

## **ANTENATAL MANAGEMENT IN PREGNANT WOMEN WITH PREVIOUS CAESAREAN SECTION**

**E.Monterde, P.Ferrer, J.Parra, M.López**

### **1. INTRODUCTION**

The number of women with a history of previous caesarean section is increasing. The existence of a previous caesarean section increases the risk of placental abnormalities (placenta previa and placenta accreta spectrum (PAS) disorders) and it represents the main risk factor for uterine rupture in a subsequent pregnancy. Antenatal management in these women should include advice on the mode of delivery. Vaginal Birth After Caesarean section (VBAC) is possible and preferable in most cases, but the risks and benefits of a vaginal delivery and a subsequent caesarean section need to be addressed during pregnancy. The use of prediction models can be useful in assessing the probability of success of a vaginal delivery.

### **2. ANTENATAL MANAGEMENT**

#### **2.1. Clinical data and risk factors**

The management of pregnancy in a patient with a previous caesarean section should be done in accordance with the standard local protocols for medium-risk pregnancies. An appropriate collection of maternal epidemiological data and a detailed obstetric history is needed, including the date of the previous caesarean section, type of caesarean section, indication, perinatal outcome and the existence of intra- or post-caesarean complications.

#### **2.2 First trimester assessment**

Although it is a very rare entity, a caesarean scar pregnancy should be ruled out in any ultrasound assessment performed in the first trimester. Caesarean scar pregnancy is considered to have a common pathogenic pathway with placenta accreta spectrum (PAS) disorders. Therefore, given the ultrasound suspicion, the diagnosis should not be delayed.

#### **2.3 Ultrasound follow-up**

Ultrasound follow-up in a patient with a previous caesarean section does not differ from the standard ultrasound screening protocol. The location of the placenta should be assessed in the second- and third-trimester ultrasound, taking into account that a previous caesarean section is a risk factor for placenta previa and PAS. In cases of anterior placenta previa, a specific assessment in the outpatient Placental Clinic will be performed between 28-32 weeks to evaluate the risk of PAS. Nevertheless, if high suspicion of PAS disorders is observed at the first- or second-trimester evaluation, specific control in the Placental Clinic may be performed earlier. In patients with 2 previous caesarean sections or with a short interdelivery period (defined as less than 18 months between caesarean section and next delivery) who have no other contraindications for vaginal delivery, or other risk factors for uterine rupture, a specific ultrasound will be offered to assess the lower uterine segment and myometrial thickness at 34 to 36 weeks.

### 3. MODE OF DELIVERY

Antenatal assessment in a patient with a previous caesarean section should include an individual assessment of the mode of delivery (before 37 weeks if possible) and should be documented in the clinical notes.

If no contraindications for vaginal delivery exist (see Table 1), VBAC is appropriate and recommended.

Table 1: Contraindications for VBAC

<p><b>ABSOLUTE</b></p> <ul style="list-style-type: none"> <li>• History of previous uterine rupture</li> <li>• History of non-low transverse caesarean incision (corporeal or classical uterine incision, inverted T-incision)</li> <li>• Previous uterine surgery with entry into the endometrial cavity (myomectomy)</li> <li>• 3 or more previous caesarean sections</li> <li>• Other contraindication for vaginal delivery (placenta previa, non-cephalic presentation, etc.)</li> </ul> <p><b>RELATIVE</b></p> <ul style="list-style-type: none"> <li>• 2 previous caesarean sections</li> <li>• Interdelivery interval below 18 months</li> </ul>
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#### 3.1. Risk assessment

The pregnant woman should be informed of the risks and benefits associated with a vaginal delivery or a subsequent caesarean section. A vaginal delivery has lower maternal morbidity and mortality, as well as lower neonatal respiratory morbidity, than a caesarean section. However, VBAC is associated with a risk of uterine rupture and a risk of instrumental delivery and perineal injuries. A subsequent caesarean section carries a risk, for future pregnancies, of placenta previa, placenta accreta spectrum disorders, or intraoperative injuries in subsequent caesarean sections. Nevertheless, caesarean section may also have some advantages, such as the possibility of planning, the possibility of tubal sterilisation in the same surgical act, and a lower perinatal mortality. Specific and individualised counselling should be given on the risk of uterine rupture and on the prediction of success of a vaginal delivery.

##### 3.1.1. Counselling about the risk of uterine rupture

The generic risk of uterine rupture in a woman with a previous caesarean section is around 0.5%, although it can differ according to different factors that have to be considered when counselling these women. The main factors associated with an increased risk of uterine rupture are:

- Factors considered as absolute contraindications for vaginal delivery:
  - 3 or more previous caesarean sections
  - Previous uterine rupture

- Previous non-lower uterine segment incision. When no information can be obtained regarding the type of uterine incision, a vaginal delivery is considered adequate.
- Factors considered as relative contraindications for vaginal delivery:
  - 2 previous caesarean sections: the risk of uterine rupture may increase up to approximately 1.5%, although some series do not show a significantly increased risk of uterine rupture compared to women with a single previous caesarean section. The success rate of vaginal delivery is lower (between 60 and 70%).
  - Short interdelivery interval (period between caesarean section and next delivery below 18 months). The risk of uterine rupture has been described to be around 1.5% in these cases, although some series do not show a significant increased risk.
- Labour induction: increases the risk of uterine rupture up to 2%, approximately. The method of induction may influence the risk. Both the use of prostaglandin E2 (dinoprostone) and oxytocin increase the risk of uterine rupture, and especially their sequential use (risk of rupture up to 4%). The use of prostaglandin E1 (misoprostol) is contraindicated in women with a previous caesarean section.
- Maternal factors: advanced maternal age, obesity, postoperative complication with the previous caesarean section (postpartum fever, significant endometritis) have been considered risk factors for uterine rupture although with a lower level of evidence.
- Fetal factors: macrosomia (estimated fetal weight above 97<sup>th</sup> percentile), multiple pregnancy.

As previously explained, having 2 previous caesarean sections or a short interdelivery interval (defined as a period between caesarean section and next delivery of less than 18 months) are risk factors for uterine rupture, but not an absolute contraindication for vaginal delivery. In women with those risk factors and no other contraindications for vaginal delivery, a lower uterine segment ultrasound at 34-36 weeks of pregnancy may be used to assess the uterine rupture risk. A VBAC may be considered if all of the following criteria are met:

- Patient acceptance of VBAC, understanding that the risk of uterine rupture may be higher. An individual evaluation of the success rate of vaginal delivery should also be performed (considering the indication for previous caesarean sections, fetal estimated weight, maternal body mass index (BMI), etc.).
- Absence of additional risk factors or contraindications for vaginal delivery.
- Lower uterine segment thickness > 3 mm and myometrial thickness > 2 mm.
- Spontaneous onset of labour. If an induction of labour is needed, an elective caesarean section should be considered.

### **3.1.1.1. Ultrasound assessment of the risk of uterine rupture**

Ultrasound measurement of lower uterine segment thickness or myometrial thickness in the previous uterine scar area has been proposed as a predictor of uterine rupture. A correlation exists between a lesser thickness and a greater risk of uterine rupture. A lower uterine segment thickness below 2 mm is related to a higher risk of rupture. Nevertheless, there is no cut-off value below which a vaginal delivery may be contraindicated. An ultrasound assessment of the

lower uterine segment has been described as having a high negative predictive value when the lower uterine segment thickness is more than 3 mm and myometrial thickness is more than 2 mm.

The lower uterine segment is identified sonographically as a two-layer structure: one echogenic, which corresponds to the serosa and the bladder wall, and another hypoechoic, which corresponds to the myometrium. The uterine segment thickness measurement (Figure 1a) should be performed transvaginally, with a partially full bladder and in a longitudinal plane. Prior to its measurement, a sweep will be carried out in both the longitudinal and transverse planes to identify the area of lesser thickness. The thinnest area should be measured. Calipers should be positioned so that the inner edge merges with the line that delimits the thickness. The measurement line must be perpendicular to the uterine wall and should include the myometrium, serosa and bladder wall.

For the measurement of the myometrial thickness (Figure 1b), the same technique will be used as in the measurement of the lower uterine segment, but including only the myometrium, and excluding the echogenic layer that corresponds to the serosa and bladder wall.



Figure 1: Transvaginal ultrasound measurement of the lower uterine segment thickness (a) and myometrial thickness (b).

### 3.1.2. Assessment of success rate of vaginal delivery

The success rate of vaginal delivery in women with a previous caesarean section is between 71 and 75%, although it may be influenced by different factors. One of the main factors that significantly increases the success rate of vaginal delivery is having a previous vaginal delivery, especially after a caesarean section.

Different prediction models have been developed to assess the probability of success of a vaginal delivery. Most of them include maternal and obstetrical factors and some of them include ultrasound parameters. The Grobman prediction model is the most widely used, which includes the following parameters:

- Maternal age
- Ethnicity
- BMI at the beginning of pregnancy
- Previous vaginal delivery

- Previous vaginal delivery after caesarean section
- Indication of recurrent caesarean (failure to progress or labour dystocia)

All these parameters are present from the first antenatal visit, so the counselling on the mode of delivery can be given in the early stages of pregnancy. An early antenatal assessment is recommended, as soon as possible, and best before 37 weeks of pregnancy. Predictive models can be applied by using different risk calculators, which are available online. A risk calculator adapted to our population is available in our setting, obtaining two different values of success rates, one for spontaneous vaginal delivery, and another for induced labour. The use of risk calculators for vaginal delivery is recommended in all women with a previous caesarean section for an appropriate individualised assessment of the mode of delivery.

With the aforementioned assessment, the decision about the mode of delivery should be made by the women, but the use of the predictive models may help in the decision-making process:

- Prediction of more than 60% of success of vaginal delivery: vaginal delivery should be recommended.
- Prediction of between 10-60% of success of vaginal delivery: the patient will be informed and the mode of delivery will be decided according to her preferences.
- Prediction of  $\leq 10\%$  of success of vaginal delivery: An elective caesarean section may be recommended in these cases.

In all cases, the final decision about the mode of delivery will be made by the patient, according to her preferences, once she has been fully informed.

### **3.1.3. Global counselling**

Therefore, as stated in sections 3.1.1 and 3.1.2, the assessment of the mode of delivery must include specific and individualised advice on the risk of uterine rupture and on the success rate of a vaginal delivery.

After an appropriate individualised assessment has been performed, the pregnant woman should decide about the preferred option for delivery and it should be recorded in the clinical notes. An informed consent form should be signed if the patient accepts the option of a vaginal delivery. Since the induction of labour confers a higher risk of uterine rupture and has a lower success rate of vaginal delivery, it is recommended to include in the consent form a specific mention to the patient's agreement for an induction of labour.

The existence of a previous caesarean section does not affect the obstetrical indications for induction of labour. If a patient has a contraindication for a vaginal delivery or does not accept the option of vaginal delivery, the caesarean section will generally be scheduled at 39 weeks. If a patient agrees to spontaneous vaginal delivery but does not accept an induction of labour, the caesarean section will be scheduled when an indication for induction of labour exists, which may be beyond 39 weeks.

#### 4. OTHER ANTEPARTUM CONSIDERATIONS

- Pre-anaesthetic assessment in those patients who are scheduled for a caesarean section.
- Assess the possibility of tubal ligation or salpingectomy in case of a new caesarean section.
- Plan the possibility of blood transfusion at admission if other risk factors for postpartum haemorrhage exist.
- In case of suspicion of placenta accrete spectrum disorders, act according to the specific protocol.

#### 5. INTRAPARTUM MANAGEMENT

The antenatal assessment of the mode of delivery and the signed informed consent form specifying the preferred option should be verified upon admission for labour or induction of labour in women with a previous caesarean section. If this is not available, the assessment should be performed upon admission.

If a woman with a previous caesarean section that has requested an elective caesarean section enters into active labour, the obstetric approach to take will be agreed with the patient according to the obstetric conditions and her preferences.

Continuous fetal monitoring during labour is recommended in all pregnant women with a previous caesarean section, and an optimal control of uterine dynamics should be achieved to avoid uterine tachysystole, a known risk factor for uterine rupture. Uterine dynamics (UD) monitoring can be external or internal:

- External monitoring of UD: the frequency of contractions and the relationship between contractions and fetal heart rate are monitored. It is the method of choice.
- Internal monitoring of UD: allows a precise evaluation of the uterine basal tone at rest, the intensity, duration and frequency of the contractions. It is indicated in cases of dynamic dystocia or lack of labour progress in cases with special indication in safely monitoring uterine dynamics (up to 200 MU in first stage of labour and 250 MU in second stage of labour), in inductions of labour with an increased risk of uterine rupture, and in obese patients with suboptimal abdominal transmission.

A prolonged second stage of labour in patients with a previous caesarean section significantly decreases the probability of vaginal delivery and significantly increases the risk of uterine rupture. For these reasons, a second stage of labour of more than 3 hours should be avoided.

Uterine rupture can be sudden and evident, with serious repercussion for both the mother and the fetus. Nevertheless, it can also be a masked complication to be aware of. The symptoms and signs of uterine rupture include: loss of fetal well-being, loss of fetal static, a change in the type of abdominal pain generally located at the suprapubic level or at the level of previous uterine

scar, requirement of a higher dose of epidural analgesia to control the pain, vaginal bleeding and/or haematuria, maternal hemodynamic instability.

The presence of a previous caesarean section will not modify the assistance to the vaginal delivery and to the delivery of the placenta. The indications for operative delivery should be the same as those patients without a previous uterine scar.

In case of retained placenta, the possibility of placenta accreta should be considered and the extraction should be carried out ultrasound guided, with the presence of adequate personnel and resources for an eventual advanced management of postpartum haemorrhage.

After a vaginal delivery in a patient with a previous caesarean section, an exploration of the lower uterine segment is not routinely recommended to assess the previous uterine scar integrity. It may be considered only in cases of suspected uterine rupture.

## **6. POSTPARTUM MANAGEMENT**

Systematic postpartum analytic control of maternal anaemia is not recommended in patients undergoing caesarean section. However, in some cases where significant intraoperative bleeding has occurred, or in women with severe pre-existing anaemia, a postpartum hemogram is recommended.

The following considerations should be taken into account after a caesarean section:

- An interdelivery period (period between caesarean section and next delivery) of at least 18 months is recommended. A short interdelivery period may increase the risk of uterine rupture.
- In cases of non-low transverse caesarean incision or uterine rupture, the performance of an elective caesarean section in the following pregnancy before the spontaneous onset of labour is recommended. The patient must be informed before discharge and it should be documented in the clinical information given to the patient.