits of a trial of labor versus planned repeat cesarean delivery.²¹

For another point of view on vaginal birth after cesarean, see the Editorial on page 4, "Does vaginal birth after cesarean have a future?" by John T. Repke, MD, of the OBG MANAGEMENT Board of Editors.

Not surprisingly, increased birth weight or a history of cephalopelvic disproportion reduced the rate of success, but a history of vaginal delivery negated that risk of failure. A history of successful VBAC improved the chance of success to more than 90%—even when the birth weight exceeded 4,000 g—and the success rate reached 82% when the birth weight exceeded 4,500 g.¹⁶

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Repeat cesarean is probably best for obese gravidas

Obesity increases the likelihood of cesarean delivery in all circumstances, so it is not surprising that it is a risk factor for a failed trial of labor after cesarean. Obesity also increases the risks of anesthesia and surgery. Because of these risks, most clinicians opt to deliver obese patients by scheduled elective cesarean rather than risk having to perform emergent cesarean delivery in the case of acute fetal compromise or uterine rupture.

Race is not a risk factor for rupture

Race is probably not a significant independent risk factor for failure of VBAC. A secondary analysis of a multicenter, retrospective, cohort study found that black women were somewhat more likely to fail a trial of labor than white women (OR, 1.50; 95% CI, 1.29–1.74), after adjustment for confounding variables. However, black women undergoing a trial of labor were 40% less likely to suffer a uterine rupture than white women were.¹⁷

When comorbidities are well managed, VBAC remains an option

In general, a trial of labor in women who have well managed chronic medical disease does not pose undue risk to mother or baby.

In a population-based, retrospective cohort study using discharge data from California, Gregory and coworkers attempted to delineate clinical variables that might be associated with VBAC success and complications. They examined a wide range of maternal conditions, from diabetes to chorioamnionitis, as well as fetal conditions, such as oligohydramnios and unengaged vertex. Mothers were stratified into low- and high-risk groups, and multivariate logistic regression was performed. Low-risk patients had a 73.7% success rate, whereas high-risk patients had a 50% success rate. Not surprisingly, women who had a fetus with an unengaged vertex had a 9.8% chance of success and an eightfold increase in the risk of uterine rupture.¹⁸

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Most clinicians opt to deliver obese patients by scheduled elective cesarean