1 Introduction

Policies of routine repeat cesarean section for all women with a scarred uterus were never widely practiced in Europe, and now the dogma is being questioned in North America as well. The catch aphorism ‘once a cesarean always a cesarean’ came from a paper published in 1916, entitled ‘Conservatism in obstetrics’. It was neither a prescription nor a recommendation, but rather an observation and a caution to avoid a primary cesarean if at all possible, because it might doom the women to surgical delivery in future pregnancies. The warning was given when the cesarean rate was under 2%, sections were usually done for severe cephalopelvic disproportion, and the classical (vertical) incision in the muscular body of the uterus was almost universally used. It is hardly a proposed today.

Two general propositions underlie the practice of repeat cesarean section: that planned vaginal birth after cesarean, with its inherent risk of uterine rupture, represents a significant hazard to the well-being of mother and baby; and that planned repeat cesarean operations are completely free of risk. Are these underlying premises true?

2 Results of a planned vaginal birth after cesarean

The proportion of women with previous cesarean section who are allowed a trial of labor varies from country to country and from center to center. Among individual units, there appears to be no significant correlation between the proportions of women allowed to labor and the rate of successful vaginal birth.

No randomized, controlled trials have compared the results of routine repeat cesarean section with those of planned vaginal birth for women who have had a previous cesarean section. In the absence of such trials, the best available data on the relative safety of a planned vaginal birth after cesarean come from observational prospective cohort studies. In these studies, in which the proportion of women who undertook a planned vaginal birth after previous cesarean varied from 20 to 80%, successful vaginal birth occurred in from 67 to 84%, averaging about 80% of the women who made the attempt. In the series for which total data are available for both women who had elective cesareans and those who had a planned vaginal birth after cesarean section, well over half of all women with a previous cesarean gave birth vaginally.

Overall, attempted vaginal birth for women with a single previous low transverse cesarean section is associated with a lower risk of complications for both mother and baby than routine repeat cesarean section. The morbidity associated with successful vaginal birth is about one-fifth that of elective cesarean. Failed trials of labor, with subsequent cesarean section, involve almost twice the morbidity of elective section, but the lower morbidity in the 80% of women who successfully give birth vaginally means that overall women who opt for a planned vaginal birth after cesarean suffer only half the morbidity of women who undergo an elective cesarean section.

Maternal mortality and serious morbidity are fortunately very rare, and for this reason estimates of their frequency are imprecise. A large meta-analysis showed maternal mortality of 2.8 per 10 000 for women undergoing trials of labor, and 2.4 per 10 000 for women having an elective cesarean. Uterine dehiscence (asymptomatic separations of the uterine scar) or ruptures occur in less than 2% of trials of labor, the same proportion as is seen among women who have routine repeat cesareans. Most of these are asymptomatic and of no clinical importance.

Obstetricians’ fear of uterine rupture has had a major influence on clinical practice. This fear may be justified in developing countries in which pelvic contraction and cephalopelvic disproportion are common, and access to clinical facilities often difficult. In these circumstances, when obstructed labor occurs after a previous cesarean section, dehiscence of the wound may extend into a rupture of other parts of the uterus and become a threat to the life of both mother and baby.

These are not, however, the conditions in ‘developed’ countries in which the cesarean section rates are highest. In these countries, dehiscences that are encountered are usually slight, often representing so-called ‘windows’ in the uterus, and do not result in any health problems. Indeed, the prospective observational studies found evidence of dehiscence in 0.5-2.0% of women undergoing planned cesarean section before labor had even started. The corresponding figure for women undergoing a trial of vaginal birth (successful or unsuccessful) was little different (0.5-3.3%), although, because of lack of randomization, the two figures are not directly comparable. The important point is that serious wound dehiscence is a rare complication during labor after previous cesarean section.

Perinatal mortality and morbidity rates were similar with planned vaginal birth after cesarean and elective repeat cesarean section in the studies that report these data. Such comparisons, however, are of little value, because the groups compared are not equivalent. In the absence of randomized trials, both patient choice and physician choice are involved. The decision to perform a repeat cesarean section or to permit a planned vaginal birth after cesarean may be made on the basis of whether or not the fetus is alive, dead, anomalous, or immature. In one large meta-analysis, the perinatal mortality was 18 per 1000 births in the planned vaginal birth after cesarean and 10 per 1000 in the elective cesarean groups. However, when antenatal deaths (which could not be affected by the mode of birth) and deaths of immature babies weighing less than 750 g (when elective cesarean would be unlikely) were
excluded, the perinatal mortality rates were similar, at 3 per 1 000 for planned vaginal birth after cesarean and 4 per 1 000 with elective cesarean.

3 Risks of cesarean section

3.1 Risks to the mother

Large series of cesarean sections have been reported with no associated maternal mortality. One should not be lulled into a false sense of security by this; no operation is without risk. The risk of a mother dying with cesarean section is small, but is still considerably higher than with vaginal birth.

The rate of maternal death associated with cesarean section (approximately 4 per 10 000 births) is four times that associated with all types of vaginal birth (1 per 10 000 births). The maternal death rate associated with elective repeat cesarean section (around 2 per 10 000 births), although lower than that associated with cesarean sections overall, is still twice the rate associated with all vaginal deliveries, and nearly four times the mortality rate associated with normal vaginal birth (0.5 per 10 000 births).

Most forms of maternal morbidity are higher with cesarean section than with vaginal birth. In addition to the risks of anesthesia attendant on all surgery, there are risks of operative injury, infection, postpartum pain, effects on subsequent fertility, and of psychological morbidity as well. The prolonged hospitalization and increased costs of cesarean section compared to vaginal birth may also be considered as a form of maternal morbidity.

3.2 Risks to the baby

The major hazards of cesarean section for the baby relate to the risks of respiratory distress contingent on either the cesarean birth itself or on preterm birth as a result of miscalculation of dates. Babies born by cesarean section have a higher risk of respiratory distress syndrome than babies born vaginally at the same gestational age.

The availability of more accurate and readily available dating with ultrasound should decrease the risk of unexpected preterm birth. Nevertheless, it is unlikely that errors in dating can ever be completely eliminated.

4 Factors to consider in the decision about a planned vaginal birth after cesarean

A mathematical, utilitarian approach, comparing the balance of risks and benefits of planned vaginal birth after cesarean with those of planned cesarean section, will not always be the best way to choose a course of action. Such an approach can, however, provide important data that may be helpful in arriving at the best decision.

The technique of decision analysis has been used to determine the optimal birth policy after previous cesarean section. The probabilities and utilities of a number of possible outcomes, including the need for hysterectomy, uterine rupture, iatrogenic preterm birth, need for future repeat cesarean sections, prolonged hospitalization and recovery, additional cost, failed trial of labor, discomfort of labor, and inconvenience of awaiting labor, were put into a mathematical model comparing different policies. Over a wide range of probabilities and utilities, which included all reasonable values, planned vaginal birth after cesarean proved to be the safer choice.

The choice of the woman concerned plays an important role in the decision, and her informed choice should be the major deciding factor. When given the option, from 30 to 50% of women choose to undergo a repeat cesarean delivery.

Women's preferences and expectations regarding the birth method are based not only on their assessment of medical risks, but are also influenced by personal and attitudinal factors. In a randomized, controlled trial of a prenatal 'vaginal birth after cesarean' (VBAC) education and support program, the most frequent reasons reported for choosing elective repeat cesarean section were the fear of failed trial of labor, concerns about the dangers of vaginal birth, the fear of pain, and the convenience of scheduling.

4.1 More than one previous cesarean section

Data on the results of trials of labor in women who have had more than one previous cesarean section tend to be buried in studies of planned vaginal birth after previous cesarean section as a whole. Now that vaginal birth after one cesarean has received widespread acceptance, reports specifically about series of trials of labor in women who have had two or more cesareans are appearing in the literature. The available data show that among these women the overall vaginal birth rate is little different from that seen in women who have had only one previous cesarean section. Successful trials of labor have been carried out on women who have had three or more previous cesarean sections.

The rate of uterine dehiscence in who have had more than one previous cesarean section is slightly higher than the dehiscence rate in women one cesarean, but dehiscences in the reported series tend to be asymptomatic and without serious sequelae. No data have been reported on other maternal or infant morbidity specifically associated with multiple previous cesarean sections.
While the number of cases reported is still small, the available evidence does not suggest that a woman who has had more than one previous cesarean section should be treated any differently from the woman who has had only one cesarean section.

4.2 Reason for the primary cesarean section

The greatest likelihood of vaginal birth following previous section is seen when the first cesarean section was done because of breech presentation; vaginal birth rates are lowest when the initial indication was failure to progress in labor, dystocia, or cephalopelvic disproportion. Even when the indication for the first cesarean section was disproportion, dystocia, or failure to progress, successful vaginal birth was achieved in more than 50% of the women in most published series, and the rate was over 75% in the largest series reported. It is clear that a history of cesarean section for dystocia is not a contra-indication to a planned vaginal birth after cesarean. It has only a small effect on the chances of vaginal birth when a trial of labor after previous cesarean is permitted.

4.3 Previous vaginal birth

Mothers who have had a previous vaginal birth in addition to their previous cesarean sections are more likely to give birth vaginally than mothers with no previous vaginal births. This advantage is increased even further in those mothers whose previous vaginal birth occurred after, rather than before, the original cesarean section.

4.4 Type of previous incision in the uterus

Modern experience with operative approaches other than the lower segment operation for cesarean section is limited. There is, however, a growing trend towards the use of vertical incisions in preterm cesarean sections. This, and the inverted T incision sometimes necessary to allow delivery through a poorly formed lower segment, show that consideration of the type of uterine scar is still relevant.

The majority of dehiscences after lower segment transverse incisions are ‘silent’, ‘incomplete’, or incidentally discovered at the time of repeat cesarean section. The potential dangers of uterine rupture are related to the rapid ‘explosive’ rupture, which is most likely, to be seen in women who have a classical midline scar. Rupture of the scar after a classical cesarean section is not only more serious than rupture of a lower segment scar, it is also more likely to occur. Rupture may occur suddenly during the course of pregnancy, prior to labor, and before a repeat cesarean section can be scheduled. A review of the literature at a time when classical cesarean section was still common, showed a 2.2% rate of uterine rupture with previous classical cesarean sections and a rate of 0.5% with previous lower segment cesarean sections. That is, the scar of the classical operation was more than four times more likely to rupture in a subsequent pregnancy than that of the lower segment incision.

Unfortunately, even in the older literature, there are very few data on the risk of uterine rupture of a vertical scar in the lower segment. One 1966 study reported an incidence of rupture of 2.2% in classical incision scars, 1.3% in vertical incision lower segment scars, and 0.7% in transverse incision lower segment scars. The distinction between the risk of rupture of vertical and transverse lower segment scars may be related to extension of the vertical incision from the lower segment into the upper segment of the uterus.

The uncertain denominators in the reported series make it difficult to quantify the risk of rupture with a previous classical or vertical incision lower segment scar. It is clear, however, that the risk that rupture may occur, that it may occur prior to the onset of labor, and that it may have serious sequelae, are considerably greater with such scars than with transverse incision lower segment scars. It would seem reasonable that women who have had a hysterotomy, a vertical uterine incision, or an inverted T incision, be treated in subsequent pregnancies in the same manner as women who have had a classical cesarean section, and that trial of labor, if permitted at all, should be carried out with great caution, and with acute awareness of the increased risks that are likely to exist.

4.5 Gestational age at previous cesarean section

During the past decade, improved neonatal care has increased the survival rate of preterm babies. This in turn has led to a reduction in the stage of gestation at which obstetricians are prepared to perform cesarean sections for fetal indications. It has resulted in cesarean sections being used to deliver babies at, or even before, 26 weeks. At these early gestations, the lower segment is poorly formed and so-called ‘lower segment’ operations at this period of gestation are, in reality, transverse incisions in the body of the uterus. Whether or not such an incision confers any advantage over a classical incision remains in doubt. Indeed, some obstetricians now recommend performing a classical incision in these circumstances.

5 Care during a planned vaginal birth after cesarean

5.1 Use of oxytocics

The use of oxytocin or prostaglandins for induction or augmentation of labor in women with a previous cesarean section has remained controversial, because of speculation that there might be an increased risk of uterine rupture or dehiscence. This view is not universally held nor is it strongly supported by the available data. A number of series have been reported in which oxytocin or
prostaglandins were used for the usual indications with no suggestion of increased hazard. Review of the reported case series show that an increased risk of uterine rupture with the use of oxytocin or prostaglandins is likely to be extremely small. When dehiscences occur in women they are more likely to occur in women who have received more than one oxytocic agent, rather than a single agent used in an appropriate manner.

Such comparisons, of course, are rendered invalid by the fact that the cohorts of women who received, or did not receive oxytocics, may have differed in many other respects in addition to the use of oxytocic agents. Nevertheless, the high vaginal birth rates and low dehiscence rates noted in these women suggest that oxytocics can be used for induction or augmentation of labor in women who have had a previous cesarean section, with the same precautions that should always attend the use of oxytocic agents.

5.2 Regional analgesia and anesthesia

The use of regional (caudal or epidural) analgesia in labor for the woman with a previous cesarean section has been questioned because of fears that it might mask pain or tenderness, which are considered to be early signs of rupture of the scar. The extent of the risk of masking a catastrophic uterine rupture is difficult to quantify. It must be minuscule, as only one case report of this having occurred was located. In a number of reported series, regional block is used whenever requested by the woman for pain relief, and no difficulties were encountered with this policy.

There does not appear to be any increased hazard from uterine rupture associated with the use of regional anesthesia for women who have had a previous cesarean section. It is sensible, safe, and justified, to use analgesia for the woman with a lower segment scar in the same manner as for the woman whose uterus is intact.

5.3 Manual exploration of the uterus

In many reported series of vaginal births after previous cesarean section, mention is made of the fact that the uterus was explored postpartum in all cases, in a search for uterine rupture or dehiscence without symptoms. The wisdom of this approach should be seriously challenged.

Manual exploration of a scarred uterus immediately after a vaginal birth is often inconclusive. It is difficult to be sure whether or not the thin, soft, lower segment is intact. In any case, in the absence of bleeding or systemic signs, a rupture without symptoms discovered postpartum does not require any treatment, so the question of diagnosis would be academic. In the absence of epidural or general anesthesia, it is also very painful to the woman.

No studies have shown any benefit from routine manual exploration of the uterus in women who have had a previous cesarean section. There is always a risk of introducing infection by the manual exploration, or of converting a dehiscence into a larger rupture. A reasonable compromise consists of increased vigilance in the hour after delivery of the placenta, reserving internal palpation of the lower segment for women with signs of abnormal bleeding.

6 Rupture of the scarred uterus in pregnancy and labor

In many reported series, true uterine rupture has not been distinguished from uterine scar dehiscence. Bloodless uterine scar dehiscence does not have negative consequences for mother or baby, whereas complete rupture of the uterus can be a life-threatening emergency. Fortunately the true rupture is rare in modern obstetrics, despite the increase in cesarean section rates, and serious sequelae are even more rare. Although often considered to be the most common cause of uterine rupture, previous cesarean section is a factor in less than half the reported cases.

Excluding symptomless wound breakdown, the rate of reported uterine rupture has ranged from 0.09 to 0.8% for women with a singleton vertex presentation who underwent a planned vaginal birth after a previous transverse lower segment cesarean section. To put these rates into perspective, the probability of requiring an emergency cesarean section for acute other conditions (fetal distress, cord prolapse, or antepartum hemorrhage) in any woman giving birth, is approximately 2.7%, or up to 30 times as high as the risk of uterine rupture with a planned vaginal birth after cesarean. The extremely low level of the risk does not minimize the importance of this complication to the individual women who suffer it, but comparisons may help to put it in a more reasonable perspective.

Treatment of rupture of a lower segment scar does not require extraordinary facilities. Hospitals whose capabilities are so limited that they cannot deal promptly with problems associated with a planned vaginal birth after cesarean are also incapable of dealing appropriately with other obstetrical emergencies. Any obstetrical department that is prepared to look after women with much more frequently encountered conditions, such as placenta praevia, abruptio placentae, prolapsed cord, and acute fetal distress, should be able to manage a planned vaginal birth safely after a previous lower segment cesarean section.

7 Gap between evidence and practice
Obstetric practice has been slow to adopt the scientific evidence confirming the safety of vaginal birth after previous cesarean section. The degree of opposition to vaginal birth after cesarean section, in North America in particular, is difficult to explain, considering the strength of the evidence that vaginal birth after previous cesarean is, under proper circumstances, both safe and effective. Two national consensus statements and two national professional bodies, in Canada and the United States have recommended policies of trial of labor after previous cesarean section. A randomized trial of different strategies to encourage implementation of these policies showed that local opinion leaders were more effective than either national promulgation of guidelines or audit and feedback to obstetricians.

Many women choose to attempt a vaginal birth after a cesarean section. Their earlier cesarean experience may have been emotionally or physically difficult. They may be unhappy because they were separated from their partners or from their babies. They may wonder if it was all necessary. They may be aware of the accumulated evidence on the relative safety and advantages of planned vaginal birth after cesarean and simply be looking for a better experience this time. Other women, of course, may prefer an elective repeat cesarean section.

In recent years, a number of consumer 'shared predicament' groups have appeared, with the expressed purposes of demythologizing cesarean section, of combating misinformation, and of disseminating both accurate information and their own point of view. Hospital and community-based prenatal VBAC education and support programs have been developed in many communities, but there is little evidence as to whether these programs increase rates of vaginal birth after cesarean section or improve women's perception of the quality of the birth experience. This has been assessed in one Canadian multi-centered randomized trial involving over 1300 women, which compared the results for women who were given an individualized educational program with those for a control group who were only provided with a pamphlet documenting the benefits of a planned vaginal birth. Rates of vaginal birth were similar in the two groups (53 and 49%, respectively), as were the women's perception of control over the birth experience. It is difficult to know to what extent these results can be generalized to the broader population. Women with a high motivation for vaginal birth were much more likely to be successful, irrespective of the type of educational program that they received.

8 Conclusions

A Planned vaginal birth after a previous cesarean section should be recommended for women whose first cesarean section was by lower segment transverse incision, and who have no other indication for cesarean section in the present pregnancy. The likelihood of vaginal birth is not significantly altered by the indication for the first cesarean including 'cephalopelvic disproportion' and 'failure to progress', nor by a history of more than one previous cesarean section.

A history of classical, low vertical, or unknown uterine incisions, or hysterotomy, carries with it an increased risk of rupture, and in most cases is a contra-indication to trial of labor.

The care of a woman in labor after a previous lower segment cesarean section should be little different from that of any woman in labor. Oxytocin induction or stimulation, and epidural analgesia, may be used for the usual indications. Careful monitoring of the condition of the mother and fetus is required, as for all pregnancies. The hospital facilities required do not differ from those that should be available for all women giving birth, irrespective of their previous history.

Sources:
Effective care in pregnancy and childbirth
Enkin, M., Labour and delivery following previous caesarean section.

Other sources
Putting Uterine Rupture into Perspective  
By Janelle Komorowski

In recent years, it has become harder to find physicians and hospitals willing to allow women to attempt a vaginal birth after cesarean (VBAC), also called a trial of labor after cesarean (TOLAC). The biggest risk attempting a VBAC is that the uterine scar may separate during labor. This is called a uterine rupture.

Although uterine rupture is not common, it can be very serious for both the mother and baby. Most hospitals in the United States now require that anesthesia, an operating room, and a surgeon be immediately available when a woman is attempting a VBAC.

Although this sounds like a good policy, it has caused some hospitals to stop allowing VBACs because they do not have adequate staff. The National Institutes of Health (NIH) VBAC Consensus Statement raises an important question: how often does uterine rupture happen, compared with other childbirth emergencies?

Every labor carries a small risk of an unexpected emergency happening, so should a surgeon, anesthesia, and operating room have to be immediately available for all labors? Or should planned VBACs be treated like other labors, where the physician is nearby, but does not have to remain inside the hospital during the entire labor?

Since hospitals don’t require a surgeon and anesthesiologist to be present during every labor, the NIH is asking whether the risk of VBAC has been emphasized more than other childbirth emergencies. These emergencies include placental abruption, where the placenta separates from the uterus before the baby is born; cord prolapse, where the umbilical cord is coming out in front of the baby’s head; and shoulder dystocia, where the baby is stuck because its shoulders are too wide to fit through the pelvis.

To understand how often such emergencies happen during labor or birth, let’s look at the following table:

<table>
<thead>
<tr>
<th>Table 1.</th>
<th>Uterine Rupture</th>
<th>Placental Abruption</th>
<th>Umbilical Cord Prolapse</th>
<th>Shoulder Dystocia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7-8 out of every</td>
<td>11-13 out of every</td>
<td>14-62 out of every</td>
<td>6-14 out of every</td>
</tr>
<tr>
<td>1000 VBAC attempts</td>
<td>1000 labors</td>
<td>1000 labors</td>
<td>1000 labors</td>
<td></td>
</tr>
</tbody>
</table>

The next table shows the risk of a baby dying as a result of one of these emergencies:

<table>
<thead>
<tr>
<th>Table 2.</th>
<th>Uterine Rupture</th>
<th>Placental Abruption</th>
<th>Umbilical Cord Prolapse</th>
<th>Shoulder Dystocia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6 out of every 100 uterine ruptures will result in a baby’s death</td>
<td>1.25 out of every 750 placental abruptions will result in a baby’s death</td>
<td>91 out of every 1000 babies with cord prolapsed will die</td>
<td>1 out of every 1000 babies with shoulder dystocia will die</td>
</tr>
</tbody>
</table>

The truth is, in a low-risk woman, the risk of the uterus rupturing is about the same as the risk of any serious birth emergency happening. To be considered low risk, you should have:

- One horizontal scar on your uterus (the scar on your skin may be vertical or horizontal)
- A labor that starts on its own
- No use of pitocin during labor, or prostaglandin to soften the cervix
- At least 18 months since the cesarean birth

What are the risks of a planned repeat c-section compared to a planned VBAC? We don’t have a lot of evidence to help us decide, but the risks seem to be different for the mother than the baby. About 13 out of every 100,000 women who have a cesarean birth will die from surgery complications. Only 4 out of every 100,000 women who attempt a VBAC will die as a result.
A repeat cesarean birth may be safer for baby. NIH figures show that 50 babies out of every 100,000 born by c-section will die. 130 out of every 100,000 babies born to mothers having a trial of labor will die. However, these numbers come from studies that included all women who had a trial of labor, even if they were high risk, had prostaglandins to soften the cervix, or pitocin during labor. In other words, these numbers do not distinguish lower-risk from higher-risk VBAC attempts.

We know that softening the cervix with prostaglandins or using pitocin during labor increases the risk of uterine rupture. If a woman does not receive prostaglandins or pitocin, the risk of her baby dying during a trial of labor is probably lower.

Worth noting is that most babies who are born after a uterine rupture do not have serious long-term problems if the baby is delivered immediately after the rupture.

The NIH is encouraging doctors and hospitals to find ways to make VBAC more available for women. One of the ways this can be done is to recognize that the absolute risks of VBAC are about the same as the risk of any other serious complication during labor and birth. Understanding these risks can help you plan a safe VBAC for your next birth.

References


What About Uterine Scar Ruptures?
revised Sep. 01, 2004 by Nicette Jukelevics, MA, ICCE

What is a uterine scar rupture?

A complete uterine scar rupture is a potentially life threatening condition for both the mother and/or the baby that requires immediate surgical intervention. Fortunately, uterine ruptures from a prior cesarean with a low-transverse scar is a rare event and occurs in less than 1% of women laboring for a VBAC. It is a tear through the thickness of the uterine wall at the site of a prior cesarean incision. The majority of cesarean uterine incisions are low-transverse. The scar from this type of incision is the least likely to rupture in a subsequent pregnancy, labor, and birth.

Uterine ruptures have also been known to occur in some women who have never had a cesarean. This type of rupture can be caused by weak uterine muscles after several pregnancies, excessive use of labor inducing agents, prior surgical procedure on the uterus, or mid-pelvic use of forceps.

Some women have a low vertical incision on the uterus, made when there is a placenta previa (low-lying placenta), a large baby, a baby in a transverse position (lying horizontally in the pelvis) or a premature breech delivery.

When planning a VBAC it is important to determine if the previous low vertical scar has not stretched to the body of the uterus in the current pregnancy. The risk of rupture for a low vertical scar has been reported to be the same as for a low horizontal scar and as high as 1-7%.

Sometimes a woman may have a "T" or "J" shaped scar on the uterus or one that resembles an inverted "T". These scars are very rare. It is estimated that between 4 and 9% of "T" shaped uterine scars are at risk for rupture.

Rarely, a woman may have a classical (vertical) scar in the upper part (the body) of the uterus. This type of incision is used for babies who are in a breech or transverse position, for women who may have a uterine malformation, for premature babies or in extreme circumstances when time is of essence.

The risk of rupture for this type of scar has been reported to be between 4% and 9%. A classical scar on the thinner and more vulnerable part of the uterus tends to rupture with more intensity and result in more serious complications for mothers and babies. Mothers who have had several children and have a classical uterine scar are at higher risk for uterine rupture.

The American College of Obstetricians and Gynecologists (ACOG), the Society of Obstetricians and Gynecologists of Canada (SOGC) and the Royal College of Obstetricians and Gynaecologists (RCOG) of Britain recommend that women with a classical scar have a repeat cesarean birth.

What are the symptoms of a uterine rupture?

A uterine rupture cannot be accurately predicted or diagnosed before it actually occurs. It can occur suddenly during labor or delivery. A few studies have suggested that measuring the thickness of the scar by ultrasound or following closely the pattern of contractions in labor may be useful in anticipating and therefore preventing a scar rupture. However, there is not enough information to prove that these methods should be widely adopted.

Several symptoms have been identified, but do not necessarily occur with every uterine rupture. Signs of uterine rupture that may or may not be present.

- Vaginal bleeding
- Sharp pain between contractions
- Contractions that slow down or become less intense
- Abdominal pain or tenderness
- Recession of the fetal head (baby's head moving back up into the birth canal)
- Bulging under the pubic bone (baby's head has protruded outside of the uterine scar)
- Sharp onset of pain at the site of the previous scar
- Uterine atony (soft muscles)

To date, studies have shown that a uterine rupture can be detected by electronic fetal monitoring (EFM) because the women in these studies laboring for a VBAC were monitored electronically. Although some caregivers closely monitor VBAC labors with a fetoscope or a hand-held ultrasound-measuring device (the Doppler), no VBAC studies have yet been published on this method. Guidelines from the ACOG, SOGC, and RCOG recommend that women laboring for a VBAC be offered electronic fetal monitoring.
Abnormal fetal heart tones, variable decelerations, or bradycardia (slow heart rate) have been associated with a uterine rupture. It is important to note that with a uterine rupture, labor sometimes continues, there is no loss of uterine tone or amplitude of contractions.

How often does a cesarean scar rupture occur?

For women who had a prior cesarean birth the rupture can occur at the site of the previous uterine scar. Dozens of studies report that for women who have had one prior cesarean birth with a low-horizontal incision, the risk of uterine rupture is 0.5% to 1.0%. A woman who has had more than one cesarean with a low horizontal incision may have a slightly higher risk of rupture. One study that looked at the risks of uterine rupture for planned VBACs over a ten-year period at a teaching hospital that was often able to perform an emergency cesarean very quickly found the following results:

<table>
<thead>
<tr>
<th>Number of Previous Cesareans</th>
<th>Successful VBACs</th>
<th>Rupture Rate</th>
<th>Perinatal Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,880 Planned VBACs with one prior scar</td>
<td>83%</td>
<td>0.6%</td>
<td>0.018%</td>
</tr>
<tr>
<td>1,586 Planned VBACs with two prior scars</td>
<td>76%</td>
<td>1.8%</td>
<td>0.063%</td>
</tr>
<tr>
<td>241 Planned VBACs with three prior scars</td>
<td>79%</td>
<td>1.2%</td>
<td>0</td>
</tr>
</tbody>
</table>

*This study included women with breech babies and twins and use of oxytocin.

How does the risk of a rupture compare with any other complications of labor whether the mother had a prior cesarean birth or not?

For women whose labors begin spontaneously, uterine rupture is reported to be less than 1% and the risks similar to or less than the risk of any other unpredictable complication of labor and delivery.

Medical experts state that the risk of a uterine rupture with one prior low-horizontal incision is not higher than any other unforeseen complication that can occur in labor such as fetal distress, maternal hemorrhage from a premature separation of the placenta or a prolapsed umbilical cord.

Respected studies have concluded that the probability of any woman needing to have an emergency cesarean those other complications is approximately 2.7% or up to 30 times as high as the risk of uterine rupture.

For the year 2000, for approximately 4 million live births, the US National Center for Health Statistics reported the following complications that occurred during labor and birth: The table below compares the risks of a uterine rupture (with one low-transverse scar) with the risks of other unpredictable complications of labor and birth.

<table>
<thead>
<tr>
<th>Reported Complications of Labor and Delivery in US for year 2000</th>
<th>Rate per 1000 live births</th>
</tr>
</thead>
<tbody>
<tr>
<td>Umbilical Cord Prolapse</td>
<td>1.9</td>
</tr>
<tr>
<td>Fetal Distress</td>
<td>39.2</td>
</tr>
<tr>
<td>Abruptio Placenta</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Source: CDC: NCHS: Births: Final Data for 2000
www.cdc.gov/nchs/data/nvsr/nvsr50/nvsr50_05.pdf

| Uterine rupture rate per 100 women laboring for a VBAC, based on worldwide systematic reviews (0.09 to 0.8 %) | 0.9-8.0 |


Data from the Vermont/New Hampshire VBAC Project shows a risk for uterine rupture to be 5 per 1,000 for women who labor for a VBAC compared to 2 per 1,000 for women who have a planned cesarean birth. The RCOG in Britain states that uterine rupture is a very rare complication, but is increased in women who labor for a VBAC (35 per 10,000) compared to women who have a planned repeat cesarean (12 per 10,000).

What happens if the scar ruptures?

Although uterine scar ruptures for women laboring for a VBAC are rare, the medical response is a rapid cesarean. The
longer it takes to diagnose and respond to a uterine rupture the more likely it is that the baby and/or the placenta can be pushed through the uterine wall and into the mother's abdominal cavity putting women at increased risk for hemorrhage and babies at increased risk for neurological complications and very rarely, death.

The authors of A Guide to Pregnancy and Childbirth, an internationally respected evidence-based text, state that any birthing facility equipped to respond to a medical emergency can care for women laboring for a VBAC.

Whereas ACOG guidelines for an emergency cesarean previously allowed for a maximum response time of 30 minutes for an obstetric emergency, controversial VBAC guidelines revised by ACOG (1999 and 2004) have recommended that birth facilities who care for women laboring for a VBAC should have a physician capable of performing an emergency cesarean, anesthesia services, and staff "immediately available." The SOGC recommends "urgent attention and expedited laparotomy [surgical incision into the abdominal cavity]" when a uterine rupture is suspected. The RCOG recommendations are "immediate access to a cesarean section and on-site blood transfusion services."

Birthing facilities vary in their guidelines and protocols for VBAC and response time to a uterine rupture and other unforeseen complications of labor. Many US facilities have recently determined that they don't have the capability to respond "immediately" in case of uterine scar rupture and are currently denying women the option to labor for a VBAC. Caregivers who support VBACs say that the focus should be on improving access to quality of care for women who want a VBAC, not on discouraging them because of negative outcomes publicized in high profile medical malpractice law suits.

Dr. Bruce L. Flamm, an eminent researcher on VBACs cautioned that if US physicians were to discourage women from planning VBACs and to adopt a policy of elective repeat cesarean, "it would mean performing an additional 100,000 cesareans every year. It is unlikely this huge number of operations could be performed without many serious complications and perhaps even some maternal deaths."

In the event of a uterine rupture, what are the outcomes for mothers and babies?

The majority of studies report that in the rare event of a uterine rupture, if the labor was carefully monitored, the birth attendant was trained to attend VBAC births, and if the medical response was rapid, mothers and babies usually do well. One study in a large California hospital which had 24 hour emergency coverage reported that outcomes for babies were better when the response time was 18 minutes or less.

With access to a rapid cesarean, fetal death from a uterine rupture is an extremely rare event. Three large studies that determined the number of babies who died as a direct result from a uterine rupture when women labored for a VBAC found the following:

<table>
<thead>
<tr>
<th>Number of women who labored for a VBAC</th>
<th>Number of babies who died from uterine rupture</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>17,613</td>
<td>5</td>
<td>Rageth, et al 2000</td>
</tr>
<tr>
<td>10,000</td>
<td>3</td>
<td>Rosen, et al 1991</td>
</tr>
<tr>
<td>5,022</td>
<td>0</td>
<td>Flamm, et al 1994</td>
</tr>
</tbody>
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The Vermont/New Hampshire VBAC Project findings show the overall risk of infant death from a VBAC attempt is 6 per 10,000 compared to 3 per 10,000 planned cesarean births.

Women who receive good prenatal care, whose care providers are trained and experienced with VBAC, and who labor in a facility that is equipped to provide immediate medical care usually have good outcomes.

Women who are thinking about laboring for a VBAC at home may want to consider and make plans for the possibility of a uterine rupture. Home VBACs are not recommended by the US, Canadian, or UK professional guidelines.

Women thinking about laboring for a VBAC in a free-standing birth center may also want want to consider making plans to access emergency services in the event of a uterine rupture.

Can the risk for a uterine rupture be reduced?

Although it is not possible to predict which women are likely to experience a uterine rupture while laboring for a VBAC,
recent studies have suggested that the risk for uterine rupture is higher when:

- Labor is induced with oxytocin, prostaglandin preparations, or misoprostol (Cytotec).
- The prior cesarean incision was closed with a single-layer of sutures (single-layer closure- often done in recent years to shorten the time in the operating room) as opposed to two layers of sutures (double-layer closure).
- Women become pregnant and labor for a VBAC within less than 24 months after a prior cesarean.
- Women are older than 30 years of age.
- Maternal fever was a consequence of a prior cesarean birth.
- A classical uterine incision was used in a prior cesarean birth.
- A woman has had two or more prior cesarean births.

According to ACOG, prostaglandins for induction of labor in most women with a previous cesarean should be discouraged. Similarly, the SOGC states that misoprostol "is associated with a high risk of uterine rupture and should not be used" when women labor for a VBAC.

Informed Choice-Informed Refusal

Current US health law and medical-ethical guidelines give childbearing women who once gave birth by cesarean the option of laboring for a VBAC or scheduling an elective repeat cesarean. ACOG states that "it has become clear that patients are entitled to participate with their physicians in a process of shared decision making with regard to medical procedures, tests, or treatments"; Once the patient has been informed of the material risks, and benefits involved; that patient has the right to exercise full autonomy in deciding whether to undergo the treatment, test, or procedure or whether to make a choice among a variety of treatments, tests, or procedures. In the exercise of that autonomy, the informed patient also has the right to refuse to undergo any of these treatments, tests, or procedures. This election by the patient to forgo a treatment, test, or procedure that has been offered or recommended by the physician constitutes informed refusal."

Women are encouraged to ask questions, gather information, and discuss their concerns with their care providers to enable them to make an informed choice for a VBAC or a repeat cesarean birth.

References: