DELIVERY AFTER PREVIOUS CAESAREAN SECTION

CLINICAL PRACTICE GUIDELINE

Institute of Obstetricians and Gynaecologists, Royal College of Physicians of Ireland

and

Clinical Strategy and Programmes Directorate, Health Service Executive

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1. Key Recommendations

- All women with a previous caesarean section (CS) should have an ultrasound examination before 32 weeks gestation for placental localisation.

- Women with one previous caesarean section should be formally reviewed by a senior obstetrician early in pregnancy to discuss the management of the pregnancy and the mode of delivery. The review should be recorded in the case notes.

- The term uterine "dehiscence" should be reserved for an incomplete uterine rupture, which is asymptomatic and is usually diagnosed at caesarean section.

- Women with a previous vertical scar on the body of the uterus may experience a rupture antepartum and thus, may require observation in hospital during the third trimester.

- Women with a previous vertical incision on the uterine body should be delivered by an elective repeat section.

- Women for a planned repeat CS who present with abdominal pains or signs of labour should be reviewed by a senior obstetrician because it may be necessary to expedite the repeat CS.

- Uterine rupture usually presents intrapartum with fetal heart rate abnormalities. In a woman with a previous CS who is in labour, a decision to perform a fetal blood sample may lead to a delay in delivery with adverse consequences.

- In a woman with a previous CS, oxytocin augmentation of labour should only be administered with clear instructions following a full clinical assessment, including vaginal examination, by a senior obstetrician.

- Uterine rupture may present with a primary postpartum haemorrhage, which is either concealed intrabdominally or revealed vaginally. The diagnosis of uterine rupture should be considered in a woman with a uterine scar if primary postpartum haemorrhage does not respond to oxytocic agents.

- The decision to use vaginal prostaglandins in a woman with a previous uterine scar should only be made by a senior obstetrician.

- If a uterine rupture occurs, it is recommended that the woman is reviewed by a consultant obstetrician within 48 hours of laparotomy to discuss her care and answer any questions raised by her or her family.

2. Purpose and Scope

The purpose of this guideline is to improve the management of women with a history of one previous caesarean section (CS). These guidelines are intended for maternity care health professionals, including those in training, who are working in HSE-funded maternity services. They are designed to guide clinical judgement but not replace it. In individual cases a healthcare professional may, after careful consideration, decide not to follow a guideline if it is deemed to be in the best interests of the woman and her baby.

3. Background and Introduction

It is nearly a century since Craigin's original dictum "once a caesarean, always a caesarean", which was published in the New York Medical Journal (Craigin, 1916). It may not be appreciated that at the time caesarean deliveries were performed with a vertical incision in the uterus and that the lower segment transverse incision was not popularised until the 1920s. The consensus in clinical practice remains once a vertical incision on the uterine body at the time of a prior section, always a repeat caesarean.

In Europe, a trial of labour after caesarean section (TOLAC) has been standard practice, driven in part because of obstetric concerns about the maternal mortality and morbidity associated with CS. It is only since the 1950's that papers reporting on TOLAC emerged from the United States. With advances in clinical practice, CS became safer and rates started to increase. As CS rates increased the National Institute of Health (NIH) held a Consensus Development conference in 1980. Subsequently, a policy encouraging TOLAC was adopted, and the overall vaginal birth after caesarean section (VBAC) rate reached 28% in the United States by 1996 with an associated decrease in the overall CS rate (Scott, 2011).

In 1996, however, a study of 6138 women from Nova Scotia with a previous CS was published reporting that major maternal complications, including uterine rupture (UR), were almost doubled (1.6 v 0.8%) in the TOLAC group compared with the group of women who had an elective repeat CS (McMahon et al 1996). All 10 cases of UR occurred in the TOLAC group. In another population-based study of 20,095 women in Washington State, the authors concluded that for women with one prior CS, the risk of UR was higher among those who labour was induced than among those with repeated CS without labour (Lydon-Rochelle et al, 2001).

A large prospective American study of women with a singleton gestation and prior CS was conducted at 19 academic medical centres (Landon et al, 2004). The authors concluded that a trial of labour after prior caesarean was associated with a greater perinatal risk than elective repeat caesarean, although absolute risks were low. There is now emerging evidence that these publications in the influential New England Journal of Medicine contributed to a reversal of the trend in VBAC rates (Scott, 2011).

Data from the National Centre for Health Statistics have shown that VBAC rates in the United States are now in single figure percentages (Scott, 2011). An ACOG survey showed that between 2003-6, 26% of American obstetricians were no longer prepared to offer a TOLAC regardless of prior vaginal delivery experience. This decrease in TOLAC rates has led to the overall CS rates in the United States to rise again, which has prompted calls for further reconsideration of national policies for the management of women with a previous CS (Scott, 2011; Queneen 2011).

In Ireland there are no published national VBAC rates. Agreement has been reached with the National Perinatal Reporting System (ESRI) that this information will be collected in the future.

4. Methodology

Medline and the Cochrane Database of Systematic Reviews were searched using terms relating to previous CS, labour and pregnancy complications. Searches were confined to the titles of English language articles published between August 2001 and July 2011. Relevant meta-analyses, systematic reviews, intervention and observational studies were sought.

Guidelines reviewed included the Society of Obstetricians and Gynaecologists of Canada (2005), Clinical Practice Guideline; Royal College of Obstetricians and Gynaecologists (RCOG) Guideline 45 (2007); American College of Obstetricians and Gynecologists (ACOG) Practice Bulletin no. 115 (ACOG, 2010), Australian and New Zealand College of Obstetricians and Gynaecologists (ANZOG) guideline (2010). Interestingly, there is evidence of inconsistencies between national guidelines (Foureur et al, 2010; Bujold, 2010). There is also a lack of randomised controlled trials to guide the management of women with a previous CS (Patel and Jain, 2010). Thus, practice is guided not only by published guidelines but also by the large number of observational studies and clinical reviews, which have been published (Dodd et al, 2004; Guise et al, 2010; WHO, 2005; NIH, 2010).

The principal guideline developer was Professor Michael Turner, Professor of Obstetrics and Gynaecology at the UCD Centre for Human Reproduction, Coombe Women and Infants University Hospital, Dublin. The guideline was peer-reviewed by: Dr Fionnuala Breathnach (Rotunda), Dr Sharon Cooley (JOGS), Professor Declan Devane (Midwifery), Dr Jennifer Donnelly (JOGS), Dr Michael Gannon (Mullingar), Dr Emma Kilgariff (GP). The guideline was also reviewed by the Association for the Improvement of the Maternity Services (AIMS) and the Clinical Advisory Group of the Institute of Obstetricians and Gynaecologists

Abbreviations
CS: Caesarean Section
TOLAC: Trial of Labour after Caesarean Section
UR: Uterine Rupture
VBAC: Vaginal Birth after Caesarean Section

5. Clinical Guidelines

5.1 Antenatal care

Women with a previous CS who have their labour induced are more likely to have a failed VBAC (Landon et al, 2004). Therefore, women with a history of a previous CS should have an ultrasound for the purpose of establishing gestational age. The accurate dating of the pregnancy may help avoid unnecessary induction of labour, for example for postdates, and thus any risks associated with oxytocic agents for induction may be avoided. **All women with a previous caesarean section should also have an ultrasound examination before 32 weeks gestation for placental localisation** because they have an increased risk of placenta praevia, and less commonly of placenta accreta. The risk of placenta accreta increases with the number of previous caesareans (Silver et al, 2006; Solheim et al, 2011).

If abnormal placental localisation is diagnosed before delivery this facilitates advanced planning to ensure that both a senior obstetrician and anaesthetist are available for delivery and that adequate blood is cross-matched. It also gives an opportunity to prepare the woman and her family for the

possibility of peripartum hysterectomy if intraoperative haemorrhage cannot be controlled. The Programme has commissioned a separate guideline for the management of placenta accreta.

Women with one previous CS should be reviewed formally by a senior obstetrician early in pregnancy to discuss the management of the pregnancy and the mode of delivery. The views of the woman should be sought, including her plans for future pregnancies. This discussion may include information on a reduction of postnatal morbidity associated with successful VBAC (Odibo and Macones, 2003) and on the risks of uterine rupture (Turner, 2011). This discussion should be summarised in the woman's records and communicated to her general practitioner if the woman is participating in a combined antenatal care scheme. Some units may choose to prepare a patient information leaflet. Any plans for delivery should be recorded in the notes by the senior obstetrician on the mutual understanding that the clinical circumstances can change as pregnancy advances. It is also preferable that any request for tubal ligation is discussed and recorded early in the pregnancy because the acquisition of informed consent for sterilisation is problematic if deferred until delivery is imminent.

If an individual obstetrician or maternity unit is unwilling to consider a TOLAC in any circumstances, then women who want a VBAC should be referred to another obstetrician or unit.

5.2 Uterine Rupture

Uterine rupture (UR) is an uncommon but catastrophic outcome of pregnancy with an increase in maternal and perinatal mortality and morbidity (Leung G et al, 1993). There are two types of rupture; complete rupture involves the full thickness of the uterine wall and incomplete rupture occurs when the visceral peritoneum remains intact. It is important to make this distinction because there are significant differences between the two in terms of clinical presentation and complication rates.

Complete rupture usually presents as a dramatic emergency, which is potentially life-threatening for both mother and baby. Incomplete rupture presents typically as an asymptomatic dehiscence of a previous uterine scar found, but not always reported, at the time of CS. It is almost always uncomplicated. It is also possible that asymptomatic scar dehiscence can occur with a vaginal delivery but remain undiagnosed.

When it comes to measuring rates of UR, it is cases of complete rupture that are the clinically most important and that are likely to be reported accurately. In modern obstetric practice, complete rupture usually occurs in a uterus usually scarred by a previous CS. **Thus, it is recommended that the term uterine "dehiscence" is reserved for an incomplete uterine rupture.**

In a woman with one previous caesarean, the decision to opt for a planned elective repeat CS or a planned trial of labour may be influenced by the perceived risk of UR. National guidelines and large reviews quote different risks, for example, 0.2-1.5% (SOGC 2005), 1.0% (WHO 2005), 0.2-0.7% (RCOG 2007), 0.5-.7% (RANZCOG 2010), 0.5% (AHRQ 2010), 0.5-0.9% (ACOG 2010). In the setting of a large Irish maternity hospital with strict guidelines for a TOLAC, the UR rate was 2 per 1000 overall, and 1 per 1000 for women in spontaneous labour who did not receive oxytocin augmentation (Turner et al, 2006).

The different rates may be explained by different methodological designs and definitions of scar rupture. Comparisons are also hindered by limitations in coding and verification (Foureur et al, 2010). The rates may also be influenced by clinical factors and by the healthcare setting with some guidelines, for example, including women with multiple previous CS when quoting UR rates (ACOG, 2010).

There are a number of key influences on the risk of UR with an attempted VBAC. Women with a previous vertical incision at the time of CS are at a higher risk of UR. A vertical incision may not be recorded in the summary records of previous births and is more likely to have occurred if the previous CS was performed preterm (Khalifeh et al, 2010).

Particular attention should be paid to the details of the previous delivery and/or labour. The records from the previous CS should, where possible, be available and scrutinised by a senior obstetrician at the first antenatal visit. With increasing migration of women, the previous records may be unavailable and additional caution should be exercised in cases where these details are unknown. Giving women a photocopy of their CS operation notes is helpful for any future antenatal care.

There is evidence that **women with a previous scar on the body of the uterus may experience a rupture antepartum (Turner, 2002).** However, rupture of a previous low transverse incision is usually diagnosed intrapartum or postpartum. Thus, women with a previous vertical scar on the body of the uterus may require hospitalisation in the third trimester for observation, particularly if they present with abdominal pain or signs of impending labour. There is a consensus that **women with a previous vertical incision on the uterine body should be delivered by an elective repeat section (Turner, 2002).** Due to the risk of antepartum rupture, consideration should also be given to administering corticosteroids to mature the fetal lungs and to delivering the baby before 39 weeks gestation.

In women with a previous low transverse CS, factors that have been reported to increase the risk of UR include multiple previous CS, no previous vaginal delivery, a short interpregnancy interval, one layer uterine closure, prior preterm CS, induction of labour and oxytocic augmentation (Landon, 2010).

In women with a planned elective repeat CS, labour may supervene before the CS resulting in UR. Thus, **women who are booked for a repeat CS who present with abdominal pains or signs of labour should be reviewed by a senior obstetrician because it may be necessary to expedite the repeat CS.** In a woman at term where a repeat CS is planned, a risk of UR of 0.05% has been reported (Spong et al, 2007).

5.3 Intrapartum Management

As **UR intrapartum usually presents with fetal heart rate abnormalities**, it is recommended that all women with a previous CS have continuous electronic fetal monitoring during labour (Scott, 2011). This may be achieved successfully with an abdominal monitor with recourse to fetal scalp electrode where loss of contact is present. If there is evidence of abnormal fetal heart rate patterns on the CTG, the diagnosis of UR should be considered and delivery expedited.

In the presence of CTG abnormalities, it is common practice to perform a fetal blood sample to check the pH for evidence of fetal hypoxia. This procedure may incur a delay which could have catastrophic consequences should the CTG abnormalities be a reflection of uterine rupture. Furthermore, there is only low level evidence that the use of FBS in conjunction with continuous CTGs reduces CS rates (Alfirevic et al 2006). Therefore, **a decision to proceed with a fetal blood sample should only be taken by a senior obstetrician who is clinically confident that the uterus has not already started to rupture.**

Concerns have been expressed in the past that the use of epidural analgesia in labour may mask the clinical presentation of UR. There is no high quality evidence of the benefit of withholding an epidural in these women and such withholding is not recommended. However, careful attention should be paid to the intravenous preloading and to optimising the dose of anaesthetic. This will ensure that fetal heart rate abnormalities post-epidural are minimised.

The use of oxytocin augmentation in labour may be considered to correct inefficient uterine action, which may occur in women without a previous vaginal delivery. It is, however, associated with a small increase in the risk of UR and, therefore, **oxytocin should only be administered following a full clinical assessment, including vaginal examination, by a senior obstetrician.**

If the uterus starts to rupture, this may be associated with a decrease in the frequency and amplitude of uterine contractions. Starting oxytocin in such circumstances may make a bad situation worse and may increase the possibility of the baby and/or the placenta being expelled into the peritoneal cavity. The use of a colour-coded partogram for women with a previous CS is one way of ensuring a more cautious approach to the use of oxytocin augmentation (Turner, 1997).

If oxytocin augmentation is used because cervical dilatation has been slow, then a repeat vaginal assessment should be planned within two hours of commencing the oxytocin. If there has still been no progress consideration should be given to delivering the baby. In individual circumstances, consideration may be given to setting a time limit for continuing oxytocin augmentation particularly if progress in labour remains slow.

5.4 Perinatal Risks

Neither TOLAC or repeat elective CS is without maternal or fetal risk (Patel and Jain, 2010; O'Shea et al, 2010). Assessing risk with TOLAC is complicated because compared with elective CS, a successful VBAC may decrease risks, shorten hospital stay and avoid CS in future pregnancies. An unsuccessful TOLAC requiring an emergency CS, however, may increase risks, lengthen hospital stay and mean that all future deliveries will be by CS. Unfortunately, it is not possible to predict accurately in advance whether a TOLAC will be successful or not.

Elective CS is not without risk to the fetus and may be associated with, for example, respiratory morbidity especially if the elective caesarean section is performed too early or, scalp lacerations due to the scalpel (Morrison et al, 1995). Even if the elective CS is deferred until post-term, neonatal respiratory morbidity may occur.

The overall rate of rupture-related death with a TOLAC is low and has been estimated as 1 in 1000 approximately (Landon et al 2004; Scott et al, 2011). One study reported no serious neonatal morbidity in 78 cases of UR when less than 17 minutes elapsed between a prolonged fetal heart rate abnormality and delivery (Leung AS et al, 1993). In a Dublin study of 4021 women undergoing TOLAC, there were no cases of HIE or intrapartum death (Turner et al, 2006).

A key factor in assessing the fetal risks of UR is the availability of trained obstetric, anaesthetic and paediatric staff in the hospital on a 24 hours a day basis and the ability of the unit to implement a decision to proceed to CS quickly.

5.5 VBAC rates

Another key factor in the decision to attempt a TOLAC is the chance of a successful VBAC. Again, these figures must be scrutinised carefully. Interpretation of published VBAC rates must consider the denominator used: specifically whether the VBAC rate is quoted to reflect successful vaginal delivery among women with a prior caesarean, or among women with a prior caesarean who have been selected for a trial of labour.. Thus, a maternity unit may have a high rate of elective repeat CS and only allow a small number of low risk women a TOLAC, yet achieve a "high VBAC" rate in labour. In

Dublin, the VBAC rate with a trial of labour in 2002 was 65% in the National Maternity Hospital and 74% in the Coombe (Annual Clinical Reports, 2002) compared with 73% in the US study (Landon et al, 2004). However, overall 52% of women in the NMH and 61% in the Coombe with a prior CS had a VBAC compared with only 29% in the US study.

There is remarkable variation in the VBAC rates quoted by the different national guidelines varying from 30-51% to 50-85% (Foureur et al, 2010). A lot depends on the selection of women studied. The most important predictor of a successful VBAC is whether the woman has had a previous vaginal delivery or not (Turner, 1997). Another key factor clinically is the favourability of the cervix.

A final decision on the mode of delivery is often best deferred until term. If a woman has had a previous vaginal delivery and the cervix is favourable, then the chances of a successful VBAC are high. If oxytocic agents are not used, the risk of UR is low. The risk-benefit analysis favours a TOLAC.

If a woman has never had a vaginal delivery, the cervix is unfavourable and the baby needs to be delivered soon for obstetric reasons, then the chances of a VBAC are low and the risk of UR may be increased by the use of oxytocic agents. Thus, the risk:benefit analysis is less favourable for a TOLAC. In such circumstances, a repeat elective CS may be the better option. There is no conclusive evidence that suspected macrosomia, a twin pregnancy or a postdated pregnancy preclude a TOLAC (ACOG, 2010).

The previous indication for CS may be a factor in the likelihood of a successful VBAC. Women with a non-recurrent indication for previous elective CS e.g. for breech presentation, have a high chance of VBAC if the presentation is cephalic in the index pregnancy (Coughlan et al, 2002). However, even if the previous CS was for apparent cephalo-pelvic disproportion, rates of VBAC are high in a subsequent pregnancy (Impey and O'Herlihy, 1998).

Such decision-making is best made in partnership with the woman following a full discussion, which also takes into account a woman's plans for future pregnancies. The decision may be influenced by the healthcare setting and ideally, in larger maternity units should be informed by the hospital's own rates of UR and VBAC.

5.6 Induction of labour

Induction of labour is an option in women with one previous CS but should be reserved for maternal or fetal indications. It is more likely to be successful in women with a previous vaginal delivery (McNally and Turner, 1999).

Induction of labour with one previous CS has been associated with an increased risk of UR (Lydon-Rochelle et al, 2001). However, this study of 20,095 women was based on a computerised data analysis and the individual records of cases of UR were not reviewed for accuracy. Women with a previous vaginal delivery were also excluded. A more recent multicenter study of 33,699 women undergoing a TOLAC found that the risk of UR was 0.4% for spontaneous labour, 0.9% for augmented labour, 1.1% for induction with oxytocin alone and 1.4% for induction with prostaglandin with or without oxytocin (Grobman et al, 2007).

However, the increased UR rate was observed only in women undergoing induction with no prior vaginal delivery (1.5%) and not in women with a prior vaginal delivery (0.8%), (p=0.02). Thus, induction of labour in a woman without a previous vaginal delivery is less likely to result in UR and more likely to result in a VBAC.

The use of vaginal prostaglandin to induce labour in women with one previous CS is controversial (Scott, 2011). While early reports were reassuring, there is now an emerging consensus that caution should be exercised especially with the sequential use of prostaglandin and oxytocin. This is reflected in the more recent ACOG and RCOG guidelines. Particular caution should be exercised with misoprostol (prostaglandin E1).

In a woman with an unfavourable cervix, no previous vaginal delivery and a single previous CS the increased risk of UR must be balanced against the lower chances of a successful VBAC.

5.7 Postpartum Care

In women with a previous CS, **UR may present with a primary postpartum haemorrhage that is either concealed intrabdominally or revealed vaginally.** The possibility of a UR should be considered early if the woman presents with clinical shock, an acute abdomen or postpartum haemorrhage unresponsive to oxytocics.

The practice of examining the integrity of the previous caesarean section scar by transcervical manual examination after a successful VBAC is no longer recommended. Indeed, it runs the risk of causing the problem it is intended to diagnose (Turner, 2002).

Arrangements should also be made, ideally with the same consultant, to ensure continuity of care, for the woman to be reviewed one month postpartum to allow for further discussion, including her plans for any future pregnancies. It is also recommended that the public health nurse and her general practitioner are kept informed of any serious complications.

5.8 Delivery after two or more caesarean sections

It is normal practice to advise women with two or more previous CS to have a repeat elective CS at term because there are concerns about an increased risk of UR with multiple prior caesareans (Turner, 2002; Landon 2010). Studies on this subject in women with >1 previous CS are limited, and the risks of UR may be less in women with a history of a prior vaginal delivery or a successful VBAC (Landon, 2010).

In individual circumstances where a woman strongly desires a trial of labour after two previous CS, it may be considered. If the head is engaged, if the cervix is favourable, if there is a history of a prior vaginal delivery and if labour starts spontaneously the risk of a successful VBAC may be high and the risk of UR may be low. However, the risks and benefits of a TOLAC in such cases should be documented antenatally in the notes. There is also a case for not using oxytocic agents either to induce or augment labour in such circumstances (Turner, 2002). Women with >1 previous CS should also be advised to attend their maternity hospital early if they experience any abdominal pains or signs of labour.

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7. Implementation Strategy

- Distribution of guideline to all members of the Institute and to all maternity units.
- Implementation through HSE Obstetrics and Gynaecology programme local implementation boards.
- Distribution to other interested parties and professional bodies.

8. Key Performance Indicators

- Number of complete uterine ruptures per annum..
- Number of perinatal deaths or cases of cerebral palsy associated with perinatal uterine rupture.

9. Qualifying Statement

These guidelines have been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. Clinical material offered in this guideline does not replace or remove clinical judgement or the professional care and duty necessary for each pregnant woman. Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources and expertise.

This Guideline does not address all elements of standard practice and assumes that individual clinicians are responsible for:

- Discussing care with women in an environment that is appropriate and which enables respectful confidential discussion.
- Advising women of their choices and ensuring informed consent is obtained.
- Meeting all legislative requirements and maintaining standards of professional conduct.
- Applying standard precautions and additional precautions, as necessary, when delivering care.
- Documenting all care in accordance with local and mandatory requirements.