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Vasa Praevia: Diagnosis and Management

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This is the third edition of this guideline. The first, published in 2011, was entitled Placenta Praevia, Placenta Accreta and Vasa Praevia: Diagnosis and Management. The second, published in 2018, was divided into Green-top Guideline No. 27a Placenta Praevia, Placenta Accreta: Diagnosis and Management and Green-top Guideline No. 27b Vasa Praevia: Diagnosis and Management. The management and diagnosis of placenta praevia and placenta accreta is addressed in Green-top Guideline No. 27a.

Key recommendations

- Health care professionals providing care for pregnant women should be aware of vasa previa, risk factors for the condition, and its clinical implications.
- Women with a velamentous cord insertion and/or bilobate or succenturiate placenta and/or a low-lying placenta and those with multiple pregnancy are at the highest risk of vasa praevia and should be screened. [Grade B]
- Women who conceive following assisted reproductive techniques (ART) are at increased risk of vasa praevia, and targeted ultrasound screening for these women may reduce perinatal loss from vasa praevia. [Grade C]
- Ultrasound assessment for vasa praevia at the time of fetal anomaly screening (FAS) ultrasound examination at 18^{+0}–20^{+6} weeks of gestation, with third-trimester confirmation, has a high diagnostic accuracy with a low false-positive rate. [Grade B]
- In settings with appropriate resources, skilled and trained personnel, universal screening for vasa praevia results in a high detection rate and prevents perinatal deaths from this condition. [Grade A]
- To avoid false positive diagnoses, unnecessary anxiety, admissions, prematurity, and caesarean birth, it is essential to confirm persistence of vasa praevia by ultrasound at about 32 weeks of gestation. [Grade C]
- There is no evidence of a benefit of routine antepartum hospitalisation of asymptomatic women with a prenatal diagnosis of vasa praevia. [Grade B]
- A decision for prophylactic hospitalisation from 30–32 weeks of gestation in women with confirmed vasa praevia should be individualised and based on a combination of factors, including multiple pregnancy, cervical length, prior obstetric history, distance from the hospital, antenatal bleeding, and threatened preterm labour. [Grade C]
- In women with a confirmed diagnosis of vasa praevia in the third trimester, elective caesarean birth should be carried out before the onset of labour. Delivery in asymptomatic low-risk women should be performed between 35^{+0} to 36^{+6} weeks of gestation. [Grade D]
- Rupture of a vasa praevia is associated with a high perinatal morbidity and mortality. Emergency caesarean birth and neonatal resuscitation, including the use of neonatal blood transfusion if required, are essential in the management of ruptured vasa praevia diagnosed antenatally or during labour. [Grade B]
- Because of the speed at which fetal exsanguination can occur and the high perinatal mortality rate associated with ruptured vasa praevia, birth should not be delayed while trying to confirm the diagnosis, particularly if there is evidence that fetal well-being is compromised. [GPP]

1. Purpose and scope

The purpose of this guideline is to describe the diagnostic modalities and review the evidence-based approach to the clinical management of pregnancies complicated by vasa praevia. The evidence

informing the diagnosis and management of vasa praevia is predominantly derived from observational studies, many of which exhibit varying methodological quality. Randomised controlled trials are not available and, in this clinical context, are neither always appropriate nor ethically feasible. However, there is high-quality evidence from systematic reviews and meta-analyses that supports key diagnostic approaches and management strategies. These data provide a sufficiently robust evidence base to inform these recommendations, while recognising areas where further research is required.

This guideline is for healthcare professionals who care for women and non-binary people with vasa praevia. Within this document, we use the terms "woman" and "women's health." However, it is important to acknowledge that it is not only women for whom it is necessary to access women's health and reproductive services in order to maintain their gynaecological health and reproductive wellbeing. Gynaecological and obstetric services and delivery of care must therefore be appropriate, inclusive, and sensitive to the needs of those individuals whose gender identity does not align with the sex recorded at birth.

2. Introduction and background epidemiology

Vasa praevia occurs when a fetal vessel(s) run freely through the amniotic/placental membranes near or over the internal os (IO) of the cervix, below the fetal presenting part.[1,2] Unprotected by placental tissue or Wharton's jelly of the umbilical cord, a vasa praevia is likely to rupture when rupture of the membranes occurs either spontaneously, such as in active labour, or iatrogenically, when amniotomy is performed to induce or augment labour.

Two types of vasa praevia were described initially: type I, when the vessel is connected to a velamentous umbilical cord, and type II, when it connects the main placental mass with a succenturiate or accessory lobe. Type I is the most common, accounting for 80–90% of cases of vasa praevia.[3,4] A third category, Type III, was recently added to this classification to describe aberrant free vessels that traverse the membranes over the internal os (IO) of the cervix, originating from the lowest placental edge and looping back to re-enter the placenta at a different site.[5-7] In such cases, the placenta may be low-lying or normally located, and the umbilical cord insertion can be central, marginal, or velamentous.[1,5-7]

Wide variations in the prevalence and incidence of vasa praevia have been reported, ranging between 1 in 500 and 1 in 5,800 singleton pregnancies at term and higher in twins.[8,9] A recent systematic review and meta-analysis found a weighted pooled incidence of vasa praevia of 0.79 (95% CI 0.59-1.01) per 1000 pregnancies, corresponding to 1 case per 1271 (95%CI 990-1692) pregnancies.[10] A UK prospective trial of two-stage screening, including 26,830 pregnancies, found 21 cases of vasa praevia confirmed at birth, corresponding to a rate of 1 in 1,278 pregnancies.[11] Vasa praevia can be diagnosed on visual examination of the placenta after delivery, and in the UK, all placentas and cords are examined by midwives at birth. However, the condition is likely under-reported as, in most countries, vasa praevia are more likely to be recorded only in cases of stillbirth or major perinatal complications when the placenta is sent for examination by a perinatal pathologist.[7] Furthermore, the umbilical cord in pregnancies with vasa praevia with a velamentous cord insertion may avulse with traction at delivery, making confirmation difficult. Differences in antenatal screening and distribution of risk factors may also explain variation in the incidence of vasa praevia between countries.

3. Identification and assessment of evidence

This guideline was developed in accordance with the standard methodology for producing Royal College of Obstetricians and Gynaecologists (RCOG) Green-top Guidelines. The Cochrane Library (including the Cochrane Database of Systematic Reviews and the Database of Abstracts of Reviews of Effects [DARE]), EMBASE, Trip, MEDLINE, and PubMed (electronic databases) were searched for relevant randomised controlled trials (RCTs), systematic reviews, and meta-analyses. The search was restricted to articles published between December 2017 and November 2025 (the previous guideline search ended in

November 2017). The databases were searched using the relevant Medical Subject Headings (MeSH) terms, including all subheadings, and the results were combined with a keyword search. Search words included 'vasa praevia', 'velamentous cord insertion', and 'umbilical cord anomalies'. The search was restricted to humans and the English language. The National Library for Health and the National Guideline Clearinghouse were also searched for relevant guidelines and reviews.

Where possible, recommendations are based on available evidence. In the absence of published evidence, these have been annotated as 'good practice points'. Further information about the assessment of evidence and the grading of recommendations may be found in Appendix I.

4. What are the risk factors associated with vasa praevia?

Several risk factors have been known to be associated with vasa praevia, including a history of in vitro fertilisation (IVF), multiple gestations, second-trimester low-lying placenta or placenta praevia, and anomalies of the placental shape and the umbilical cord, such as succenturiate or bilobed placenta and a velamentous cord insertion (VCI).[1,2,8] Studies have estimated that approximately 80% of pregnancies with vasa praevia have one or more of these risk factors.[9,11,14] Therefore, systematic assessment and documentation of placental location and umbilical cord insertion at the fetal anomaly screening (FAS) at 18^{+0}–20^{+6} weeks of gestation is essential, with targeted screening recommended for pregnancies with identified risk factors in order to reduce the risk of adverse outcomes associated with vasa praevia.

Table 1 Epidemiologic factors associated with vasa praevia

Risks factors	Odd ratios	Positive predictive value	Evidence quality
Pregnancy resulting from assisted reproductive techniques (ART)	10.4 (95%CI 1.7-63.4)[11]	1.1 (0.5–2.7)	2++
Velamentous cord insertion	706.6 (95%CI 217.6–2293.8)[11]	20.3 (15.3–26.4)	2++
Low-lying placenta	19.9 (95%CI 5.8–67.8)[11]	0.5 (0.3–0.7)	2++
Bilobed or succenturiate placenta	39.1 (95%CI 8.8–173.1)[11]	8.5 (4.9–14.3)	2++
Multiple pregnancies	N/A		2–

About two-thirds of pregnancies with vasa praevia have a VCI.[1,9,14] The estimated incidence of VCI is 0.4–11% in singleton pregnancies, with a higher incidence in twin pregnancies (1.6–40%).[12] Around 4–6% of pregnant patients with a VCI also have a vasa praevia, whereas around 2/3 of women with a vasa praevia have a VCI.[7,13] A UK prospective cohort study of 26,830 pregnancies reported that in screening for vasa praevia, the sensitivities of VCI and bilobed placenta were 76.19% (95% CI 52.83–91.78) and 38.10% (95% CI: 18.11–61.56), respectively whereas the positive predictive value (PPV) of VCI for vasa praevia was 20.25% (95% CI: 15.26–26.37) and that for bilobed placenta the PPV was 8.51% (95%CI: 4.93–14.30%).[11] Similarly, type II vasa praevia is associated with anomalies of the placental shape, and type III is often found associated with a second-trimester low-lying placenta.[5-7] A systematic review and meta-analysis of the risk of factors of vasa praevia at birth found that the most common anomalies of placentation associated with vasa praevia are low-lying placenta (61.5%; 95% CI 53.0–70.0), VCI (52.2%; 95% CI 39.6–64.7) and bilobed or succenturiate lobed placenta (33.3%; 95% CI 20.9–45.7).[14] A recent population study of 53,648 singleton pregnancies, including 45 with vasa praevia, reported similar associations.[15] *[Evidence level 2++]*

Pregnancies conceived through assisted reproductive techniques (ART), particularly IVF, have a higher incidence of vasa praevia, marginal cord insertion, and VCI compared to naturally conceived pregnancies.[16-18] A recent systematic review and meta-analysis of the association of ART and abnormal cord insertion, including 16 observational studies, found that ART pregnancies have a higher risk of VCI (OR 2.14; 95% CI 1.64–2.79).[17] This increased risk was independent of the type of IVF technique used

(blastocyst versus cleavage-stage frozen versus fresh embryo transfer). A systematic review and meta-analysis on the risk indicators for vasa praevia found that pregnant women who conceived by ART had an increased risk of vasa praevia compared to spontaneously conceived pregnancies (common OR 19; 95% CI 6.6–54).[9] ART is strongly associated with higher rates of placentation in the lower uterine segment[19,20] and of multiple pregnancies.[21] A few cohort studies have also shown an increased incidence of bilobate placental shape in IVF pregnancies.[18,22,23] Overall, these data indicate that IVF conceptions are at higher risk for vasa praevia. *[Evidence level 2++]*

The prevalence of umbilical cord abnormalities is higher in twin pregnancies compared to singleton pregnancies.[16,22] A VCI of one of the umbilical cords is eight-fold more frequent in twins than in singletons, with a risk 10-fold higher in monochorionic twins.[16] A retrospective cohort study of 941 twin pregnancies reported that 58 women presented with a VCI (6.2%) of one of the twins, of which four (0.43%) also had a vasa praevia.[22] A case series of 40 twin pregnancies complicated by the first-trimester spontaneous loss of a twin, also called vanishing twin syndrome, has reported an increased risk for vasa praevia (OR 41.1; 95% CI 12.77–131.94).[25] Other studies have not yet confirmed these data. *[Evidence level 2–]*

5. Screening and antenatal diagnosis of vasa praevia

5.1 Can vasa praevia be diagnosed clinically?

Recommendation	Evidence quality	Strength	Rationale for the recommendation
The detection of pulsating fetal vessels inside the internal os on vaginal examination during labour while the membranes are still intact, or vaginal bleeding with acute changes in the fetal heart rate after rupture of the membranes should alert the obstetric team of the presence or possible rupture of a vasa praevia and the fetus should be immediately delivered.	**4**	**GPP**	**To avoid excessive bleeding and fetal compromise.**

Vaginal bleeding during pregnancy should raise the possibility of vasa praevia.[1,8,26,27] However, this symptom has a very low positive predictive value given the high prevalence of bleeding during pregnancy and low prevalence of vasa praevia. Tests such as the Apt test, Ogita Test, or the Londersloot test assess for fetal blood in the vaginal blood, but are often not timely in a potentially life-threatening clinical situation. In addition, the resources and expertise to perform these tests in a timely manner are rarely available. Because pregnant women with a vasa praevia may have a co-existent low-lying placenta, which is often the primary source of the bleeding, determining the source of the bleeding can be challenging. *[Evidence level 4]*

The previous versions of this guideline[28] concluded that in the absence of vaginal bleeding during the antenatal period, there is no method to diagnose vasa praevia clinically before labour. Vasa praevia has been reported to be diagnosed during early labour by vaginal examination, detecting the pulsating fetal vessels just above or inside the internal os, when the cervix is sufficiently dilated, and the membranes are intact. However, this overlooks the fact that the vessel may be a vein rather than an artery. The presence of vaginal bleeding and acute changes in fetal heart rate patterns (sinusoidal pattern or non-recovering bradycardia), indicating fetal compromise, after spontaneous or artificial rupture of the

membranes, should alert the obstetric and neonatal teams to the possible rupture of a vasa praevia.[1,8] In all cases of suspected vasa praevia, the placenta should be assessed after delivery by the midwife or obstetrician. This may show vessels running through the membranes, supporting a diagnosis of vasa praevia. Placental examination by a perinatal pathologist may be helpful to confirm the diagnosis of vasa praevia, in particular when stillbirth has occurred, or there has been acute fetal compromise during birth, and may aid discussion with the parents. This examination may be limited, as the diagnosis of vessel rupture and evaluation of the distance between the vasa praevia and the membrane opening may be difficult due to the distortion of the membranes' anatomy during birth *[Evidence level 4]*

5.2 Diagnosis of vasa praevia using ultrasound imaging: how and at what gestational age?

Recommendation	Evidence quality	Strength	Rationale for the recommendation
Identifying women at risk of vasa praevia at birth is best performed at the time of the 18^{+0}–20^{+6} weeks fetal anomaly screening (FAS) scan when the umbilical cord insertion and the placental position can be accurately evaluated.	**2++**	**B**	First trimester scan before the definitive placenta is fully formed is associated with higher false-positive rates
A combination of transabdominal ultrasound and TVS with CDI provides the best diagnostic accuracy for vasa praevia.	**1**	**A**	TVS with CDI mapping and flow-velocity waveform provide direct visualisation of the vasa praevia position in relation to the IO of the cervix.
Women with ultrasound features suggestive of vasa praevia on a transabdominal scan should be referred to a specialist fetal medicine unit for further investigation including a TVS with CDI.	**4**	**GPP**	The use of standardised protocol for the diagnosis and follow-up of pregnant women presenting with a vasa praevia is essential to optimise neonatal outcomes.
A follow-up ultrasound examination including a TVS is recommended at about 32 weeks of gestation by an experienced operator to confirm the diagnosis of a persistent vasa praevia.	**1**	**A**	Between mid-gestation and the third trimester, up to 30% of cases recorded as vasa praevia at the FAS scan are no longer vasa praevia.

Ultrasound imaging is the primary tool for diagnosing vasa praevia antenatally. Fetal vessels appear as linear or circular echolucent structures overlying the cervix.[1] Transabdominal ultrasound is the first-line imaging technique for most patients. Colour flow Doppler imaging (CDI) will enhance the visualisation of blood vessels, demonstrating their proximity to the cervix. Transvaginal CDI has improved the accuracy of grey-scale imaging[1,8,29] in diagnosing vasa praevia by demonstrating flow and fetal vascular waveforms on pulsed Doppler using low pulse repetition frequency to visualize low-flow velocities through at least one aberrant vessel.[1,30] Vasa praevia was defined initially on imaging when a fetal vessel was found running in the free placental membranes over the uterine cervix.[31-33] There is currently no

consensus on the distance between the fetal vessels and the IO for the antenatal diagnosis of vasa praevia. Some have proposed using a 2 cm distance to define vasa praevia, a definition extrapolated from that of a low-lying placenta. However, that distance has not been shown to be safe. There are reports of fatal fetal exsanguination following rupture of vessels when the distance was between 2 and 5 cm from the IO.[1] While there was no consensus on a distance to define vasa praevia, an international Delphi consensus of experts recommended that the distance not be limited to 2 cm.[59] The distance between a vasa praevia and the IO will also vary greatly with advancing gestational age, particularly during the third trimester when the lower segment of the uterus expands rapidly. *[Evidence level 4]*

Due to major anatomical changes in placental mass distribution and growth and its relative position inside the uterine cavity between 10 and 14 weeks of gestation, prenatal diagnosis of placental and cord anomalies is most effective at the 18^{+0}–20^{+6} weeks FAS ultrasound examination. This strategy remains unchanged since the publication of the previous version of this guideline[28] and is also recommended by Society for Maternal-Fetal Medicine (SMFM, USA),[35] the Society of Obstetricians and Gynaecologists of Canada (SOGC),[36,37] and the Royal Australian, the New Zealand College of Obstetricians and Gynaecologists (RANZCOG)[41] and the National Women and Infants Health Programme and The Institute of Obstetricians and Gynaecologists of Ireland.[39] *[Evidence level 4]*

A systematic review, including two prospective and six retrospective cohort studies, of which six had poor methodology, found prenatal detection rates ranging between 53% (10/19) and 100% for a total of 442,633 women, including 138 cases of vasa praevia.[29] Four out of the eight studies used transvaginal scanning (TVS) for primary assessment. In comparison, the remaining four studies used transabdominal ultrasound and TVS only when vasa praevia was suspected on the transabdominal scan. The results of two prospective studies, including a total of 33,795 women, reported that TVS CDI performed during the second trimester detects all cases (n = 11) of vasa praevia (sensitivity, 100%) with a specificity of 99.0–99.8%. *[Evidence level 2++]*

A recent systematic review evaluated 19 studies that all implemented prospective screening protocols for vasa previa. In these studies, screening was performed prospectively at the second-trimester anatomy scan, with confirmation using TVS CDI in the third trimester.[48] Across 779,845 pregnancies, the pooled sensitivity was 1.00 (95% CI, 0.99–1.00; I^2=0%) and specificity was also 1.00 (95% CI, 1.00–1.00; I^2=0%). In total, 505 cases of vasa previa were identified with only 11 false positives, and the pooled perinatal survival rate was 98.15% (95% CI, 88.30%–100.00%; I^2=0%). Seventeen of the 19 studies reported universal prospective screening, and two were conducted in the UK, demonstrating the feasibility of the approach across varied clinical settings.[48]

Overall, these findings indicate that prospective routine screening for vasa praevia at the second-trimester anatomy ultrasound, with targeted confirmation in the third trimester, is feasible and associated with very high detection rates, minimal false-positive results, and excellent perinatal outcomes. (Evidence Level 1a)

Due to the development of the lower uterine segment in the third trimester, between 10–30% of cases of vasa praevia detected in the second trimester will no longer be vasa praevia by the time of birth. Thus, the diagnosis should be confirmed with transvaginal ultrasound, CDI, and pulsed-wave Doppler at about 32 weeks.[1,2,59] Two recent large, multicentre, retrospective cohort studies in the US have evaluated the natural history of prenatally diagnosed vasa praevia in the second trimester. The first study[40] identified 165 pregnancies with vasa praevia, of which 43 (26.1%) resolved on subsequent ultrasound. The second study[41] reported on 136 antenatally diagnosed cases of vasa praevia, 19 (14%) of which resolved spontaneously at a median estimated gestational age of 27 weeks. The OR for resolution in those with the estimated gestational age of less than 24 weeks at the time of diagnosis was 7.9 (95% CI 2.1–29.4) after adjustment for confounding variables. Similar findings were reported in a UK-based prospective study of 53,648 pregnancies, in which the authors found that of 56 pregnancies suspected of vasa praevia at 20–22 weeks of gestation, 11 (19.6%) resolved by the third trimester.[15] These data

highlight the need for the diagnosis of vasa praevia to be confirmed during the third trimester, at 28 and 32 weeks of gestation, by an experienced ultrasound operator.[1,8,13,35-38] *[Evidence level 2+]*

5.3 Should we screen for vasa praevia?

Recommendation	Evidence quality	Strength	Rationale for the recommendation
There is accumulating evidence to support targeted screening for vasa praevia for women with a pregnancy resulting from ART and/or those diagnosed with a VCI and/or a low-lying placenta and in monochorionic twins at the 18^{+0}–20^{+6} weeks FAS scan.	**2+**	**C**	Antenatal screening of women at higher-risk of vasa praevia allows referral to specialised centres for ultrasound follow-ups and to discuss the corresponding management with the obstetric team in charge of patient care.

The largest study to date on perinatal outcome is based on a cohort of 155 women with vasa praevia that reported a 97% survival rate in cases of prenatal diagnosis compared with only 44% when the diagnosis was made during birth.[42] Median Apgar scores among survivors in the absence of prenatal diagnosis were poor (1 and 4 at 1 and 5 minutes, respectively). A prospective population-based cohort study using the Australasian Maternity Outcomes Surveillance System (AMOSS) found no perinatal deaths among the 58 cases diagnosed prenatally among the 63 cases with confirmed vasa praevia at birth.[43] A recent systematic review and meta-analysis[44], including seven studies with cases of vasa praevia with and without a prenatal diagnosis, found that the pooled weight intact neonatal survival rate in pregnancies without a prenatal diagnosis (n = 118) was 28.1% (95% CI 14.1–44.7) compared to 96.7% (95% CI, 93.6–98.8) in cases with a prenatal diagnosis (n = 226). Overall, lack of antenatal diagnosis of vasa praevia was associated with a substantially increased risk of adverse perinatal outcomes, with significantly higher odds of perinatal death and hypoxic perinatal morbidity compared with cases diagnosed antenatally (perinatal death: OR 25.4; 95% CI: 7.9-81.3 and hypoxic morbidity: OR 50: 95% CI: 17.3-144.8).[44] *[Evidence level 2++]*

Using national data and based on an 80% detection rate, the 2014 UK National Screening Committee (UK NSC) external review estimated that targeted screening of all twins and singleton pregnancies with at least one high-risk factor could reduce the perinatal loss rate by up to 150 cases per year.[45] The potential impact of screening for vasa praevia on the prevention of stillbirths in the UK was evaluated in a systematic review and meta-analysis examining the incidence of the condition.[10] Using UK birth statistics from 2021 and an estimated incidence of vasa praevia of 1 in 1218 pregnancies, the authors projected approximately 573 cases annually in the UK. Based on reported perinatal survival of 72.1% in pregnancies without an antenatal diagnosis, this corresponded to an estimated 160 potentially preventable stillbirths per year (95% CI 61–283), representing 5.30% of all stillbirths (95% CI 2.11–9.89%).[10,44] These estimates are consistent with projections from the UK National Screening Committee. However, the 2017[45] and 2023 (https://www.view-health-screening-recommendations.service.gov.uk/vasa-praevia) reports of the UK NSC recommended against all screening for vasa praevia because: "It is not known how many babies are affected in the UK, how accurate the screening is, and because of the risks of unnecessary preterm caesarean birth associated with a high false-positive rate and false reassurance in case of false negative test." By contrast, the SMFM,[35] the SOGC,[36,37], and the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG),[38] recommend examining the placenta and umbilical cord at the mid-pregnancy FAS in all pregnant women and performing a targeted screening in women with a risk factor for vasa praevia. *[Evidence level 4]*

Up to 80% of vasa praevia cases have one or more identifiable prenatal risk factors[14], and there has been accumulating epidemiologic evidence that screening protocols targeted at high-risk women could identify the majority of these cases.[46] A 2016 systematic review of the incidence and risk factors of vasa praevia including 13 studies (two prospective cohort studies, 10 retrospective cohort studies and one case–control study) and reporting on 569 410 women found that 83% of the 325 cases reviewed had one or more risk factor, including placenta praevia, bilobed placenta, succenturiate placental lobes, conception by ART and VCI.[47] For pregnant women with a VCI at the 18^{+0}–20^{+6} weeks FAS ultrasound examination, the number needed to screen to find one case of vasa praevia is 13, whereas it is 260 for those with a pregnancy conceived by ART.[47] A recent systematic review and meta-analysis of 779,845 pregnancies, including 505 with vasa praevia, found that the pooled sensitivity of standardised second-trimester ultrasound screening with third-trimester confirmation was 1.00 (95% CI 0.99–1.00; $I^2 = 0\%$), and specificity was also 1.00 (95% CI 1.00–1.00; $I^2 = 0\%$).[48] Results remained consistent after excluding studies at high risk of bias. *[Evidence level 2++]*

A retrospective cohort study of 51 pregnant women with risk factors for vasa praevia found that implementing a targeted screening protocol, including TVS, improved perinatal outcomes.[49] A recent retrospective cohort study of 189 singletons and 16 twin pregnancies diagnosed prenatally in a centre where all pregnant women are screened for vasa praevia at the second-trimester fetal anatomy scan found almost universal perinatal survival with no false-positive or false-negative diagnoses.[50] *[Evidence level 2+]*

A decision-analytic model to estimate the lifetime incremental costs and benefits of screening for vasa praevia in all twin pregnancies was found to be cost-effective in a study of approximately 132,000 pregnancies.[51] Similarly, a decision-analytic model found that TVS for vasa praevia is most cost-effective when performed for pregnancies resulting from IVF.[52] The results of an exploratory modelling study to estimate the effects of second-trimester, ultrasound-based antenatal detection strategies for vasa praevia in a hypothetical cohort of pregnant women have suggested that a targeted-based approach for women presenting a low-lying placenta could detect a substantial proportion of vasa praevia cases, while avoiding over-detection if the policy was based on ascertainment of VCI and requiring minimal changes to current clinical practice in the UK.[53] However, this proposed targeted strategy of prenatal diagnosis for vasa praevia only in pregnancies with low-lying placenta could potentially miss vasa praevia Type I cases, which are associated with VCI and account for almost 80-90% of vasa praevia cases.[3,4] In a UK-based study, the authors suggested a 2-stage screening strategy for vasa praevia screening, which involves identifying pregnancies with VCI and those with low-lying placentae, which can then be offered a TVS with CDI for confirmatory diagnosis.[11] *[Evidence level 4]*

Identification of the placental cord insertion at the routine FAS is easy and accurate, and does not add significantly to scan time, and requires little additional scanning skills for a trained operator.[1,8,13,35-38,46] In the USA, professional organisations, including the American Institute of Ultrasound in Medicine (AIUM), SMFM, and the American College of Obstetricians and Gynecologists (ACOG), recommend that the placental cord insertion site be documented when technically possible during the second- or third-trimester routine ultrasound examination.[35,54,55] These organisations also recommend a TVS examination if vasa praevia is suspected on transabdominal ultrasound, whereas the SOGC recommends that TVS should be considered for all women at high risk of vasa praevia.[40] *[Evidence level 4]*

A 2010 questionnaire survey of obstetricians and gynaecologists in England and Wales[56] and a 2019 population-based cross-sectional survey of Fellows of RANZCOG[57] showed a knowledge gap in risk factors for vasa praevia, which would inform a targeted screening policy. The data highlight the need to increase awareness of vasa praevia among healthcare professionals. There is also a need to ensure skill validation and quality control across the board, as hyper-specialisation in fetal medicine and obstetric scanning has limited the exposure of both MFM and sonographer trainees to the use of TVS, and placental and cord anomalies are not given the same status as other fetal anomalies by professional bodies providing training and continuing professional development.[58] *[Evidence level 4]*

Available data indicate that systematic screening for vasa praevia is associated with high detection rates, low false-positive rates, and nearly universal survival.[48] Thus, in settings with adequate personnel, ultrasound skills, and resources, it is appropriate to offer *routine* screening for vasa praevia. In settings where expertise or resources are limited, a risk-based approach is appropriate, with targeted screening of pregnancies with recognised risk factors, such as velamentous cord insertion or a low-lying placenta. Where there is diagnostic uncertainty or suspicion of vasa praevia, referral to a specialist centre for confirmation of the diagnosis should be considered. Finally, it is possible, even with skilled examiners, to fail to diagnose vasa praevia, and failure to diagnose vasa praevia should not be interpreted as negligent care. *[Evidence level 4]*

6. Care of pregnant women diagnosed with vasa praevia

6.1 How should women diagnosed with vasa praevia prenatally be cared for?

Recommendation	Evidence quality	Strength	Rationale for the recommendation
Women diagnosed with a vasa praevia should be provided with a coordinated multidisciplinary care approach and information about the condition and an emergency plan including emergency contact numbers.	**4**	**GPP**	**Follow-up and management by a specialist fetal medicine team provides the best support high risk pregnancies such as those with vasa praevia**
A decision for prophylactic hospitalisation from 30–32 weeks of gestation in women with confirmed vasa praevia should be individualised and based on a combination of factors, including multiple pregnancy, antenatal bleeding and threatened preterm labour.	**2+**	**C**	**Individualised management reduces the risk of unplanned emergency birth and the corresponding neonatal risks**
Asymptomatic women diagnosed with a vasa praevia, a singleton pregnancy and stable cervical length on TVS can be cared for as outpatients depending on their circumstances.	**2+**	**C**	**Asymptomatic women with a cervical length in excess of 2.5 cm have a low risk of preterm birth.**

The management protocols for vasa praevia recommended in the guidelines from the different professional organizations share similarities[28,39-41], but there are also notable differences based on national management protocols and healthcare practice in each region. Overall, the objective of the management of vasa praevia diagnosed during the second trimester of pregnancy is to prolong pregnancy safely while avoiding potential complications related to rupture of membranes or vessels before or during labour. Improved survival rates of over 98% have been reported when the diagnosis is confirmed antenatally by ultrasound, followed by planned caesarean delivery.[35, 48.] All guidelines recommend delivery between 34 and 37 weeks, depending on the clinical scenario. Recommending that pregnant women with confirmed vasa praevia in the third trimester be delivered by caesarean section is

intuitive and logical, and not based on RCTs but on observational data, decision analyses, and expert opinions.[59,60] *[Evidence level 4]*

Expectant management is the basis of antepartum care for most women with a vasa praevia, and pregnant women should be provided with a coordinated multidisciplinary care approach, including a fetal medicine consultant, a specialist midwife in fetal medicine care, and psychological support if required. Information about the condition and the reasons for the planned delivery method should be provided to prepare them for the procedure. *[Evidence level 4]*

Routine antenatal hospitalisation in a unit with appropriate neonatal facilities has been proposed from 30–32 weeks of gestation, but the evidence is weak, and the data are of low quality.[28,38] No study has shown a benefit of this strategy. However, the practice still varies widely between hospitals, healthcare providers, and between countries.[61] Furthermore, this approach poses considerable physical, social, psychological, and financial challenges for pregnant women and their families. A prospective population-based cohort study using the Australasian Maternity Outcomes Surveillance System found no difference in perinatal outcomes when vasa praevia was diagnosed prenatally between women hospitalised and those with no antenatal hospitalisation.[62] This management strategy needs to be adapted to the individual circumstances of women, such as the distance between their home and the maternity ward, and anxiety about starting labour at home. *[Evidence level 4]*

A retrospective cohort study of 109 women diagnosed and managed in a single centre found that women in the inpatient group were more likely to receive antenatal steroids (57.3 vs. 26.4%, $p = 0.002$) and were less likely to have an urgent caesarean birth (34.6 vs. 58.8%, respectively, $p < 0.001$) compared with the outpatient group with no difference in the rate of neonatal complications.[63] A retrospective cohort study of 89 pregnant women, including 72 (80.9%) electively admitted vs. 17 (19.1%) managed as outpatients, found no difference in the rate of short cervix or vaginal bleeding, in stillbirths or neonatal deaths, and the rates of neonatal intensive care unit admission.[64] However, the authors found a lower rate of admission in those with public insurance, and hospital admission was associated with earlier delivery, including scheduled deliveries, suggesting a disparity in management based on non-clinical confounding factors. *[Evidence level 2-]*

A recent systematic review and meta-analysis of 10 studies found no significant difference in perinatal mortality (OR 1.12; 95% CI 0.10–12.07) or morbidity between women managed as inpatients and those managed as outpatients.[65] Overall, outpatient care has been associated with excellent outcomes. Therefore, the benefit of routine hospitalisation in asymptomatic/low-risk women (no prior history of preterm birth, preterm contractions, or vaginal bleeding) remains unproven. *[Evidence level 2++]*

The purpose of hospitalisation is to allow for closer surveillance for signs of labour and a timely performance of caesarean birth before labour and/or before membrane rupture. A recent systematic review and meta-analysis of 25 cohort studies with 1167 pregnancies and 88 case series or reports with 130 pregnancies diagnosed with vasa praevia found that perinatal death, including stillbirth and neonatal death is uncommon after a prenatal diagnosis of vasa praevia (0.94%; 95% CI 0.52–1.70) and approximately half of the cases of perinatal mortality are not directly attributable to vasa praevia.[66] A systematic review of 1,109 prenatally diagnosed cases, including 1,000 singletons and 109 twins, reported a perinatal mortality rate attributable to vasa praevia of 1.1% (95% CI 0.6–1.9). All perinatal deaths occurred with unscheduled deliveries, and the perinatal mortality rate in twin pregnancies was markedly higher than that in singleton pregnancies (9.2% vs 0.2%, $P < 0.001$), accounting for 80% of overall mortality despite twins representing only 9.8% of births.[63] An institutional policy of routine hospitalisation was associated with a reduced need for neonatal transfusion and a lower perinatal mortality rate in twin pregnancies but not in singleton pregnancies (0% vs 0.5%, P = 0.31).[67] *[Evidence level 2++]*

Data on the use of TVS cervical length measurements in the management of vasa praevia are still

limited. A retrospective case-control study of 29 singleton pregnancies with a prenatal diagnosis of vasa praevia in the second trimester found that the rate of cervical length shortening is faster for women with an emergency compared with elective caesarean birth.[68] For each additional millimetre-per-week decrease in cervical length, the odds of emergency caesarean birth increased by 6.50 (95% CI 1.02–41.20). Similarly, data from a 2017 systematic review on the management of vasa praevia in twins have indicated that TVS cervical length measurements at 26–28 weeks of gestation may be useful for assessing the individual risk of preterm birth and the need for antenatal hospitalisation.[69] Data from the follow-up of women with placenta praevia indicate that a short cervical length (≤30 mm) measured at 28 to 34 weeks of gestation can assist in predicting the risk of emergency caesarean birth.[70] A UK study population of 26 830 singleton pregnancies including 21 diagnosed with a vasa praevia at 20–22 weeks of gestation, found that the 15 pregnant women who had an elective caesarean birth at 34 weeks of gestation had normal cervical lengths (greater than the 5th centile), whereas those who required emergency caesarean birth because of labour or rupture of the membranes had cervical lengths less than the 5th centile.[11] *[Evidence level 2+]*

6.2 Can vaginal birth ever be considered?

Recommendation	Evidence quality	Strength	Rationale for the recommendation
When the vasa praevia is located between 2 and 5 cm from the IO of the cervix, at the end of the third trimester a caesarean birth should be discussed with the parents as the safest option.	**4**	**GPP**	A 10 cm cervical dilation is required for a vaginal birth and vasa praevia at > 5cm from the IO can be consider safe for a vaginal birth.

When the diagnosis of vasa previa is confirmed in the third trimester, scheduled cesarean delivery is recommended, and labour and vaginal birth are contraindicated. There is limited information regarding the actual safe distance that a vasa praevia needs to be from the internal os to be confident that there is no risk for vessel rupture during labour and delivery that may lead to severe fetal hypoxic-ischaemic injury and consequent neurodevelopmental impairment. The 2 cm cut-off distance between the vasa praevia and the IO of the cervix that some have used for the antenatal diagnosis of the condition was extrapolated from the definition of a low-lying placenta,[34,54,] which, unless also presenting with a vasa praevia type III, is not associated with a direct risk to the fetus during labour. Considering that around term, the average biparietal diameter (BPD) of a fetal head is approximately 9.5 cm[71,] and thus a 10 cm cervical dilation must be achieved to accommodate a vaginal birth, a distance of 5 cm or greater from the internal os can be accepted to be a safe threshold for allowing vaginal birth.[72,73] Given a scarcity of evidence and case reports of perinatal death with unprotected fetal vessels beyond 2 cm from the internal os,[1] an RCT to investigate whether different distances between 2 and 5 cm for vasa praevia are associated with different risks of perinatal morbidity and mortality would be ethically unacceptable. *[Evidence level 4]*

Third-trimester antenatal fetoscopic laser ablation of the unprotected vessels overlying the cervix has been proposed as a potential antenatal management option for prenatally diagnosed vasa praevia. This intervention has the potential to remove the potential for vessel rupture, allowing for a successful vaginal birth at term, thus avoiding elective prematurity and caesarean birth associated with traditional management. However, the potential benefits of endoscopic laser surgery, including prolongation of pregnancy beyond 37 weeks and the possibility of vaginal birth, should be carefully balanced against the associated risks, notably a reported 10% risk of prelabour rupture of membranes and the uncommon but potentially serious complication of intraoperative haemorrhage, as well as against the risks and benefits of planned caesarean birth. In this context, it should be recognised that elective caesarean birth beyond 34–35 weeks' gestation is associated with minimal risks related to prematurity. Small case series

and case reports have shown that laser occlusion of type II or III vasa praevia is technically feasible and has demonstrated promising results in terms of feasibility, safety, and efficacy.[74-76] Little data is available as to whether it is safe, for example, to occlude a fetal umbilical vein, given that this one umbilical vein may be the only conduit of blood to the fetus. Access to this technique is limited to a few centres with experience of this procedure in other fetal conditions and does not apply to vasa praevia type (associated with VCI), which accounts for 80-90% of all cases of vasa praevia.[3,4] Fetoscopic laser ablation has considerable risks, including potential rupture of the membranes, rupture of the vessels, preterm birth, and even fetal death. This intervention should be considered experimental at this time and should be performed only under a research protocol with comprehensive patient counselling and institutional review board approval. *[Evidence level 3]*

6.3 At what gestation should planned delivery occur and how?

Recommendation	Evidence quality	Strength	Rationale for the recommendation
In the presence of confirmed vasa praevia in the third trimester, planned caesarean birth should be carried out prior to the onset of labour.	**4**	**GPP**	Planned caesarean birth protects the fetus from the consequence of ruptured vasa praevia during labour.
Where vasa praevia is present and labour starts or rupture of membranes occur at viable gestational ages, a caesarean birth should be performed without delay.	**4**	**GPP**	Labour may lead to premature rupture of the membranes and of a ruptured vasa praevia.
Timing of birth and use of corticosteroids should be tailored according to clinical symptoms. In the absence of risk factors for preterm birth and/or antenatal bleeding, planned birth at 35^{+6} to 36^{+6} weeks of gestation.	**2+**	**C**	Early iatrogenic near-term birth in asymptomatic women diagnosed with a vasa praevia provides the best balance between fetal maturity and the risk of unscheduled birth.

Gestational age at birth is the only other variable associated with perinatal outcomes in the management of vasa praevia. Similar to placenta praevia and placenta praevia accreta, vasa praevia is associated with an increased risk of spontaneous and iatrogenic preterm birth (RR 3.36; 95% CI 2.76–4.09).[77] Around a third of women diagnosed antenatally with a vasa praevia require unscheduled birth, with twin gestations nearly 3 times as likely to require unscheduled birth as singleton gestations (73.3% vs. 25.2%; P < 0.001).[67] In twins, this is likely to be due to other risk factors.[78.] In contrast, in singletons most preterm births are iatrogenic to prevent stillbirth and to deliver the fetus before the development of catastrophic complications during labour. There are no data on the use of tocolytic or cerclage in the case of preterm labour in women diagnosed with vasa praevia. *[Evidence level 4]*

Data from a decision analysis study comparing 11 strategies for delivery timing in a woman with vasa praevia found that delivery between 34 and 36 weeks of gestation balances the risk of preterm rupture of membranes, and subsequent fetal haemorrhage and death versus the risks of prematurity.[79] A systematic review and meta-analysis of 37 studies, 14 of which were included in a quantitative synthesis, found that among 490 neonates, there were two perinatal deaths (0.4%), both of which were neonatal deaths before 32 weeks of gestation.[80] The rate of neonatal complications decreased steadily from 32 weeks, then increased slightly at 37 weeks, suggesting that prolonging pregnancies until 36

weeks of gestation seems to be safe. *[Evidence level 2+]*

Other observational studies have found improved perinatal outcomes with scheduled delivery between 36 and 37 weeks of gestation, without an increase in perinatal mortality.[60]

As for other obstetric situations associated with a higher risk for late preterm birth, the administration of corticosteroids has been recommended in national guidelines.[38-41] Patients are often given steroids at the time of admission, at approximately 32 weeks. However, the overwhelming proportion of women admitted with a prenatal diagnosis of vasa praevia do not deliver within seven days of this steroid administration, with most delivering several weeks after. Thus, routine steroid administration is most often associated with inappropriate timing. As such, the timing of steroid administration in patients with a prenatal diagnosis of vasa praevia should be individualized. It is administered only to patients who are considered at high risk of delivery within the next 7 days. Since women with a prenatal diagnosis of vasa praevia will be delivered before 37 weeks of gestation, the patients should receive steroids within 7 days of planned delivery. Within this context, we refer to the recent Green-top Guideline No. 74 *Antenatal corticosteroids to reduce neonatal morbidity and mortality*.[81] Similarly, magnesium sulphate should be used when indicated.[82] *[Evidence level 4]*

7. Identification and management of women with previously undiagnosed vasa praevia in labour or at delivery

Recommendation	Evidence quality	Strength	Rationale for the recommendation
Ruptured vasa praevia is associated with high neonatal morbidity and mortality and, delivery should not be delayed while trying to confirm the diagnosis.	**4**	**GPP**	Fetal exsanguination occurs rapidly after rupture of a vasa praevia.
Emergency caesarean birth and neonatal resuscitation, including the use of blood transfusion, are essential in the management of ruptured vasa praevia diagnosed during labour.	**4**	**GPP**	Rapid (within 2 minutes of birth) neonatal blood transfusion reduces neonatal morbidity and mortality.

The classic presentation of unexpected vasa praevia in labour is painless vaginal bleeding associated with fetal heart rate abnormalities (decelerations, bradycardia, and sinusoidal fetal heart rate patterns) and often fetal death if urgent caesarean delivery is not performed (also known as Benckiser's haemorrhage). This occurs mainly when the cervix is effaced and dilated, and when the membranes rupture spontaneously or are artificially ruptured.[2,3] As the total fetal blood volume at term is approximately 80–100 ml/kg, the loss of what may appear as a relatively small amount of blood can have major implications for the fetus and is rapidly fatal.[3,7–10] The perinatal mortality rate and hypoxic morbidity in this situation are 25-fold and 50-fold higher, respectively, than in cases not diagnosed prenatally.[11] Despite urgent caesarean birth, survivors after rupture during labour of vasa praevia frequently have high rates of low Apgar scores, hypoxic-ischemic encephalopathy, and long-term neurodevelopmental impairment with severe psychological consequences to parents and families.[83] *[Evidence level 4]*

In cases of undiagnosed vasa praevia vaginal bleeding and fetal heart rate abnormalities, typically bradycardia, late decelerations, or a sinusoidal fetal heart rate pattern[1], the neonatal team should be called urgently to the obstetric theatre operating room, and there should be preparation for immediate

neonatal volume replacement and transfusion. A recent regulation 28 coroner's report to prevent future deaths (PFD) issued following a case of undiagnosed vasa praevia resulting in neonatal death, found that blood could not be administered because the blood was located 10 minutes away from the operating room.[84] The coroner recommends that Rhesus-negative blood in neonatal blood fridges should be stored less than 2 minutes away.[84] *[Evidence level 4]*

8. Clinical governance

8.1 Debriefing

Postnatal follow-up should include a debriefing that explains what happened, why it happened, and any implications for future pregnancy and mode of delivery.

8.2 Training

Raising awareness about vasa praevia is essential. Importantly, the clinical risk factors of vasa praevia should be addressed locally, including organising policies or guidelines to flag women at risk and arrange for them to see a specialist fetal medicine consultant when vasa praevia is suspected.

There should be appropriate training for ultrasound staff in the antenatal diagnosis of vasa praevia and in situ simulation educational intervention for obstetric emergencies such as the Practical Obstetric Multi-Professional Training (PROMPT).

8.3 Clinical incident reporting

There should be written protocols for the identification of and planning of further care for women diagnosed with vasa praevia.

9. Recommendations for future research

- National/regional epidemiological data are needed to define a relevant high-risk population and to assess the cost-effectiveness of screening for vasa praevia in service provision.
- Prospective screening studies are needed to evaluate the outcome of VCI and other structural anomalies of the umbilical cord in the absence of vasa praevia.
- Prospective multicentre studies evaluating the role of cervical length ultrasound in the management of vasa praevia are required.

10. Auditable topics

- Evaluation of local delivery management plans when a diagnosis of vasa praevia is made antenatally.
- Outcome and management of cases of vasa praevia at birth that were not diagnosed antenatally or during labour.
- Percentage of patients referred for TVS and CDI after identification of LLP/VCI at anomaly scan.
- Serial scans for patients identified as VP/VCI at anomaly scan.
- Percentage of pregnancies with vasa praevia that resolved at 28-32 weeks.

11. Useful links and support groups

- Vasa praevia raising awareness [www.vasapraevia.co.uk/the-experts/].
- The International Vasa Previa Foundation [www.vasaprevia.org].

- Royal College of Obstetricians and Gynaecologists. *Low-lying placenta after 20 weeks (placenta praevia). Information for you.* London: RCOG; 2018 [www.rcog.org.uk/media/z55dayvh/pi-placenta-praevia-placenta-accreta-and-vasa-praevia.pdf].
- UK National Screening Committee. The UK NSC recommendation on Vasa praevia screening in pregnancy. London: UK NSC; 2017 Screening for vasa praevia [www.legacyscreening.phe.org.uk/vasapraevia].
- The PROMPT Maternity Foundation (PMF) registered as a charity with the Charity Commission for England & Wales (Charity No. 1140557)

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Appendix 1: Explanation of grades and evidence levels

Classification of evidence levels

1++	High-quality meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a very low risk of bias
1+	Well-conducted meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a low risk of bias
1–	Meta-analyses, systematic reviews of randomised controlled trials or randomised controlled trials with a high risk of bias
2++	High-quality systematic reviews of case–control or cohort studies or high-quality case–control or cohort studies with a very low risk of confounding, bias or chance and a high probability that the relationship is causal
2+	Well-conducted case–control or cohort studies with a low risk of confounding, bias or chance and a moderate probability that the relationship is causal
2–	Case–control or cohort studies with a high risk of confounding, bias or chance and a significant risk that the relationship is not causal
3	Non-analytical studies, e.g. case reports, case series
4	Expert opinion

Grades of Recommendation

A At least one meta-analysis, systematic review or RCT rated as 1++, and directly applicable to the target population; or a systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population and demonstrating overall consistency of results

B A body of evidence including studies rated as 2++ directly applicable to the target population, and demonstrating overall consistency of results; or
Extrapolated evidence from studies rated as 1++ or 1+

C A body of evidence including studies rated as 2+ directly applicable to the target population, and demonstrating overall consistency of results; or
Extrapolated evidence from studies rated as 2++

D Evidence level 3 or 4; or
Extrapolated evidence from studies rated as 2+

Good Practice Points (GPP)

GPP Recommended best practice based on the clinical experience of the guideline development group.*

*on the occasion when the guideline development group find there is an important practical point that they wish to emphasise but for which there is not, nor is there likely to be any research evidence. This will typically be where some aspect of treatment is regarded as such sound clinical practice that nobody is likely to question it. These are marked in the guideline, and are indicated by **GPP**. It must be emphasised that these are NOT an alternative to evidence-based recommendations, and should only be used where there is no alternative means of highlighting the issue.

825 **Appendix 2: Flow diagram for ultrasound diagnosis and follow-up of women with vasa praevia.**

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Appendix 3: Abbreviations

ACOG = The American College of Obstetricians and Gynecologists
ART = Assisted reproductive techniques
BMI = Body mass index
CDI = Colour Doppler imaging
CL = Cervical length
FAS = Fetal anomaly screening
GSI = Grey-scale imaging
IO = Internal os
IVF = In-vitro fertilisation
LUS = Lower uterine segment
OR & CI = Odds ratio & confidence intervals
RCT = Randomised controlled trial
RR = Relative risk
TVS = Transvaginal scan
VCI = Velamentous cord insertion

Appendix 4: Glossary

Internal os: Opening between the uterine cervix and the corpus or upper uterine segment.
Low-lying placenta: When the lower placental edge is < 20 mm from the IO of the uterine cervix at any gestation > 16 weeks on ultrasound examination.
Lower uterine segment: part of the uterus between the cervix in the upper thicker uterine segment which undergoes circumferential dilatation during labour.
Placenta praevia: When the placental edge reaches or covers the IO of the uterine cervix at any gestation > 16 weeks on ultrasound examination.
Velamentous cord insertion: Describes an umbilical cord attached in the free placental membranes instead of directly into the chorionic or fetal plate placenta.

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The guideline will be considered for update 3 years after publication, with an intermediate assessment of the need to update 2 years after publication.

