CHAPTER 38

Labor and birth after previous cesarean section

1 Introduction

Policies of routine repeat cesarean section for all women with a scarred uterus were never widely practised in Europe, and now the dogma is being questioned in North America as well. The catchy 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

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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 apropos 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 almost 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 births 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 group 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 1000 for planned vaginal birth after cesarean and 4 per 1000 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 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 section 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 women who have had more than one previous cesarean section is slightly higher than the dehiscence rate in women with only one previous 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.

Whichever of these incisions is used at these early gestational ages, their consequences for subsequent pregnancies are currently unknown. It is quite possible, in theory at least, that they may result in a greater morbidity in future pregnancies than that associated with the lower segment operation at term.

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 shows that any increased risk of uterine rupture with the use of oxytocin or prostaglandins is likely to be extremely small. When dehiscenses occur 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 in the first place. 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 multicentered 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 section (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 incision, or hysterotomy, carries with it an increased risk of uterine 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

Cragin, E.B. (1916). Conservatism in obstetrics. *NY Med. J.*, CIV:1–3.

Fraser, W., Maunsell, E., Hodnett, E., Moutquin, J.M. and the Childbirth Alternatives Post-Cesarean Study Group (1997). Randomized controlled trial of a prenatal vaginal birth after cesarean section education and support program. *Am. J. Obstet. Gynecol.*, **176**, 419–25.

Lomas, J., Enkin, M., Anderson, G., Hannah, W., Vayda, E. and Singer, J. (1991). Opinion leaders vs audit and feedback to implement practice guidelines. Delivery after previous cesarean section. *JAMA*, **265**, 2202–7.

Paterson, C.M. and Saunders, N.J. (1991). Mode of delivery after one caesarean section: audit of current practice in a health region. *BMJ*, **303**, 818–21.

Rosen, M.G. and Dickinson, J.C. (1990). Vaginal birth after cesarean: a meta-analysis of indicators for success. *Obstet. Gynecol.*, **76**, 865–9.

Rosen, M.G., Dickinson, J.C. and Westhoff, C.L. (1991). Vaginal birth after cesarean: a meta-analysis of morbidity and mortality. *Obstet. Gynecol.*, **77**, 465–70.