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No. 402, July 2020 (Replaces No. 189, March 2007)

Guideline No. 402: Diagnosis and Management of Placenta Previa

(En français : Placenta prævia : diagnostic et prise en charge)

The English document is the original version. In the event of any discrepancy between the French and English documents, the English version prevails.

This Clinical Practice Guideline was prepared by the authors and reviewed by the Society of Obstetricians and Gynaecologists of Canada (SOGC) Maternal–Fetal Medicine Committee, Diagnostic Imaging Committee, and Guideline Management and Oversight Committee and was approved by the SOGC Board of Directors. This Clinical Practice Guideline supersedes Clinical Practice Guideline 189, published in March 2007.

Authors
Venu Jain, MD, PhD, Edmonton, AB
Hayley Bos, MD, Victoria, BC
Emmanuel Bujold, MD, MSc, Québec City, QC

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Corresponding Author: Venu Jain
venu.jain@albertahealthservices.ca

Weeks gestation notation used in this guideline
This guideline follows the World Health Organization's notation on gestational age: the first day of the last menstrual period is day 0 (of week 0); therefore, days 0 to 6 correspond to completed week 1, days 7 to 13 correspond to completed week 1, etc.

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This document reflects emerging clinical and scientific advances as of the publication date and is subject to change. The information is not meant to dictate an exclusive course of treatment or procedure. Institutions are free to amend the recommendations. The SOGC suggests, however, that they adequately document any such amendments.

Informed consent: Everyone has the right and responsibility to make informed decisions about their care together with their health care providers. In order to facilitate this, the SOGC recommends that they provide their patients information and support that is evidence-based, culturally appropriate, and personalized.

Language and inclusivity: This document uses gendered language in order to facilitate plain language writing but is meant to be inclusive of all individuals, including those who do not identify as a woman/female. The SOGC recognizes and respects the rights of all people for whom the information in this document may apply, including but not limited to transgender, non-binary, and intersex people. The SOGC encourages health care providers to engage in respectful conversation with their patients about their gender identity and preferred gender pronouns and to apply these guidelines in a way that is sensitive to each person's needs.

RECOMMENDED CHANGES IN PRACTICE

1. Diagnosis of placenta previa or low-lying placenta should not be made <18 to 20 weeks gestation, with the provisional diagnosis requiring confirmation ≥32 weeks gestation.
2. Ultrasound evaluation of placenta previa or low-lying placenta should include determination of distance of placental edge from cervical os (or overlap beyond the cervical os) and characteristics of placental edge, including thickness and presence/absence of a marginal sinus.
3. In women with a low-lying placenta, a trial of labour is recommended in cases where the placental edge is 11 to 20 mm from the cervical os and can be considered in carefully selected cases where the placental edge is ≤10 mm from the cervical os.
4. In women with a low-lying placenta, a recent ultrasound (within 7 to 14 days) should be used prior to a cesarean delivery to confirm placental location.
5. Antenatal corticosteroids should be administered only if risk of delivery within 7 days is very high.

KEY MESSAGES

1. History of antepartum hemorrhage <29 weeks or recurrent episodes (≥3), a thick placental edge covering (or close to) the cervical os, short cervical length, and a previous cesarean delivery are factors associated with an increased risk of urgent/preterm cesarean delivery.
2. In absence of risk factors, outpatient management of placenta previa should be considered.
3. When determining the location of delivery, consider placental location, any other associated findings, the patient's history, and logistical factors, including resources available at the delivery unit.
4. Cesarean delivery for placenta previa is recommended at 36^0 to 36^6 weeks gestation in the presence of risk factors and at 37^0 to 37^6 weeks gestation in the absence of risk factors.
5. Cesarean delivery for a low-lying placenta with placental edge ≤10 mm from cervical os is recommended at 37^0 to 37^6 weeks gestation in presence of risk factors and at 38^0 to 38^6 weeks gestation in the absence of risk factors.

Abstract

Objectives: To summarize the current evidence and to make recommendations for diagnosis and classification of placenta previa and for managing the care of women with this diagnosis.

Options: To manage in hospital or as an outpatient and to perform a cesarean delivery preterm or at term or to allow a trial of labour when a diagnosis of placenta previa or a low-lying placenta is suspected or confirmed.

Outcomes: Prolonged hospitalization, preterm birth, rate of cesarean delivery, maternal morbidity and mortality, and postnatal morbidity and mortality.

Intended Users: Family physicians, obstetricians, midwives, and other maternal care providers.

Target Population: Pregnant women with placenta previa or low-lying placenta.

Evidence: Medline, PubMed, Embase, and the Cochrane Library were searched from inception to October 2018. Medical Subject Heading (MeSH) terms and key words related to pregnancy, placenta previa, low-lying placenta, antepartum hemorrhage, short cervical length, preterm labour, and cesarean. This document represents an abstraction of the evidence rather than a methodological review.

Validation Methods: This guideline has been reviewed by the Maternal–Fetal Medicine and Diagnostic Imaging committees of the Society of Obstetricians and Gynaecologists of Canada (SOGC) and approved by the SOGC Board of Directors.

Benefits, Harms, and/or Costs: Women with placenta previa or low-lying placenta are at increased risk of maternal, fetal and postnatal adverse outcomes that include a potentially incorrect diagnosis and possibly unnecessary hospitalization, restriction of activities, early delivery, or cesarean delivery. Optimization of diagnosis and management protocols has potential to improve maternal, fetal and postnatal outcomes.

SUMMARY STATEMENTS (GRADE ratings in parentheses):

1. All women with placenta previa or low-lying placenta have an increased risk of a morbidly adherent placenta, particularly those who have had a prior cesarean delivery (strong/moderate).
2. In women with placenta previa or a low-lying placenta, presence of a marginal/velamentous cord insertion close to the cervical os or a succenturiate placental lobe increases the risk of vasa previa (strong/moderate).
3. History of antepartum hemorrhage (first episode <29 weeks or recurrent episodes [≥3]), a thick placental edge covering (or close to) the cervical os, short cervical length (<3 cm with placenta previa, <2 cm with low-lying placenta), and a previous cesarean delivery are risk factors with an associated increased risk of urgent/preterm cesarean delivery (strong/moderate).
4. In the absence of risk factors, outpatient management of women with placenta previa is safe (strong/moderate).
5. Bed rest or reduced activity is not beneficial in women with placenta previa and can be potentially harmful. However, sexual intercourse/insertion of foreign bodies in vagina or rectum should be avoided (conditional [weak]/low).
6. Preoperative bedside ultrasound assessment of placental location can be useful for planning of surgical technique and may reduce risk of intraoperative transection of placenta (conditional [weak]/low).
7. Regional anaesthesia is safe and adequate as a first-line anaesthetic approach for the peripartum management of patients with placenta previa or low-lying placenta (conditional [weak]/low).
8. When deciding the location of delivery, consider ultrasound assessment of placental location, any risk factors, the patient's history, and logistical factors, including available resources at the delivery unit (conditional [weak]/low).

RECOMMENDATIONS (GRADE ratings in parentheses):

1. Classify placental location as placenta previa (placenta covering the cervical os), low-lying placenta (edge located ≤20 mm from cervical os), or normally located placenta (edge located >20 mm from cervical os) (strong/moderate).
2. Diagnosis of placenta previa or low-lying placenta should not be made <18 to 20 weeks gestation, and the provisional diagnosis must be confirmed after >32 weeks gestation, or earlier if the clinical situation warrants. In women with a low-lying placenta, a recent ultrasound (within 7 to 14 days) should be used to confirm placental location prior to a cesarean delivery (strong/moderate).
3. Assessment by transvaginal ultrasound is recommended in all cases where placenta previa or a low-lying placenta is present or suspected by transabdominal sonography, with attempt to clearly define placental location (including laterality), characteristics of

placental edge (including thickness, presence of a marginal sinus), and associated findings (succenturiate lobe, cord insertion close to the cervix) (strong/moderate).

4. In women with placenta previa or low-lying placenta and in the presence of risk factors or limited access to urgent obstetrical care, consider in-hospital management (strong/moderate).
5. A cervical cerclage can be considered in women with a short cervical length, particularly in association with antepartum hemorrhage, but not as a prophylactic measure for all women with placenta previa (conditional [weak]/low).
6. Administer antenatal corticosteroids for potential preterm delivery only if the risk of delivery within 7 days is very high and not solely because admission to the hospital is deemed necessary (strong/moderate).
7. Tocolysis can be considered in women with antepartum hemorrhage associated with uterine contractions in order to allow administration of corticosteroids or transfer of care, but not for prolongation of pregnancy (conditional [weak]/low).
8. Cesarean delivery is recommended in women with placenta previa at 36^0 to 36^6 weeks gestation in the presence of risk factors and at 37^0 to 37^6 weeks gestation in the absence of risk factors (strong/moderate).
9. Cesarean delivery is recommended in women with a low-lying placenta with the placental edge ≤10 mm from the cervical os at 37^0 to 37^6 weeks gestation in the presence of risk factors and at 38^0 to 38^6 weeks gestation in the absence of risk factors (strong/moderate).
10. A trial of labour is recommended in women with a low-lying placenta where the placental edge is 11 to 20 mm from the cervical os and can be considered in carefully selected women where the placental edge is ≤10 mm from the cervical os (strong/moderate).

INTRODUCTION

Placenta previa is defined as the condition where the placenta directly overlies the cervix, as opposed to a low-lying placenta, where the placenta is close to the cervical os. Placenta previa occurs in 4 to 5 of 1000 pregnancies.[1,2] Several risk factors have been identified, including advanced maternal age, multiparity, previous cesarean delivery, previous placenta previa, chronic hypertension, diabetes, smoking and cocaine use during pregnancy, multiple gestation, and the use of assisted reproductive technology.[1,3,4] The incidence continues to rise with increasing rates of cesarean delivery and assisted reproductive technology.[2,4]

There is a wide variation in the diagnosis, classification, and antenatal and intrapartum management of placenta previa. The diagnosis of placenta previa remains vague, with the use of qualifiers such as major, minor, marginal, and low-lying, that may or may not allow the obstetric provider to make an informed decision regarding the mode of delivery and the location of the uterine (or even skin) incision, if cesarean delivery is deemed necessary.[5,6] Another source of misinformation and stress for the patient (and the obstetric provider) is the timing of diagnosis of placenta previa. Often this diagnosis is made at the anatomy scan or even in the first trimester, notwithstanding the fact that with the enlarging uterine cavity, expanding lower uterine segment, and evolving placental morphology, the majority of these placentas will not be previa at the time of delivery. The management of placenta previa has been guided by studies that showed that women with the placental edge within 2 cm from the cervical os were at higher risk of cesarean delivery because of intrapartum hemorrhage.[7] This observation was taken as evidence that a cesarean delivery is necessary in these cases, notwithstanding the fact that a majority of the women in these studies actually delivered vaginally, albeit with increased intrapartum blood loss. As a result, current practice has evolved to a recommendation for a cesarean delivery for all women with the placental edge within 2 cm of the cervical os. Such practice trends are contributing to the rising rates of cesarean delivery,[8] resulting in an even higher incidence of placenta previa, vasa previa, and morbidly adherent placenta (a 13-fold increase).[9–11] Further, the timing of delivery has been advocated to be optimal at 36 to 37 weeks; this practice pattern does not take into account several patient factors, including the characteristics of the placental edge, anterior versus posterior location of placenta, prior uterine surgery/cesarean delivery, history (and severity) of antepartum hemorrhage, and logistical factors such as distance of the patient's residence from the delivery hospital, access to urgent transportation to the hospital, and obstetric/anaesthetic/blood transfusion services at the delivery hospital. Also of relevance is the patient's obstetric history, including prior successful vaginal delivery. In the current milieu of patient-centred care, patient's desire for a vaginal delivery needs to be factored into delivery planning. Further, the patient's choice has to be guided by counselling that is evidence based. The foregoing discussion forms the basis for this guideline, which seeks to make recommendations for the diagnosis, classification, and antepartum and intrapartum management of placenta previa. The content and recommendations were drafted and agreed upon by the authors. The Board of the Society of Obstetricians and Gynaecologists of Canada approved the final draft for publication. The quality of evidence was rated using the criteria described in the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology framework (tables 1 and 2 of the online appendix).

SUMMARY STATEMENTS 1, 2 and RECOMMENDATIONS 1, 2, 3

DIAGNOSIS OF PLACENTA PREVIA

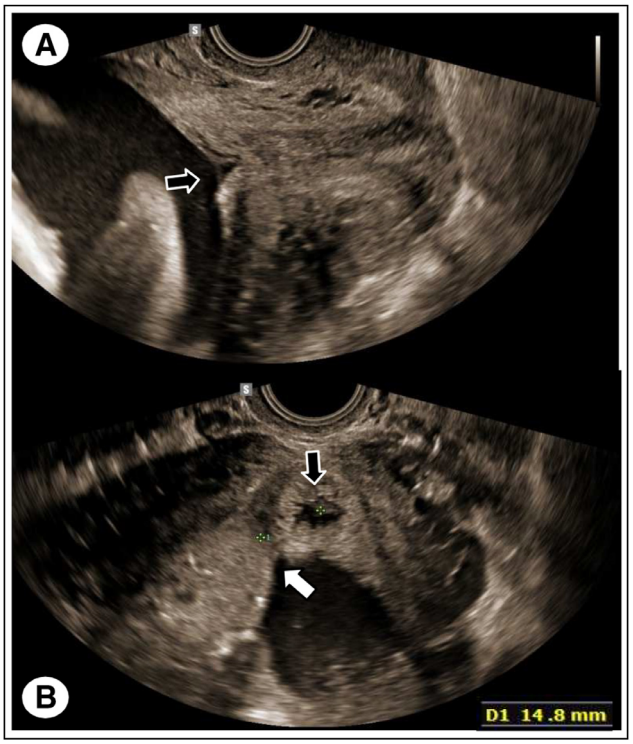
In the past, various descriptors were used for this diagnosis, such as major, minor, marginal, and low-lying, their origin being related to the historical diagnosis of placenta previa made by digital examination.[5,6] With the inability of these terms to communicate the exact relationship of the placenta/placental edge to the cervical os (and to the location of the uterine incision in cases of cesarean delivery), they are often a source of significant confusion.[5,6] A simplified (and clinically relevant) classification has been recommended: (i) placenta previa, where the placenta is covering the cervical os; (ii) low-lying placenta, where the placental edge is within 2 cm of the cervical os; and (iii) normal placental location, with the placental edge >2 cm from the cervical os (no increase in risk of antepartum hemorrhage or cesarean delivery).[5–7,12,13] In addition, delineation of the location of the placenta/placental edge in relation to the cervical os as well as to a potential Kerr incision (low transverse uterine incision, in the case of cesarean delivery) is of paramount importance.[5–7,12,13] In the case of placenta previa, the degree of overlap beyond the cervical os should be estimated. In the case of low-lying placenta, the distance from the os should be estimated. Estimation of this distance can be challenging in the presence of short cervical length with significant funneling, for which the measurement of the distance between the placental edge and the presumed location of the internal os if

the cervix had not shortened/funneled (upper edge of the funnel closest to the placental edge) may be reasonable. The ultrasound report should also provide the best estimate of placental location (i.e., anterior or posterior, left or right sided; Figure 1), and presence of a succenturiate lobe or a marginal/velamentous cord insertion close to the cervix, if noted (because of the associated risk of a vasa previa).[14] Such a description is more meaningful for the antepartum and peripartum management of these patients and can guide critical decisions such as further ultrasound assessment, hospitalization, and further assessment for invasive placentation, as well as the timing of delivery, mode of delivery, and surgical technique in the case of cesarean delivery.[6] Interestingly, the likelihood of resolution of an anterior placenta previa was found to be higher, with a lower risk of a cesarean delivery.[15]

Characteristics of the Placental Edge

In presence of a placenta previa, the presence of a thick placental edge is associated with a higher risk of antepartum hemorrhage, of cesarean delivery, and of occurrence of invasive placentation.[16,17] With a placental edge thickness >1 cm (versus <1 cm), the risk of antepartum hemorrhage was 88% (vs. 40%) and the risk of emergent cesarean delivery <36 weeks was 65% (vs. 30%) (Figure 2).[16] In a subset of patients with low-lying placenta, a marginal sinus may be present at the placental edge; this is seen as a circumscribed hypoechoic area with venous flow visible in grayscale or with colour flow imaging (Figure 3).[18–20] This sinus, when noted, is often mistakenly interpreted as a vasa previa. It represents discontinuous venous lakes at the margin of the placenta. It is filled with maternal blood and hence does not represent a vasa previa. Further, the presence of a marginal sinus is also associated with a higher risk of antepartum hemorrhage and cesarean delivery.[19–22] On the other hand, a thin and avascular edge is less likely to be associated with antepartum hemorrhage and urgent cesarean delivery (Figure 2).[16,17,20]

Figure 1. Assessment of low-lying placenta in a lateral location. (A) No abnormality of placental location is evident on transvaginal ultrasound evaluation in the sagittal plane. The black arrow indicates the location of the internal os, with no placental tissue visible close to it. (B) Evaluation in a transverse plane allows visualization of a lateral low-lying placenta and estimation of the distance of the placental edge (white arrow) from the internal os (black arrow).



Associated Conditions

All women with placenta previa or low-lying placenta have an increased risk of a morbidly adherent placenta (placenta accreta spectrum disorders), particularly those with a prior cesarean delivery.[11,23] Further, all women with a placenta previa or low-lying placenta have an increased risk of vasa previa, particularly those with a marginal/velamentous cord insertion close to the cervical os or a succenturiate placental lobe.[10,14,24] These conditions carry significant implications for maternal-fetal outcomes and need to be further assessed or ruled out. Please refer to the relevant SOGC guidelines for assessment and management recommendations.

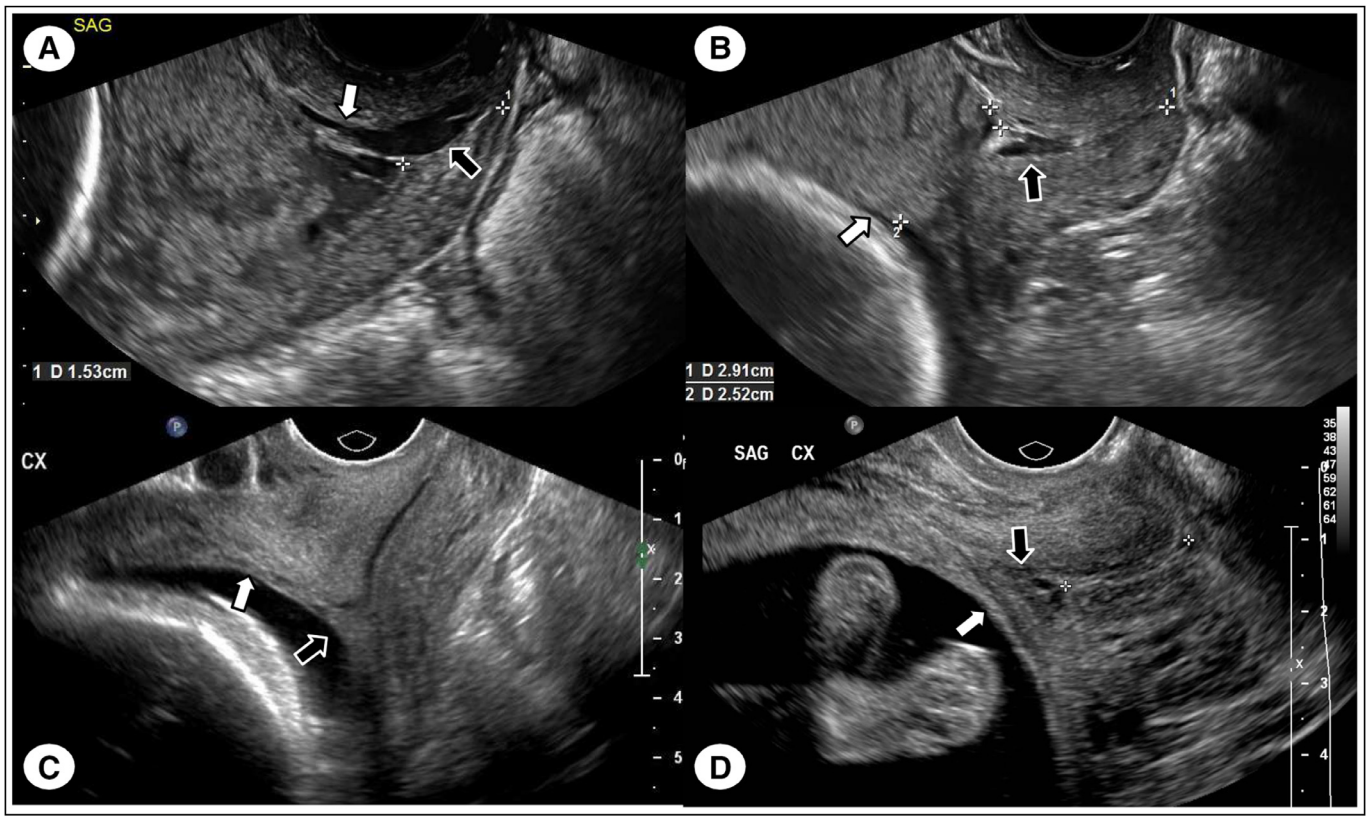
Transabdominal Versus Transvaginal Sonography

Evaluation by transabdominal sonography is associated with high false-positive and false-negative rates.[25] Although translabial assessment is an option,[26] use of a transvaginal approach provides better definition of the placental anatomy in relation to the cervix. The os is ideally visualized at 2 to 3 cm from the cervix by a probe inserted under ultrasound guidance at an angle unlikely to slip into the cervical canal. This approach can be safely used even in patients with active bleeding.[27] In addition to being safe, transvaginal sonography is more accurate for the diagnosis of placenta previa, with a sensitivity of 88% and specificity of 99%.[13,28–30]

Timing of Diagnosis

A large proportion of placentas are previa or low-lying during the first trimester. Mustafa et al. estimated the incidence of placenta previa to be 42% at 11 to 14 weeks.[30] Dashe et al. showed that when a diagnosis of placenta previa was made at 15 to 19 weeks gestation, it resolved at term in around 90% of the cases; this finding has been reproduced by other studies.[31,32] The likelihood of resolution is >98%

Figure 2. Placental characteristics affect pregnancy management and outcomes. (A) The central part of the placenta overlies the cervical os; previa with this degree of overlap is unlikely to resolve. A subplacental hematoma overlies the cervix and extends into the cervical canal (white arrow) with an associated shortening of the cervix (black arrow); these findings increase the risk of urgent/preterm cesarean delivery. (B) A thick placental edge covers the cervical os (white arrow); a hematoma appears to be present in the upper cervical canal (black arrow). (C) A thin placental edge (white arrow) lies >1 cm from the cervical os (black arrow). This patient has a very low risk of peripartum hemorrhage. (D) A thin placental edge (white arrow) covers the cervical os (black arrow). This degree of previa has a high likelihood of resolution. Even if the placental edge remains within 1 cm of the cervical os, this patient would be a good candidate for trial of labour.



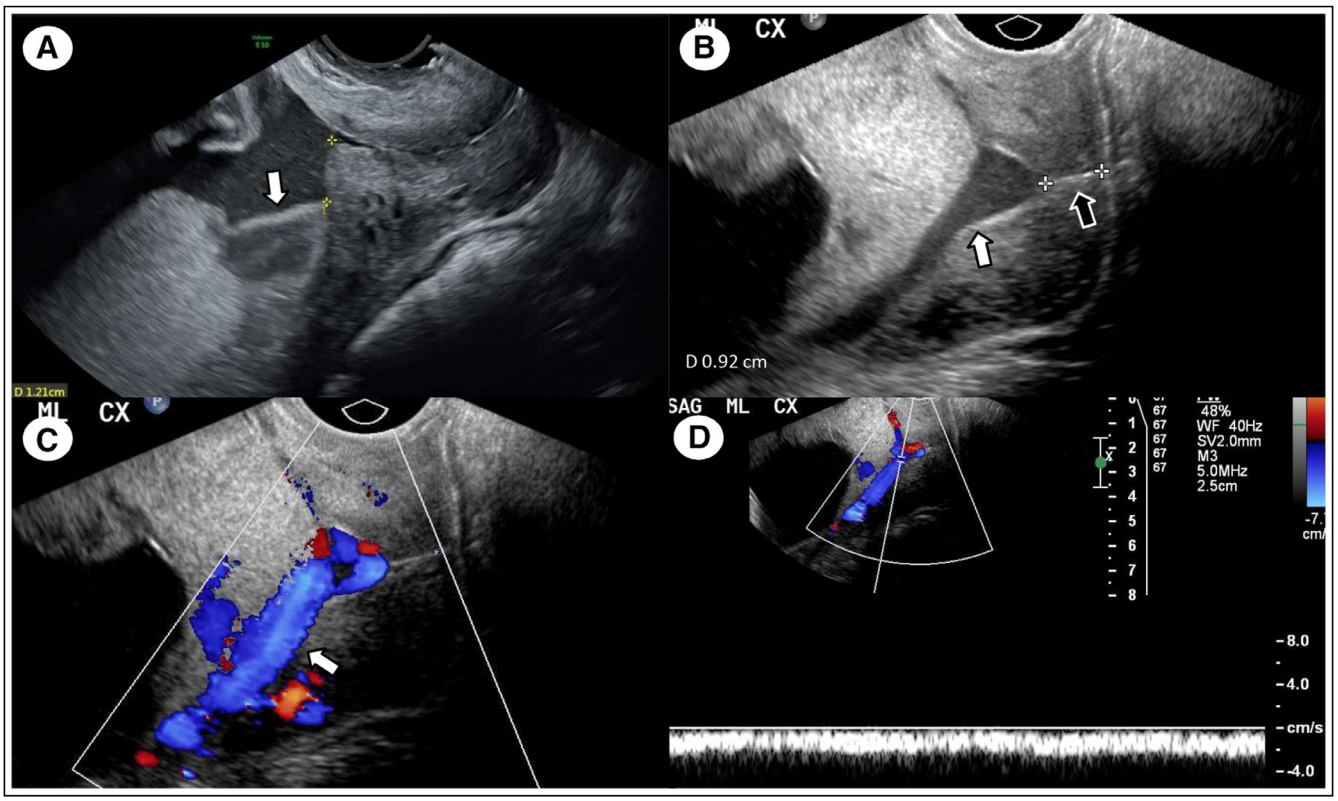
when a diagnosis of low-lying placenta is made in the second trimester.[25,32,33] However, when an overlap of >20 to 25 mm was noted at 18 to 23 weeks gestation, placenta previa persisted in ≥40% of cases (Figure 2).[25,34,35] A diagnosis of placenta previa carries significant implications for obstetric care; it is also a source of stress and anxiety for the patient. A diagnosis, therefore, should not be made before the second trimester anatomy scan since a premature diagnosis will more likely end up being incorrect. Further, an early diagnosis of placenta previa has no implications for clinical management of the patient. At the midtrimester anatomical scan (usually at 18 to 20 weeks gestation), when a placenta previa or low-lying placenta is identified, the diagnosis needs to be provisional with the understanding that it will need confirmation closer to the time of delivery, with a high likelihood of resolution. In women with low-lying placenta or placenta previa, a repeat ultrasound should be done ≥32 weeks to reassess placental location; if the placental edge is >20 mm (normal placental location) or there is an overlap of >20 mm (definitive placenta previa), no further assessment is necessary.[6,25,32,33,35] In cases with the placental edge <20 mm from the os or with overlap <20 mm, repeat assessment should be done at 36 weeks (or later as needed) for final delivery planning.[6,25,32,33,35] Assessment may need to be done <32 to 36 weeks if the clinical situation warrants (e.g., in cases with significant antepartum hemorrhage or high risk of spontaneous or iatrogenic preterm delivery).[6]

SUMMARY STATEMENTS 3, 4, 5 and RECOMMENDATIONS 4, 5, 6, 7

ANTENATAL MANAGEMENT

When determining the antenatal needs of a woman with a provisional or definitive diagnosis of placenta previa, several factors must be considered, including gestational age, placental location, history of antepartum hemorrhage, symptoms of

Figure 3. The marginal sinus. (A) A marginal sinus is seen as a hypoechoic area at the edge of the placenta (white arrow). Although presence of the marginal sinus and a thick placental edge are risk factors in reference to placenta previa, with the edge being >1 cm from the cervical os, this patient is a good candidate for trial of labour. (B) A marginal sinus is seen at the placental edge and over the cervix (white arrow), bulging into the upper cervical canal. In addition, shortening of the cervix is seen (black arrow). This patient is at a high risk of urgent/preterm cesarean delivery. (C) Colour mapping of the marginal sinus (white arrow). (D) Pulsed wave Doppler shows venous flow in the marginal sinus.



preterm labour, cervical length, parity, history of cesarean delivery or prior uterine surgery, and geographical location of the patient relative to an appropriate delivery unit.

Short Cervical Length

In patients with a placenta previa, short cervical length is associated with an increased risk of antepartum hemorrhage and preterm cesarean delivery (Figures 2 and 3).[17,36–38] A cervical length of <3 cm is associated with an increased risk of antepartum hemorrhage (79% vs. 28%) and need for an emergent cesarean delivery (69% vs. 21%).[17,36,37] Similarly, in women with low-lying placenta, a cervical length <2 cm has been associated with increased risk of antepartum hemorrhage and iatrogenic preterm delivery.[7,26,37,39,40] The proposed mechanism for the association of short cervical length with antepartum hemorrhage and preterm birth involves cervical effacement and dilation of the internal os, resulting in separation of placenta from the underlying lower uterine segment and tearing of myometrial vessels, resulting in maternal hemorrhage.[37] The ensuing hemorrhage stimulates further contractions, resulting in further cervical effacement and dilation, creating a dangerous positive feedback cycle.[37] Although traditionally thought to be painless hemorrhage, antepartum hemorrhage in presence of placenta previa is associated with contractions in a third of women.[37]

Cervical Cerclage

A cervical cerclage has been advocated as an intervention to reduce the risk of antepartum hemorrhage and preterm birth in women with placenta previa. A meta-analysis by Neilson showed that cervical cerclage may reduce the risk of delivery <34 weeks (relative risk [RR] 0.45; 95% confidence interval [CI] 0.23–0.87) or birth weight <2 kg (RR 0.34; 95% CI 0.14–0.83).[41–43] Based on the limited evidence, a cerclage can be considered <24 weeks gestation in individual patients, particularly those with short cervical length or antepartum hemorrhage (please refer to the SOGC Clinical Practice Guideline No. 373: Cervical Insufficiency and Cervical Cerclage for general considerations).[44] However, there is inadequate evidence to support the routine use of cerclage to reduce the risk of preterm delivery in women with placenta previa in general.

Hospitalization vs. Outpatient Management

In the absence of risk factors (Box 1), outpatient management of women with placenta previa has been shown to be safe.[13,41,45] The risk of urgent/preterm cesarean delivery is increased in women with a history of antepartum hemorrhage, particularly the first episode (sentinel bleed) <29 weeks gestation or recurrent episodes (≥3), or with a thick placental edge covering (or close to) the cervical os, short cervical length (<3 cm with placenta previa, <2 cm with low-lying placenta), or a previous cesarean delivery the risk of urgent/preterm cesarean delivery is increased.[7,16,17,26,36,37,39,40,46–48] In these patients, in-hospital management should be considered. Other factors to consider for safe outpatient management of these patients include remote location from a tertiary care obstetrical facility, lack of access to expedient transport to the hospital, and other social and financial factors.

Modification of Activity

Bed rest has been historically advocated for women with a placenta previa, with the assumption that exercise may increase the risk of preterm labour or antepartum hemorrhage. However, there is no evidence to support this notion. In women with short cervical length, exercise did not increase the risk of preterm birth; on the contrary, there was a trend towards a reduction in risk.[49] A meta-analysis by Aune et al. showed a 10% to 14% reduction in the risk of preterm birth with physical activity during pregnancy.[50] Further, bed rest during pregnancy has been associated with maternal stress and depression.[51] Therefore, bed rest is not recommended in women with placenta previa; continuation of routine activity should be allowed, and light exercise should be recommended to promote physical, mental, and emotional well-being. Digital examination with a dilated cervix is known to be associated with antepartum hemorrhage; therefore, avoidance of vaginal or anal sexual activity and insertion of any foreign object in the anus/rectum or in the vagina, such as a tampon, should be avoided (with the exception of transvaginal ultrasound by an experienced sonographer).

Box 1. Risk factors in presence of a placenta previa or low-lying placenta

History of antepartum hemorrhage
First episode <29 weeks
Recurrent episodes (≥3)
Thick placental edge (>1 cm)
Presence of a marginal sinus
Short cervical length
<3 cm with placenta previa
<2 cm with low-lying placenta
Previous cesarean delivery
Evidence of invasive placentation

Administration of Corticosteroids

Women with a placenta previa are admitted to the hospital for a multitude of reasons; these include medical as well as logistical factors, and not all are associated with a high risk of delivery within the next few days. Admission to the hospital is not an adequate justification for administration of antenatal corticosteroids.[52] Routine administration of corticosteroids at the time of admission has potential for harm for 2 reasons. First, if the woman does not deliver within 7 days but is deemed at a later stage to be at a high risk for preterm delivery, a repeat course of corticosteroids is usually not recommended.[52] Therefore, some preterm infants might receive corticosteroids outside the optimal window for benefit. Furthermore, prenatal administration of corticosteroids has been associated with worse outcomes for infants who go on to be born at term.[52] Therefore, corticosteroids should be administered only if the risk of delivery within 7 days is felt to be very high; please refer to the SOGC Clinical Practice Guideline No. 364: Antenatal Corticosteroid Therapy for Improving Neonatal Outcomes for the gestational age range.[52] When contemplating the risk of delivery, consider the risk–benefit ratio of corticosteroids relative to gestational age. As an example, a woman with a placenta previa with antepartum hemorrhage and short cervical length is at a high risk of preterm delivery and should receive steroids if the gestational age–related criterion is met (Box 1). On the other hand, in a woman with a placenta previa with no risk factors who is being admitted for logistical reasons, corticosteroids are not indicated as she will most likely deliver >35 weeks gestation.

Use of Tocolysis

Tocolysis can serve to break the cycle of contractions causing placental separation, which causes bleeding, which in turn causes further contractions.[37] There is a paucity of studies evaluating the use of tocolysis in the context of placenta previa and antepartum hemorrhage. Tocolysis has not been shown to prolong pregnancies with placenta previa.[53–56] In a multicentre randomized controlled trial of 109 women who had received 48 hours of tocolysis and antenatal corticosteroids because of placenta previa with antepartum hemorrhage, maintenance tocolysis with nifedipine was compared with placebo.[56] No significant prolongation of pregnancy or improvement in neonatal outcomes was noted. Therefore, maintenance tocolysis with the goal of pregnancy

prolongation is not recommended. However, in the presence of symptoms such as uterine contractions or antepartum hemorrhage, consider cautious use of tocolysis for a period of up to 48 hours (to allow administration of corticosteroids or transfer of care).[55–57] Further, tocolysis is contraindicated in a woman with ongoing antepartum hemorrhage resulting in hemodynamic instability; in such cases, delivery may be warranted.

Optimization of Maternal Status

In patients admitted for antepartum hemorrhage in the presence of placenta previa, frequent testing of maternal blood counts and coagulation profile, maintenance of an intravenous line, and ensuring ongoing availability of cross-matched blood are common practice in many units. Frequent testing of blood counts and coagulation profile is of a very limited utility and should be performed very selectively; if felt necessary, a complete blood count (without a differential count) and a serum fibrinogen level are adequate.[58] Repeat bloodwork without clinical utility has potential to cause maternal anemia. Maternal anemia should be treated with iron (oral or parenteral) as needed.[59] Although a blood transfusion may become necessary in some cases, the need for an urgent transfusion is very unlikely, thus ongoing cross-matching of blood is unnecessary for most patients (with the exception of patients with multiple/atypical antibodies).[58] The need for ongoing intravenous access should be assessed in order to avoid damage to the points of vascular access during a prolonged admission.

SUMMARY STATEMENTS 6, 7, 8, and RECOMMENDATIONS 8, 9, 10

FINAL DIAGNOSIS AND DELIVERY PLANNING

In the absence of risk factors (Box 1) and if the degree of overlap over the cervix is minimal, the final diagnosis of placental location for delivery planning should be delayed until 36 weeks (or later in some cases). This could result in an alternate diagnosis of low-lying placenta in some cases, allowing the woman the option of a vaginal delivery or a delivery at a later stage of pregnancy.[6,25,31–35] Such assessment would also result in more meaningful findings that can provide guidance related to the mode of delivery, timing of delivery, and surgical technique in cases where cesarean delivery is indicated.

Mode of Delivery

Historically, a cesarean delivery has been recommended for women with a placenta previa or low-lying placenta, sometimes even without a preoperative confirmation of the condition. With increasing rates of cesarean delivery and the associated complications, including the risk of recurrent placenta previa and invasive placentation, there is need for an evidence-based approach to determining the mode of delivery.[8,9,11] When determining the mode, consider the woman's medical history, including other maternal/fetal issues during the current pregnancy and previous vaginal delivery, as well as her desire for a vaginal delivery; also relevant are logistical considerations such as the geographical location of the patient relative to the intended location of delivery and resources available at the delivery unit.

In women with placenta previa, a cesarean delivery is recommended. In women with low-lying placenta, 2 groups need differentiation: those with the placental edge ≤10 mm from the cervical os vs. 11 to 20 mm from the cervical os. The risk of antepartum hemorrhage is 29% versus 3%, respectively, and the likelihood of a vaginal delivery is 9% to 38% versus 57% to 93%, respectively, with 75% to 80% deliveries occurring at term.[20,26,39,40,60–62] A trial of labour is recommended in women with the placental edge 11 to 20 mm from the cervical os; a trial of labour can also can be considered in carefully selected women with the placental edge ≤10 mm from the cervical os and without risk factors (Box 1).[7,16,17,26,36,37,39,40.46–48] A trial of labour for women with the placental edge ≤10 mm from the cervical os should take place in a facility with immediate access to an obstetrician, an anaesthesiologist, and a neonatologist as well as access to blood transfusion, if needed (see Location of Delivery).

If cesarean delivery is planned, transection of the placenta should be avoided if possible, as it increases the risk of intrapartum blood loss and the need for blood transfusion.[63] If point of care ultrasound is available, preoperative bedside ultrasound assessment of placental location by the surgeon can be useful for planning the surgical technique. Incision of an anterior placenta can usually be avoided by circumventing the placenta or pushing it aside and passing a hand around its margin to allow delivery of the baby.[63] If the placenta is transected during delivery, immediate cord clamping is needed to avoid exsanguination of the baby. Regional anaesthesia is preferred as first line, with general anaesthesia being reserved for usual obstetric indications.[59,64–65]

Timing of Delivery

If cesarean delivery is planned, timing should be based primarily on the location of the placenta. With a view to balancing maternal risks and postnatal outcomes, the optimal timing would be at 36^0 to 37^6 weeks for placenta previa and 37^0 to 38^6weeks for low-lying placenta (placental edge ≤10 mm from the cervical os).[13,62,66–69] The timing of

delivery can be further refined based on the presence of risk factors (Box 1).[7,16,17,26,36,37,39,40,46–48] In the presence of 1 or more risk factors, delivery can be planned during the first week of the 2-week window and deferred to the second week in cases without these risk factors. In women with a placental edge 11 to 20 mm from the cervical os, a trial of labour is recommended and an elective cesarean section should be discouraged.[20,26,39,40,60–62] However, in cases where cesarean delivery is planned for reasons such as maternal choice, the optimal timing would be 39^0 to 40^6 weeks, again with a view to balancing maternal risks and postnatal outcomes.

When cesarean delivery is indicated, earlier delivery may become necessary in some cases due to onset of preterm labour, occurrence of significant antepartum hemorrhage, or an additional finding of an abnormally adherent placenta or a vasa previa (refer to SOGC clinical practice guideline numbers 383, Screening, Diagnosis, and Management of Placenta Accreta Spectrum Disorders, and 231, Guidelines for the Management of Vasa Previa). In the presence of significant antepartum hemorrhage, most women respond to supportive therapy and expectant management.[46,70] However, if antepartum hemorrhage results in maternal hemodynamic compromise or an abnormal fetal heart rate pattern, or there is significant antepartum hemorrhage at ≥34 weeks gestation, urgent delivery is warranted.[66]

In women with low-lying placenta for whom a trial of labour is planned, induction of labour can be undertaken as per usual indications, with a cesarean delivery reserved for the usual obstetric indications that would include significant antepartum hemorrhage. The use of a Foley catheter for cervical ripening/induction of labour should be avoided in women with low-lying placenta.

Location of Delivery

All women with a placenta previa are at an increased risk of placenta accreta and massive obstetric hemorrhage requiring blood transfusion or hysterectomy.[23,62,71] When deciding the location of delivery, consider timely availability of an obstetrician, access to a second qualified surgeon, immediate access to an anaesthesiologist, availability of a urologist/vascular surgeon/interventional radiologist, and local readiness for a massive transfusion protocol.[23,71–73]

SUPPLEMENTARY INFORMATION

Supplementary material related to this article can be found in the online version, at https://10.1016/j.jogc.2019.07.019.

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Table 1. Key to Grading of Recommendations, Assessment, Development and Evaluation Quality of Evidence

Strength of Recommendation	Definition
Strong	High level of confidence that the desirable effects outweigh the undesirable effects (strong recommendation for) or the undesirable effects outweigh the desirable effects (strong recommendation against)
Conditional (weak)[a]	Desirable effects probably outweigh the undesirable effects (weak recommendation for) or the undesirable effects probably outweigh the desirable effects (weak recommendation against)
Quality of Evidence	**Definition**
High	High level of confidence that the true effect lies close to that of the estimate of the effect
Moderate	Moderate confidence in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low	Limited confidence in the effect estimate: The true effect may be substantially different from the estimate of the effect
Very low	Very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[a] Do not interpret conditional (weak) recommendations to mean weak evidence or uncertainty of the recommendation.
Adapted from GRADE Handbook (2013), Table 5.1.

Table 2. Implications of Strong and Conditional (Weak) Recommendations, by Guideline User

Perspective	Strong Recommendation • "We recommend that. . ." • "We recommend to not. . ."	Conditional (Weak) Recommendation • "We suggest. . ." • "We suggest to not. . ."
Authors	The net desirable effects of a course of action outweigh the effects of the alternative course of action.	It is less clear whether the net desirable consequences of a strategy outweigh the alternative strategy.
Patients	Most individuals in the situation would want the recommended course of action, while only a small proportion would not.	The majority of individuals in the situation would want the suggested course of action, but many would not.
Clinicians	Most individuals should receive the course of action. Adherence to this recommendation according to the guideline could be used as a quality criterion or performance indicator.	Recognize that patient choices will vary by individual and that clinicians must help patients arrive at a care decision consistent with the patient's values and preferences.
Policy makers	The recommendation can be adapted as policy in most settings.	The recommendation can serve as a starting point for debate with the involvement of many stakeholders.

Adapted from GRADE Handbook (2013), Table 6.1.