

## **CHAPTER 19**

# **VAGINAL BIRTH AFTER CESAREAN SECTION**

### **Learning Objectives**

**By the end of this chapter, the participant will:**

1. Identify the prerequisites for vaginal birth after cesarean section.
2. Describe clinical signs of rupture of uterus.
3. Explain the safe and appropriate conduct of labour when a woman chooses vaginal birth after cesarean section.

### **Introduction**

Vaginal birth after cesarean section (VBAC) has been strongly advocated, resulting in a significant increase in attempted and successful vaginal births and a decreasing overall cesarean section rate. However, recently, some cautions have been raised surrounding complications such as uterine rupture or uterine dehiscence that may occur with VBAC and, as such, VBAC rates have declined.

The majority of women who have experienced a low segment transverse cesarean section are candidates for a trial of labour (TOL). Selecting a women for TOL, as well as the management of her labour, remains an important aspect of care.

While there are risks and benefits for the mother in both planned elective repeat cesarean section and in planned VBAC, current sources of information are limited to non-randomized cohort studies, most of which are retrospective in nature. This is the best evidence available at this time.

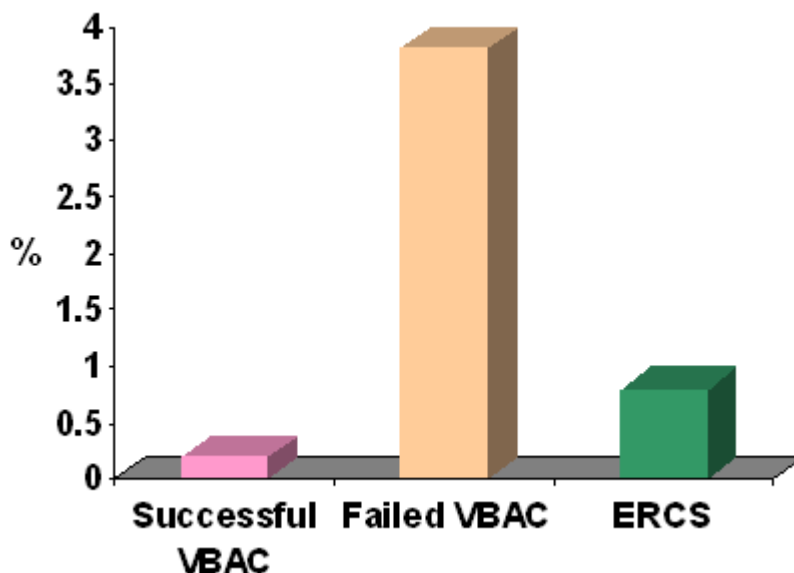
Uterine rupture is the complete separation of the myometrium usually with extrusion of the fetal parts into the maternal peritoneal cavity.

Uterine dehiscence occurs when the fetal membranes are not ruptured and the fetus is not outside of the uterus. Usually the peritoneum over the defector opening is intact. Morbidity and mortality are NOT increased as they are with uterine rupture.

### **Morbidity and Mortality**

VBAC may result in maternal morbidity or mortality from complications including uterine rupture, hemorrhage, thromboembolism, and infection. Studies demonstrate that uterine rupture can occur before, during, and even after labour. Uterine rupture may result in maternal and/or fetal mortality.

Maternal morbidity is lowest in women with a previous successful VBAC and highest in those with a previous failed VBAC. As demonstrated in Figure 1, complication rates associated with elective repeat cesarean section (ERCS) fall between those of these two VBAC groups.



**Figure 1 – Major maternal complications: vaginal birth after cesarean section** versus elective cesarean section  
 VBAC: vaginal birth after cesarean section  
 ERCS: elective repeat cesarean section  
 Source: McMahon MJ et al., 1996.

**Maternal Mortality by Mode of delivery**

In a retrospective cohort study using Canadian Institute for Health Information data, researchers analyzed 352,215 births of Canadian women with previous cesarean-section delivery between 1988 and 2000 (total deliveries during the period were 3,576,980) (Wen et al., 2004). They looked at rates of uterine rupture and rates of maternal death. They concluded that while the rates of uterine rupture were higher in women with a TOL, the rates of maternal deaths were higher in women with cesarean-section delivery.

**Table 1 - In-hospital maternal death rates (95% CI) in Canada, 1988 to 2000**

Groups	Deliveries	Deaths	Death rate/100,000	Risk ratio (95% CI)
<b>All deliveries</b> (n=3,576,980)				
Women with a C/S	685,856	119	17.3	9.11 (6.62–12.53)
Vaginal delivery	2,891,124	55	1.9	1.0 (Reference)
<b>Previous C/S</b> (n=352,215)				
Elective repeat C/S TOL	209,007	23	11.0	5.25 (1.58–17.49)
	143,208	3	2.1	1.0 (Reference)
<b>Eligible* previous C/S</b> (n=308,755)				
Eligible* elective repeat C/S	179,795	10	5.6	3.59 (0.79–16.37)
Eligible* with TOL	128,960	2	1.6	1.0 (Reference)
C/S: cesarean section TOL: trial of labour				
*Excluding multifetal pregnancy, preeclampsia, breech/transverse/oblique presentation, preterm labour, placenta previa, placental abruption, herpes simplex, age younger than 14 years old.				

**Success Rate**

The overall success rate for those undergoing labour following cesarean section is reported to range from 50% to 85%.

The following factors have been identified as predictive of outcome and are useful to consider in the selection of appropriate candidates for a TOL.

**Factors that increase the likelihood of successful VBAC**

- Previous successful VBAC
- Previous vaginal delivery
- Favorable cervix
- Spontaneous labour
- Non-recurrent indication for previous cesarean section (e.g. breech presentation)
- Maternal age <40 years

**Factors that decrease the likelihood of successful VBAC:**

- Previous cesarean section for dystocia, especially for failure of descent in second stage
- Need for induction of labour requiring cervical ripening
- Need for augmentation of labour
- Gestational age >40 weeks
- Birth weight >4,000 grams

**Selection of Candidates for VBAC**

The selection of candidates for labour depends on the clinical situation and is re-evaluated on an ongoing basis throughout the pregnancy. Before proceeding with VBAC, consider and document the following prerequisites:

- Vertex presentation
- Documented previous low transverse uterine scar
- Previous operative report (may include opinion of previous obstetrician)
- No contraindications to vaginal birth

**Consider the following factors that may increase the risk of uterine rupture:**

- Single-layer versus double-layer closure
- Macrosomic fetus
- Short interval from previous cesarean section (<18 to 24 months)
- Two or more previous cesarean sections

**Contraindications to VBAC**

- Any contraindications to labour
- Previous classical cesarean section
- Inverted T uterine incision
- Previous uterine rupture
- Previous major uterine reconstruction, e.g. full thickness repair for myomectomy, repair of mullerian anomaly, cornual resection
- Inability of health care facility to perform emergency cesarean section

**Counselling**

- Discuss the risks of cesarean section, including effects on future pregnancies
- Encourage the woman to participate in decision making and respect her autonomy
- Document the full informed choice process including any counseling offered
- If considering induction of labour, carefully review the risks associated with each of the options
- Consider offering other printed sources of information

**Neonatal Mortality and Morbidity**

Neonatal mortality and morbidity are primarily related to uterine rupture. The results of a number of studies are presented here, as some of the data are conflicting. Use of this information in discussions with women considering VBAC or repeat cesarean should assist them in making choices appropriate to their individual circumstances. VBAC should be discussed with women during prenatal care, early on in the pregnancy, and repeated closer to the expected date of delivery.

According to one meta-analysis, the perinatal mortality rate for the combined population of 47,682 women in developed countries with previous cesarean section delivery is 5.8 per 1,000 with TOL compared with 3.4 per 1,000 with elective repeated cesarean section. The odds ratio (OR) is 1.71 (confidence interval [CI] 1.28–2.28). The absolute difference between these figures is 2.4 per 1,000. Therefore, 417 elective cesarean sections would be necessary to prevent one death.

A recently published study of over 5 million live births and over 11,000 infant deaths, analyzes the neonatal mortality rates in all women with no indicated risk in the United States during the 4- year period from 1998 to 2001. The study reports a higher mortality rate (1.77 per 1,000 live births) in infants delivered by primary cesarean section than those who were born vaginally (0.62) (MacDorman et al., 2006).

Zweifler et al. (2006) studied 386,232 California residents who had previous cesareans. This study revealed similar mortality rates for newborns weighing  $\geq 1,500$  grams born via repeat cesarean delivery or as a result of attempted VBAC, successful or not. These data are similar both before and after the American College of Obstetricians and Gynecologists guidelines changed in 1999 advocating that VBAC take place only in institutions with the capability for immediate emergency response.

Landon et al. (2004) report on a prospective cohort observational study of 33,699 women at term that had previous cesarean deliveries during 1999 to 2002. Of the 15,801 women who underwent elective repeat cesarean without labour, none delivered infants with hypoxic-ischemic encephalopathy, whereas 12 babies with this condition were born within the group of 17,898 women who attempted a TOL ( $P < 0.001$ ).

**Risks of elective Repeat Cesarean Section Versus Trial of Labour**

In discussing risks, health care providers may find it helpful to provide some of the evidence that is available during discussions with women in the prenatal period. However, the evidence is conflicting and therefore must be used carefully. Landon et al. (2004) showed that the rates of thromboembolic disease are higher in women having elective repeat cesarean delivery versus TOL (0.04% versus 0.1%, OR 0.62,  $P = .32$ ). The incidents of uterine infection was also higher in the TOL group (2.9% versus 1.8%, OR 1.62,  $P < .001$ ). The need for transfusion was higher among the TOL group (1.7% versus 1.0%, OR 1.71,  $P < .001$ ).

In contrast, the meta-analysis by Mozurkewich and Hutton showed that women having a TOL had approximately half the likelihood of needing a blood transfusion compared with those with an elective repeat cesarean section. They also found the incidence of hysterectomy to be about half for women having a TOL compared with an elective repeat cesarean section.

## **Risks of Cesarean Delivery Versus Vaginal Delivery**

Women making decisions about delivery mode will also want to consider the increased risks comparing overall cesarean section rates to vaginal births (including primiparous births). These include infection, hemorrhage, thromboembolism, damage to the bladder, and the increased rate of placenta previa in a subsequent pregnancy. For women with a history of multiple cesarean deliveries, a prospective observational study of approximately 18,000 women with prior cesareans by Landon et al. (2006) found that those with multiple cesareans were at no higher risk of uterine rupture than those with one previous cesarean birth. The rates of hysterectomy and transfusion were increased compared with women with one previous cesarean.

In a woman with a history of a uterine incision, determination of the wall thickness of the lower uterine segment may assist in determining the risk of attempting vaginal delivery. More clinical studies are required to evaluate the relationship between uterine thickness and the risk of uterine rupture before recommendations can be made about this practice.

## **Management of Labour for a Women Choosing VBAC**

The management of labour is similar to the management of a normal labour. Antepartum consultation with an obstetrician may be advisable, depending on the clinical situation and local practice.

- Careful observation of:
  - progress
  - fetal well-being
  - maternal well-being
- Epidurals, or other analgesia, may be used
- Electronic fetal monitoring is recommended because it is important marker of uterine rupture
- Routine IV not mandatory
- No need for restriction of activity (electronic fetal monitoring by telemetry can facilitate mobility while allowing continuous monitoring)

## **Induction and Augmentation**

Induction of labour requiring cervical ripening is associated with a lower rate of successful VBAC and an increase in the risk of uterine rupture, mainly in women with no prior vaginal delivery. Induction and augmentation of labour in women undergoing VBAC remain controversial and require caution. Macones and colleagues (Macones et al., 2005) reported on a case control study, retrospectively reviewing data from medical records of 11,299 women with repeat cesarean delivery and 12,535 women who attempted VBAC with one prior cesarean and 1171 women with more than one previous cesarean. The uterine rupture rate for women having a TOL was .98% (134 cases). Women who had induction or augmentation had a threefold increase risk of rupture above those with spontaneous labour. The authors used several methods to analyze the data, showing that the rate of uterine rupture was only increased when oxytocin and prostaglandins were both used. (PGE-2 was the only agent used in this study.) Birth weight  $\geq 4,000$  grams was not found to be associated with uterine rupture. Women with two or more previous cesareans had a higher rate of rupture compared with those with one previous cesarean, whereas those with a previous vaginal delivery had a lower rate than those without.

The prospective study by Landon et al. (2004) reported on 227 women who received prostaglandins (a variety including misoprostol) in labour, none of whom experienced uterine rupture.

- Use of oxytocin is not contraindicated but careful monitoring is recommended.
- Use of prostaglandins alone may be acceptable if used with caution and careful monitoring, although this practice remains controversial.

- Use of prostaglandins followed by oxytocin is contraindicated.
- Mechanical cervical ripening with a Foley catheter is an option.

All of these issues should be carefully considered and discussed with the woman before a management plan is finalized. Informed consent is essential before induction commences.

### **Hospital Requirements**

Every hospital offering obstetrical care and capable of providing an emergency cesarean section should be able to offer care for a woman attempting VBAC. This includes the availability of blood, access to an operating room, and neonatal resuscitation personnel. One study suggests that even in communities without immediate on-site access to cesarean delivery, VBAC may be a reasonable choice for women. Women attempting VBAC must be made aware of the available local resources, and options, including referral and transfer to other facilities for labour and/or delivery. Health care providers must be able to recognize the signs and symptoms of uterine scar rupture.

### **Signs and Symptoms of Scar Rupture**

- Abnormal fetal heart tones
- Vaginal bleeding
- Hematuria
- Ease of fetal palpation
- Cessation of contractions
- Elevation of presenting part
- Scar pain
  - poor sensitivity and specificity
  - pain of rupture is seldom masked by epidural

### **Summary**

The success rate for vaginal delivery is quite high. Attempted VBAC, successful or unsuccessful, carries a lower maternal morbidity and mortality rate than elective cesarean section. Induction may be attempted, but oxytocin augmentation should be used with caution in women who have a prolonged active phase of labour. While the incidence of uterine rupture is low, uterine rupture is a serious complication for both the woman and the infant. Health care providers need to carefully select candidates, provide good counseling, and carefully manage labour. For women who have had a previous cesarean section, it is very important to discuss both the risks of VBAC and those of cesarean section, including the effect that the mode of delivery will have on subsequent pregnancies. This is especially important in areas where women typically have many children.



### **Key Messages**

1. Women should be fully involved in the decision-making process about the mode of delivery. Discussions should take place early in pregnancy and be re-visited closer to the expected date of delivery.
2. When assisting a woman during a VBAC, be vigilant with observations and assessments.
3. Document the fully informed choice process, including any counseling offered.

*Suggestion for Applying the Sexual and Reproductive Rights Approach to this Chapter*

When a woman has had a cesarean section, take the time to talk with her before she leaves the hospital. Women should know why the cesarean section was performed, what type of incision was performed, and what impact the cesarean section will have on subsequent deliveries. Women need to know this information so that they can decide if they should avoid another pregnancy or arrange to get proper care for the next pregnancy. Most importantly, the woman's spouse and relatives should be included in this discussion so that they may be part of the decision-making process.

**Resources:**

- Brownlee J, Yang Q, Walker M, Nimrod C, Wen S, Caughey S, et al. Should you plan a cesarean birth or a trial of labour? A decision aid to help prepare you to discuss the options with your health care team. Ottawa: The Ottawa Hospital; 2005.
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- Martel MJ, MacKinnon CJ, Clinical Practice Obstetrics Committee. Guidelines for vaginal birth after previous caesarean birth [SOGC clinical practice guideline no 155]. *J Soc Obstet Gynaecol Can* 2005;27(2):164-74. Available: <http://sogc.org/guidelines/public/155E-CPG-February2005.pdf>.
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- Obstetrical hemorrhage. In: Cunningham FG, Hauth JC, Leveno KJ, Gilstrap L, Bloom SL, Wenstrom KD, editors. *Williams obstetrics*. 22nd ed. New York: McGraw-Hill Medical Publishing Division; 2005.
- Prior Cesarean delivery. In: Cunningham FG, Hauth JC, Leveno KJ, Gilstrap L, Bloom SL, Wenstrom KD, editors. *Williams obstetrics*. 22nd ed. New York: McGraw-Hill Medical Publishing Division; 2005.